G. M. REPP.

MITERING MACHINE.

APPLICATION FILED APR. 2, 1915.

1,179,140.

Patented Apr. 11, 1916.

5 SHEETS—SHEET 1.

Fig. 1.

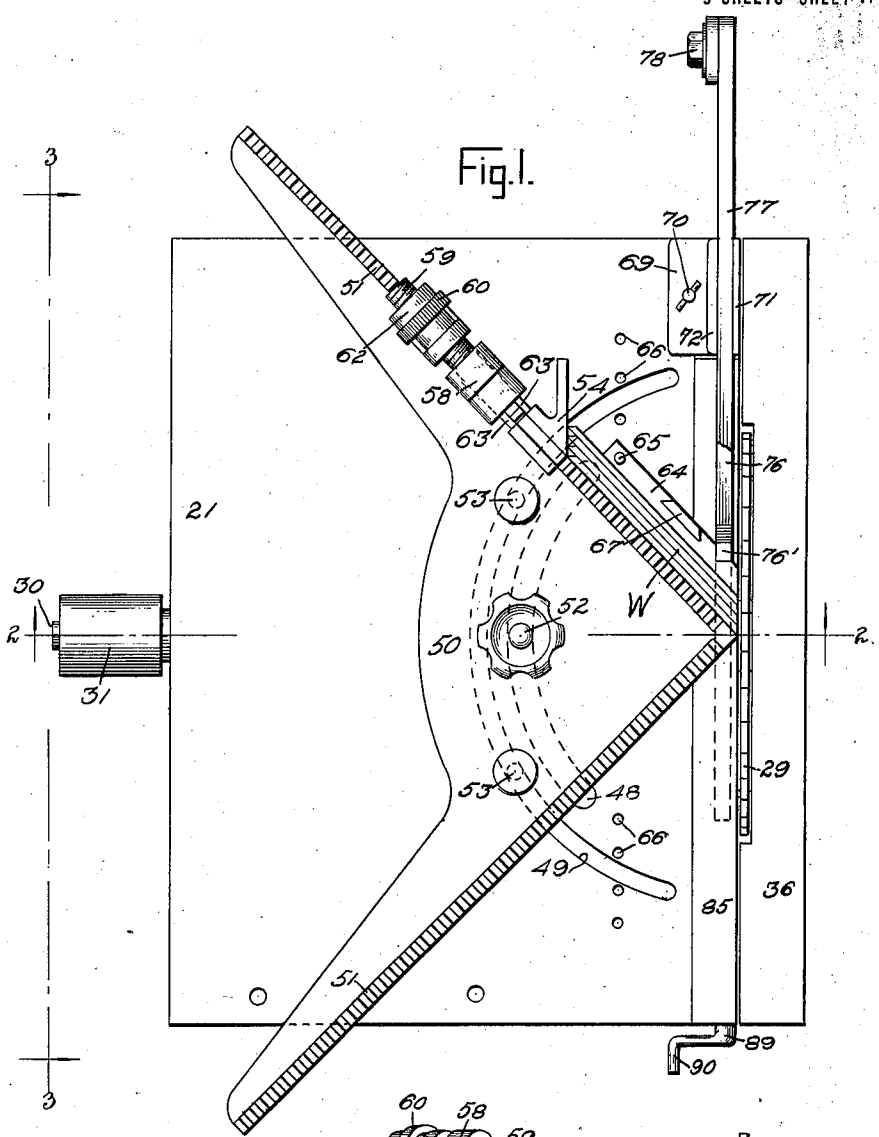
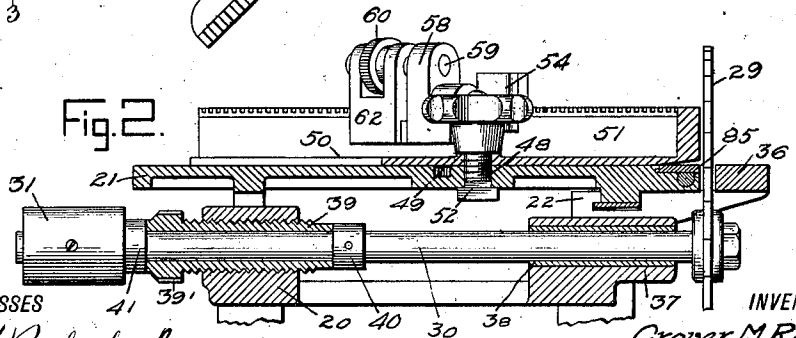


Fig. 2.



WITNESSES

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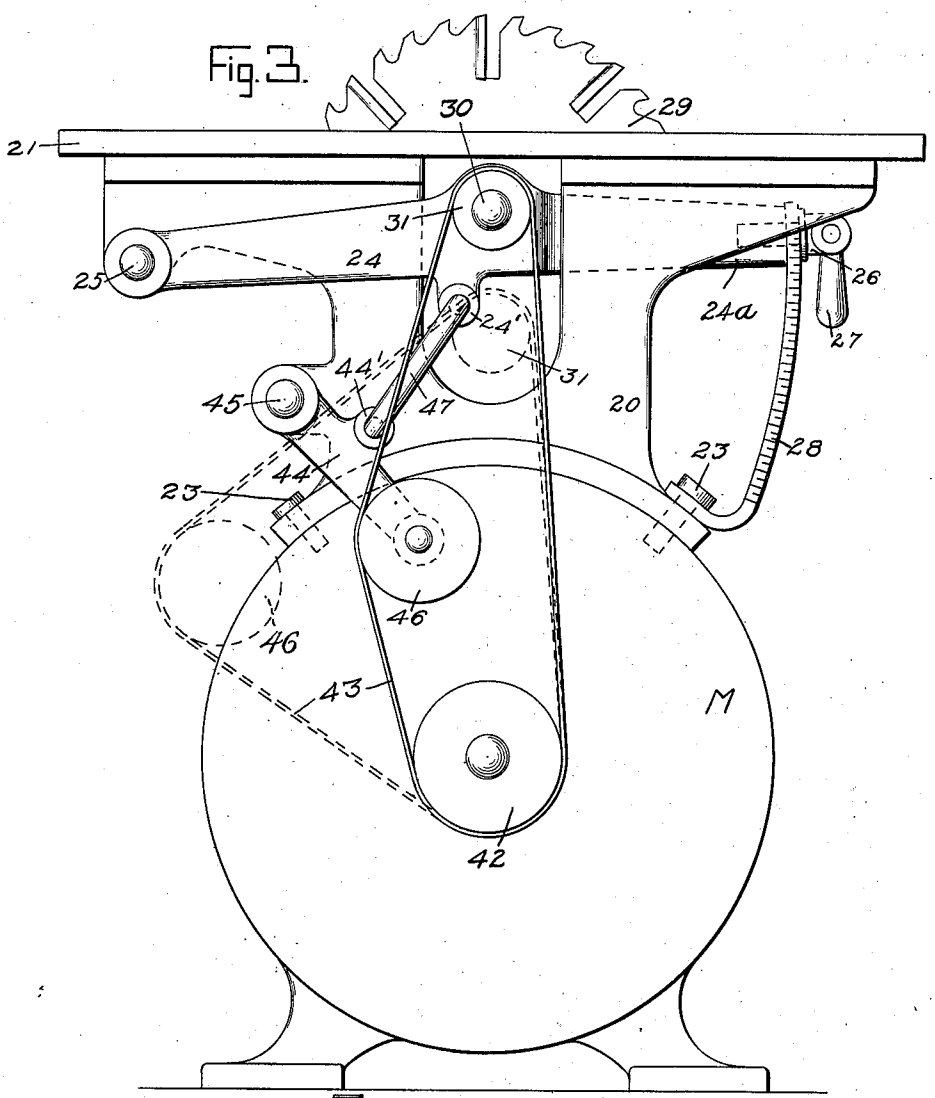
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5 SHEETS—SHEET 2.

Fig. 3.



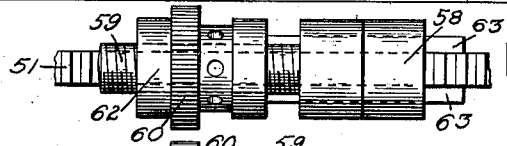


Fig. 4.

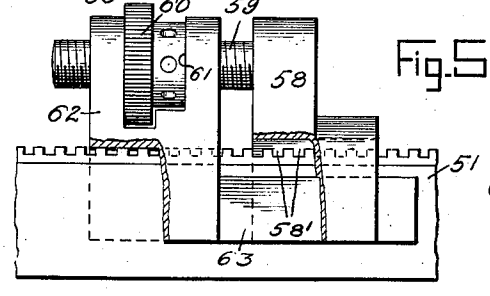


Fig. 5.

WITNESSES

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5 SHEETS—SHEET 3.

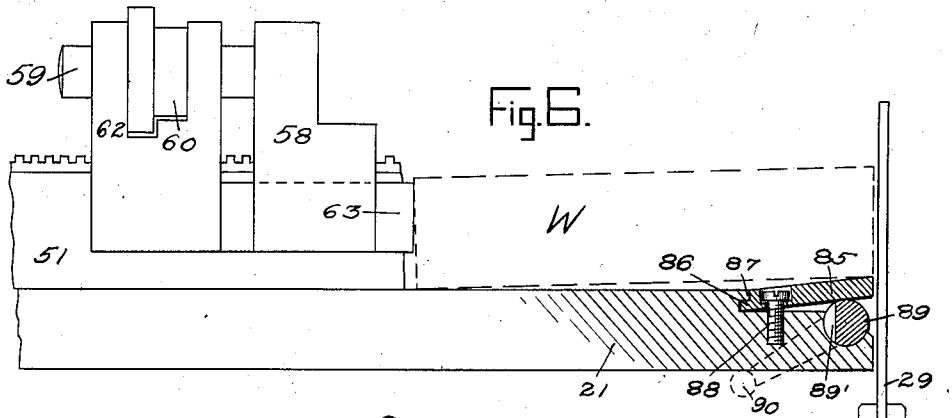


Fig. 6.

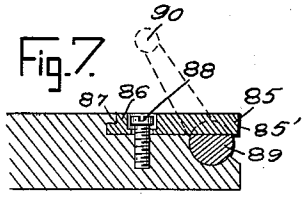


Fig. 7.

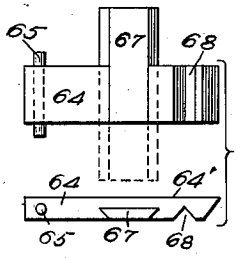
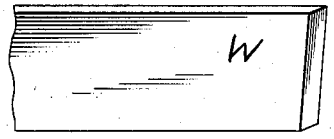


Fig. 9.

Fig. 8.



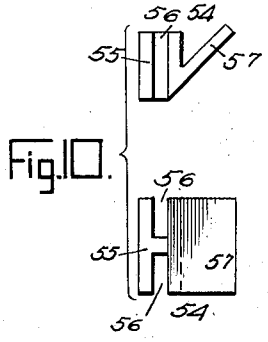


Fig. 10.

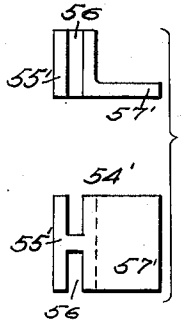


Fig. 11.

WITNESSES

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5 SHEETS—SHEET 4.

Fig. 12.

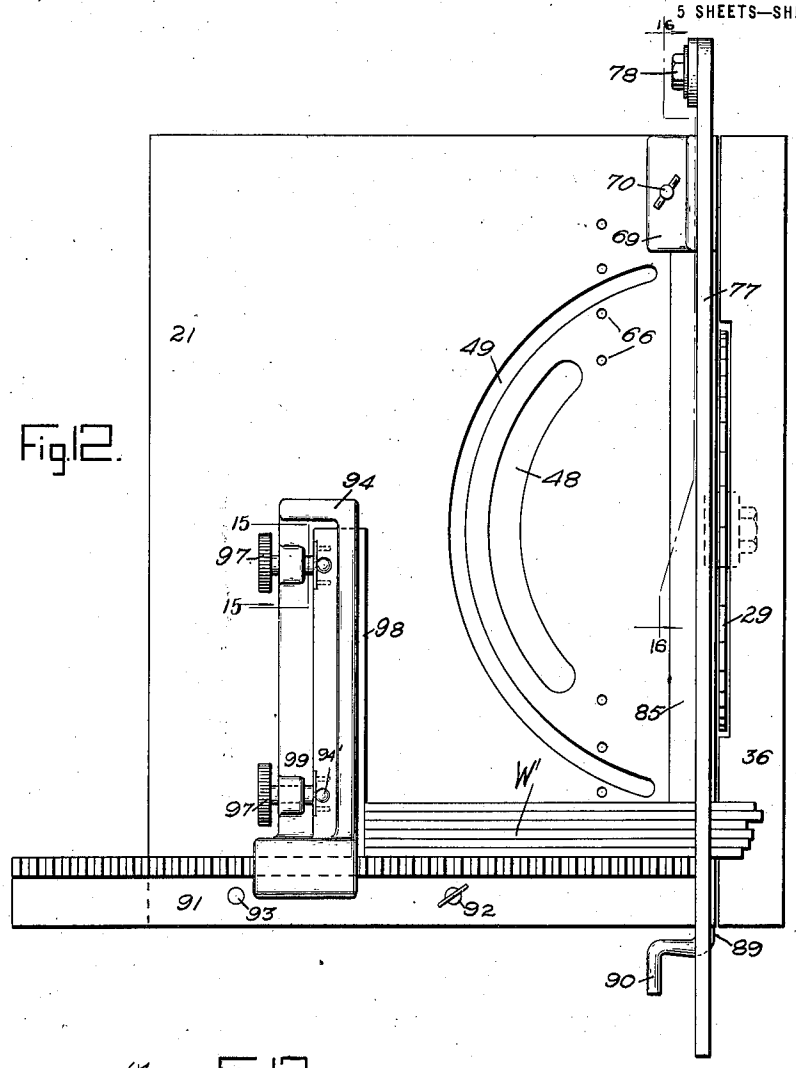


Fig. 13.

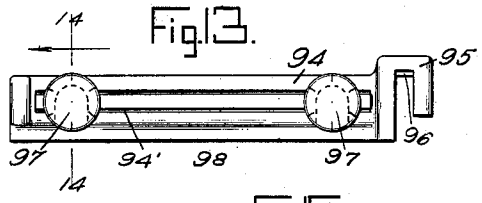


Fig. 14.

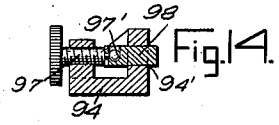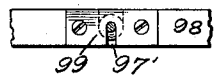


Fig. 15.



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5 SHEETS—SHEET 5.

Fig. 16.

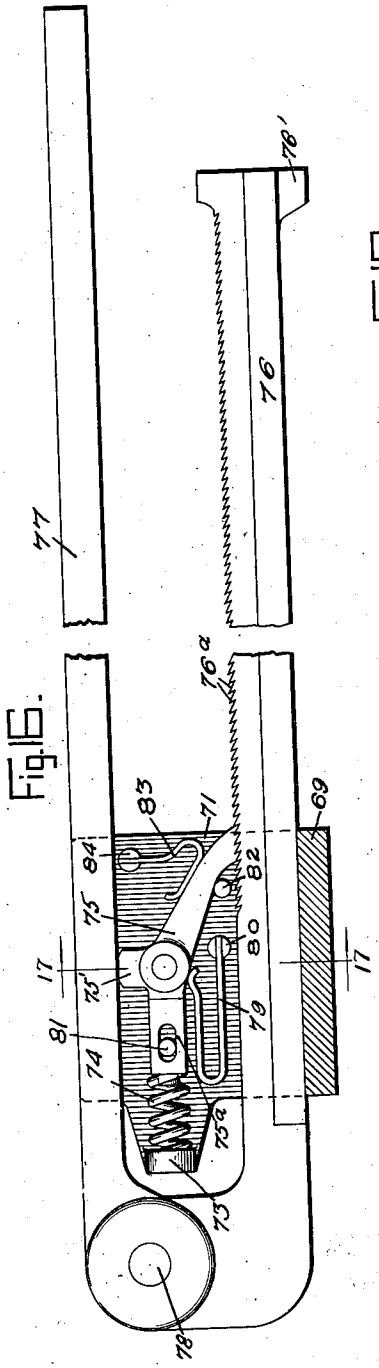


Fig. 19.

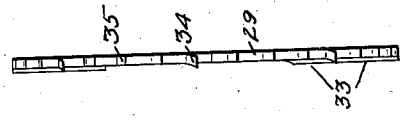


Fig. 18.

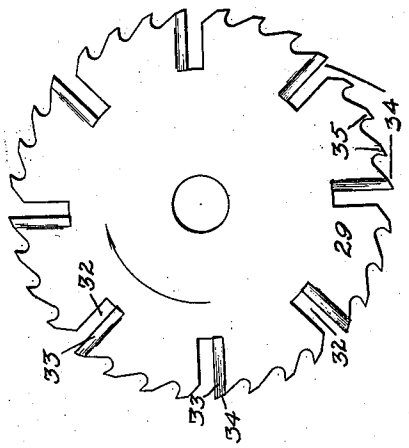
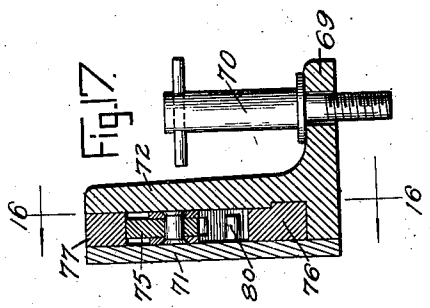


Fig. 17.



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UNITED STATES PATENT OFFICE.

GROVER M. REPP, OF NEW YORK, N. Y.

MITERING-MACHINE.

1,179,140. Specification of Letters Patent. Patented Apr. 11, 1916.

Application filed April 2, 1915. Serial No. 18,773.

To all whom it may concern:

Be it known that I, GROVER M. REPP, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county of New York and State of New York, have invented a new and Improved Mitering-Machine, of which the following is a full, clear, and exact description.

This invention relates to mitering machines and has particular reference to means for sawing rules or slugs for use in a printing office, but it is to be understood that its use is not to be so limited in all its limits of adaptabilities.

Among the objects of the invention is to provide a machine with delicately adjustable gaging devices for the manipulation of a plurality of blanks such as rules or slugs of metal and sawing or mitering the ends of all of them at the same time and in a precisely uniform manner.

Another object of the invention is to provide improved facilities for inclining the work with respect to the plane of the saw for the purpose of beveling the ends of rules or slugs or the like irrespective of the aforesaid mitering.

A further object of the invention is to improve the facilities for clamping the work in position in a reliable manner either by hand or by mechanical means.

A still further object of the invention is the provision of an improved form of metal saw adapted especially for providing a finished end surface of a metal slug during the action of cutting off the end thereof.

The foregoing and many other objects of the invention will hereinafter be more fully described and claimed and illustrated in the drawings forming a part of this specification in which like characters of reference indicate corresponding parts in all the views, and in which—

Figure 1 is a plan view of a preferred embodiment of the invention; Fig. 2 is a vertical transverse section of the same on the line 2—2; Fig. 3 is a left hand end elevation as viewed from the line 3—3 of Fig. 1; Figs. 4 and 5 are plan and side views respectively of the micrometer gage adjusting devices; Fig. 6 is a diagram of a portion of the table attachment for tilting the work; Fig. 7 is a view of the same mechanism with the tilting plate in horizontal position; Fig. 8 is one end of a blank or slug indicating the beveling as well as the mitering of the same; Fig. 9 shows two views of one of the hand vise devices; Fig. 10 shows plan and side views of one of the angle members for determining the uniform length of slugs or rules; Fig. 11 is a similar representation of a modified form of angle member for use in cutting slugs or blanks of different lengths simultaneously; Fig. 12 is a plan view showing a modified adaptation of the table top with a head gage as distinguished from the miter gage shown in Fig. 1; Fig. 13 is an elevation of the side gage device seen from the left in Fig. 12; Fig. 14 is a transverse section of the same on the line 14—14 of Fig. 13; Fig. 15 is another sectional detail of the same mechanism on the line 15—15 of Fig. 12; Fig. 16 is a side elevation of a mechanical locking device for the work being mitered or sawed, parts being in section on the line 16—16 of either Fig. 12 or Fig. 17; Fig. 17 is a transverse sectional detail of the same on the line 17—17 of Fig. 16; and Figs. 18 and 19 are inner side and edge elevations respectively of an improved form of metal saw.

The several parts of this device may be made of any suitable materials, and the relative sizes and proportions of the same, as well as the general design of the mechanism, may be varied to a considerable extent without departing from the spirit of the invention hereinafter more fully described and specifically claimed.

Referring more particularly to the drawings, I show at 20 a frame or supporting device of a substantial nature upon which is mounted a table top 21 in a substantially horizontal position and slidable to and fro in a horizontal plane upon the frame along guideways 22. The frame is shown herein as being supported upon the casing of a motor M as being typical of any suitable support and secured thereon by means of lag bolts 23 or their equivalent.

A yoke 24 is pivoted upon a transverse pivot or axis 25 at the rear end of the frame 20, said yoke having a forward extension 24^a with which coöperates a binding screw 26 having a handle 27 and coöperating with an arc-shaped gage bar 28 curved from the center of the pivot 25 and secured in any suitable fixed position as by means of one of the lag screws 23 to the frame. This gage bar obviously may be suitably graduated for the purposes of the invention.

At 29 I show an improved form of metal

saw fixed upon an arbor 30 journaled transversely below the table top 21 in the yoke 24 and to which arbor is secured a band pulley 31. The saw, shown best in Figs. 18 and 19, comprises a disk-like section having a plurality of radial slots 32 extending inwardly from the periphery, the rear edge of each slot consisting of a knife edge 33 extending forwardly and inwardly toward the movable table top. The outer end 34 of each of the knife edge features constitutes a saw tooth. Between adjacent teeth 34 I provide a plurality of saw teeth 35 of the same effective length as the teeth 34, but of slightly less width. In the action of the saw all of the teeth 34 and 35 coöperate to make the cross cut through the metal and simultaneously with such cross cut the knife edges 33 smoothly trim or shave the ends of the work on that side of the saw adjacent the movable table top. The slots 32 provide ample clearance for the passage or movement of the chips or shavings formed by these knife edges. On the side of the saw opposite the movable table top is a stationary shelf or table 36 constituting a guard for the saw and a receptacle for receiving the cut-off ends of the slugs or rules.

The saw arbor 30 is journaled in the frame 20 in a fixed bearing 37 having a bushing 38 at one side and at the other side it is journaled in a micrometer bearing 39 adjustably threaded in the frame. A collar 40 carried by or secured to the arbor takes the thrust of the shaft in one direction against one end of the micrometer bearing and a collar 41 takes the thrust at the other end of the bearing 39. By adjustment of the bushing 39, which may be delicately graduated by any suitable indicating marks on the head 39′, the saw secured rigidly to the other end of the arbor may be accurately positioned with respect to the table top.

The motor M may be located at any desirable place and is shown provided with a band pulley 42 from which a driving belt 43 operates over the saw arbor pulley 31. Since the saw supporting yoke 24 is adjustable, as already described, toward and from the motor, I provide means for maintaining the proper degree of tension upon the driving belt 43 in all positions of adjustment of the yoke. The means I show for carrying out this result includes an arm 44 pivoted at 45 to the rear portion of the stationary frame 20 and having on its front or rear end an idler pulley 46 bearing rearwardly upon the rear run of the belt. Said arm 44 is connected to the yoke 24 by means of a link 47 pivoted in lugs 24′ and 44′ constituting features of the yoke and arm respectively. The yoke lug is located below and at the rear of the axis of the arbor 30, and the arm lug is located between the pulley 46 and the pivot 45. The relative positions of these parts and the manner of connecting them together insure that while the yoke is adjusted up or down tending to loosen or tighten the driving belt, the idler pulley 46 automatically accommodates itself or compensates for such changes in tension upon the belt, the position of the idler pulley being determined directly from the position of the yoke.

The table top 21 is provided with an arc-shaped slot, 48, the center of curvature of which lies in a vertical plane coinciding with the axis of the arbor 30 and adjacent the plane of the saw. Said slot 48 extends forwardly and rearwardly from said vertical plane of the saw arbor. Surrounding the slot 48 and concentric therewith is formed a groove 49 in the upper surface of the table top.

At 50 I show what I term a miter angle, the same comprising a flat base or web bounded by a right angle coinciding with the center of curvature of the slot 48 and groove 49. The two sides of the miter angle 50, which bound or determine the right angle, comprise gage bars, each consisting of a straight vertical flange-like member 51 having rack teeth along its upper edge. A locking screw 52 acts through the web at the central portion thereof and serves to lock the miter angle at any desired position with respect to the center of curvature above described or the point of the angle, through coöperation with the slot 48. A pair of guide pins 53 carried by the miter angle extend into the groove 49 and thereby insure the miter angle being maintained with its angle point in a constant position irrespective of the angular adjustment of the entire member along the slot 48. When adjusted in its normal or mid position, as shown in Fig. 1, each of the gage bars 51 forms an angle of forty-five degrees with the plane of the saw. The rules or slugs indicated at W held or locked in position against the outer face of either gage bar will, therefore, be accurately mitered when brought into position to be acted upon by the saw.

Among the various means which may be adopted for gaging the length of the slugs W, I show at 54 a follower of the form shown best in Fig. 10 and comprising a head 55 having vertically opposed slots 56 and a blade 57 having a plane face arranged in a vertical plane at forty-five degrees from the plane of the gage bar upon which the head 55 may be fitted through either of the slots 56. In other words, as shown in Fig. 1, the follower 54 may be slipped directly downwardly upon either gage bar, the blade thereof extending outwardly from the transverse vertical center of the miter angle and in a plane precisely parallel to the

plane of the saw when said miter angle is adjusted in its normal position. It will be understood, therefore, that by the double significance of the head 55, the follower is reversible or adaptable for either of the gage bars and with the blade thereof extending either forwardly or rearwardly from the miter angle. It will be understood, moreover, that this follower is adapted to slide freely longitudinally upon either of the gage bars 51. To limit such slidable movement, however, and to determine by micrometer measurements, its exact position upon the gage bar, and hence the precise length of the slugs W being treated thereby, I provide the devices shown best in Figs. 4 and 5, the same including a stationary bolt casing 58 straddling the gage bar and having teeth 58′ seated directly downwardly and snugly into the spaces between the rack teeth of the gage bar. This bolt casing 58 carries at its upper end a threaded bolt 59 extending outwardly parallel to the gage bar and having a nut 60 with micrometer graduations adjustable thereon. This nut is fitted in a vertical slot 61 of a movable casing 62 likewise straddling the gage bar and having tongues 63 rigidly secured thereto and movable inwardly along opposite sides of the gage bar and within the legs of the stationary bolt casing. These tongues bear against the outer end of the head 55 of the follower 54. The teeth of the rack 51 are preferably formed accurately for pica measurements, and hence the stationary casing 58, when dropped into any position upon the gage bar, will always bear a definite standard relation to the plane of the saw. By graduating the nut 60 in the definite fractional sub-divisions of the standard pica measurement, the movement of the movable casing 62 and through its tongues 63 by micrometer adjustments of the nut, the follower will be positioned accurately in a corresponding manner without disturbing the pica adjustment of the fixed casing. Moreover, with the adjusting devices as herein shown and described, adjusted for fractional sub-divisions of the standard measurement, the stationary casing 58 may be lifted and adjusted longitudinally of the gage bar without disturbing the relative position of the movable casing and tongues. A group of slugs W may be held against the outer face of either gage bar 51 with their ends in alinement against the vertical plane face of the blade 57, and then, by sliding the table top with the work thereon rearwardly along the saw, the slugs will be mitered in precisely equal lengths and with their mitered ends perfectly smooth. By reversing the slugs along the machine, the other ends thereof will be mitered and without disturbing the length thereof.

As a means for clamping the slugs or rules in the position just indicated, I prefer to use a plate 64 (see Fig. 9) having a flat face 64′ adapted to lie snugly against the outermost slug W and movable around a vertical axis through a pin 65 adapted to fit at either end into any one of a series of holes 66 formed in the table top. The hole selected will be determined by the number of slugs being acted upon, and whether the plate lie flatly against the outer face of the outermost slug or not throughout its entire length, the point or free end of the plate will bind against the slugs holding all of the slugs normally against the gage bar. A thumb piece 67 is dove-tailed into the plate 64 and is slidable vertically so as to project from either edge thereof as does also the pin 65. It will be understood, therefore, that the plate 64 is reversible and adapted for coöperation with either of the gage bars. The rear face of the free end of the plate 64 is provided with a vertical right angular notch 68 with which any suitable mechanical gripping means or vise cooperates.

With reference now to Figs. 1, 16 and 17, the preferred form of gripping mechanism will be described. At the rear right hand corner of the sliding table top is secured a bracket 69 as by means of a set screw 70 and comprising parallel vertical spaced flanges 71 and 72. One of the flanges is formed with a transversely extending lug 73 constituting an abutment for a spring cushion 74 for a jointed dog 75 operating between said vertical flanges. A push bar 76 is slidably fitted between the lower portions of the flanges 71 and 72 and has a head 76′ cooperating with the notched end of the plate 64. A lever 77 lies substantially parallel to the push rod 76 and is pivoted to the rear end thereof at 78. The upper edge of the push rod is formed with teeth 76^a with which the forward and lower ends of the dog 75 coöperate when the lever 77 is forced downwardly upon the jointed portion 75′ of the dog against the force of a release spring 79 secured upon a fixed stud 80 within the space between the vertical flanges. The rear end of the jointed dog bears against said cushioning spring 74 and is provided with a transverse slot 75^a through which a fixed stud 81 projects and serves to hold this end of the dog from vertical displacement but allowing a certain amount of to and fro reciprocation. By reason of the fact that the spring 74 is of considerable strength, the stud 81 becomes for all practical purposes a substantially fixed pivot for the dog. At 82 is a guide lug which cooperates with the curved lower end of the dog and serves to lift the dog out of contact with the teeth 76^a when the spring 79 lifts the jointed portion of the dog when the

lever 77 is lifted. The dog is held in easy contact with the stud 82 by virtue of a light tension spring 83 secured to a fixed stud 84 and acting upon the opposite side of the dog from the lifting stud 82. With the bracket 69 secured in place as above described, vertical oscillation of the lever 77 will cause the dog to actuate the push bar forwardly step by step snugly gripping the work against the guide bar through the plate 64.

In Fig. 11 I show a modified form of follower 54′, the same having a head 55′ with slots 56 of the same nature and function as described in connection with Fig. 10, but having a blade 57′ arranged at a right angle to the plane of the guide bar with which this form of follower may be used when it is desired to cut or miter a group of slugs or rules of different lengths, or in the event that the follower is used with a guide bar arranged at right angles to the plane of the saw, this form of follower will provide for cutting slugs or rules into equal lengths.

As shown best in Figs. 6 and 7, I provide a simple and effective means for beveling the ends of the slugs transversely of their wider dimensions or in a plane at an angle to the mitering effected by the means already described. This beveling device comprises a plate 85 tiltable upwardly adjacent the inner face of the saw and having a beveled edge 85′ along which the saw operates and constituting the immediate support of the portions of the slugs being sawed or mitered. As shown in the drawings, the edge of the plate 85 remote from the saw is formed with a tongue 86 projecting beneath the lip 87 of the main table top, whereby this edge of the plate is held from vertical displacement and a set screw 88 countersunk below the upper surface of the plate 85 and extending loosely through a hole therein constitutes a positive means for limiting the movement of the plate. As a convenient and reliable means for tilting the plate 85, I provide a horizontal shaft 89 having a crank 90 at its front end. This shaft is formed with one of its sides reduced or flattened as indicated at 89′ whereby when the shaft is rotated from the position shown in Fig. 7 to that in Fig. 6, the plate 85 will be lifted or tilted to the extent of the ellipticity or eccentricity of the shaft.

Figs. 12 to 15 inclusive illustrate, in connection with the table top 21 and sawing devices, a right angularly disposed gage bar or head gage 91 adapted to be locked in position upon the table top by means of a set screw 92 or its equivalent in connection with a dowel pin 93. This head gage has a series of rack teeth similar to the gage bars 51 having pica measurements or any other suitable standard and coöperating with the same is a side gage 94 including a head 95 having teeth 96 coöperating with the rack teeth to hold the side gage in any definite position and at a predetermined distance from the plane of the saw and parallel therewith. A pair of micrometer adjustment screws 97 are journaled in the side gage 94 with their ends in the form of heads 97′ journaled in a tongue 98 adjustable laterally toward or from the plane of the saw in a slot 94′ in said side gage. These screws 97 are preferably graduated to precise sub-divisions of a standard pica measurement whereby, when the gage as a whole is located at pica measurements from the plane of the saw, the delicate adjustments of the tongue 98 will give any desired subdivisional measurements of the rules or slugs W′ held in place against the tongue and the side of the head gage 91 without disturbing any fixed pica measurement. Each screw head 97′ is locked in connection with the tongue by means of a slotted keeper 99.

I claim:

1. The combination of a table top arranged and held in a certain plane, a cutting member coöperating with the table top and acting in a plane at right angles to the table top, means to support a series of slugs upon the table top, a tilting plate supporting the end of the slugs adjacent the cutting member, means pivotally connecting to the table top the edge of said plate remote from the cutting member, and means acting upwardly upon the edge of the plate adjacent the cutting member to tilt the plate and thereby tilt the slugs upwardly from the plane of the table top.

2. In a mitering machine, the combination of a table top, a cutting member coöperating therewith in a plane at right angles to the plane of the table top, gage devices connected to the table top, means coöperating with the gage devices to hold a group of slugs upon the table top at definite distances from the plane of the cutting member, a plate extending along the table top adjacent the plane of the cutting member, means connecting one edge of the plate permanently within the plane of the top, and a rotary member coöperating with the opposite edge of the plate to cause the same to tilt upwardly and thereby tilt the slugs to cause the cutting member to bevel one end thereof.

3. In a mitering machine, the combination of a table top, a saw coöperating therewith and operating in a plane at right angles to the table top, gage devices adjustably secured to the table top and including a gage bar extending upwardly in a plane at right angles to the plane of the table top and at any desired angle to the plane of the saw, said gage devices also including a follower slidable along said gage bar, micrometer screw devices coöperating with said follower

to delicately adjust the same in predetermined degrees along the gage bar, and means to clamp a plurality of slugs at any desired angle against one wall of said gage bar, the length of said slugs being determined by the adjustment of said follower.

4. In a mitering machine, the combination of a table top having a flat surface, a saw coöperating therewith and in a plane at right angles to said surface, gage devices including a vertically disposed gage bar adjustable along the table top surface and having one end extending approximately to the plane of the saw, said gage bar having a series of teeth spaced from one another in precise equal measurements, a follower having a slotted head slidable along the gage bar and also having a plane-faced blade extending at an angle from the head and gage bar, and means for adjusting the follower at any predetermined degree along the gage bar, said adjusting devices including a stationary casing having teeth interlocking with the gage bar teeth and a micrometer screw acting in conjunction with said stationary casing against the follower.

5. In a mitering machine, the combination of a straight gage bar having a series of equally spaced teeth formed along its upper edge, a follower having a head slidable along the bar and having a blade extending outwardly from the head at a definite angle, a stationary casing straddling the gage bar and having teeth interlocking with the teeth thereof, a screw extending from said casing and parallel to the gage bar, a movable casing on the opposite side of the stationary casing from the follower, means acting between the screw and movable casing to vary the distance between the casings in predetermined degrees, and a member extending from the movable casing past the stationary casing and acting to delicately adjust the position of the follower with respect to the stationary casing.

6. In a mitering machine, the combination of a table top, a saw coöperating therewith in a plane at right angles to the plane of the top, a miter angle adjustably secured to the table top and including a pair of right angularly disposed gage bars having active faces arranged at right angles to the plane of the top and having the point of their angle closely adjacent the plane of the saw, length determining devices coöperating with the gage bars, and means including a plate pivoted to the table top and movable toward the active face of either gage bar to clamp the work in position.

7. In a mitering machine, the combination of a flat table top, a saw coöperating therewith in a plane perpendicular thereto, a miter angle comprising two right angularly disposed gage bars having the point of their angle adjacent the plane of the saw, means to adjust the miter angle along the plane of the table top and around the point of said angle so as to position the gage bars at any desired angle with respect to the plane of the saw, and means coöperating with the gage bars to hold the group of slugs in position thereagainst for treatment by the saw, said holding means including a plate pivoted at one end to the table top and having a thumb piece slidable transversely thereof, said thumb piece being longer than the width of the plate and adapted to project at either end beyond the edge thereof.

8. In a mitering machine, the combination of a table top, a gage bar adjustable thereon in any desired position and having a flat active face, length determining devices adjustable lengthwise of the gage bar, and holding means coöperating with the active face of the gage bar to grip a plurality of slugs thereto, said holding devices including a plate having a flat face adjacent the gage bar, a pivot pin projectable into any one of a series of holes formed in the table top, and a thumb piece having dove-tailed engagement with the plate and slidable transversely thereof parallel to the pivot pin whereby either end thereof may project beyond the flat face of the plate.

9. In a mitering machine, the combination of a stationary frame including a shelf, a yoke pivotally connected to the frame and movable up or down with respect to the shelf, a saw arbor and saw journaled in the yoke, the plane of the saw being closely adjacent the edge of said shelf, a table top slidable to and fro adjacent the opposite side of the saw from the shelf, means to secure a plurality of slugs in any desired position on the table top for operation by the saw, and a micrometer adjustable bearing for the saw arbor for determining the precise position of the saw with respect to the slidable table top and shelf.

10. In a mitering machine, the combination of a stationary frame, a table top slidable with respect thereto, a yoke connected to the frame and movable along the same toward or from the table top, a saw arbor journaled in the yoke parallel to the table top, a saw secured to the arbor, a driving shaft journaled for rotation around a fixed axis, a belt operated from the driving shaft and adapted to drive the saw arbor, and means coöperating with the yoke and belt to maintain a proper degree of tension upon the belt in all positions of adjustment of the saw.

11. In a mitering machine, the combination of a stationary frame, a motor shaft journaled therein, a driving pulley on the shaft, a table top slidable along the frame parallel to the motor shaft, a yoke connected to the frame and movable toward or from the motor shaft, a saw arbor journaled

in the yoke, a saw secured to the arbor, a belt pulley secured to the arbor, an endless belt running from the motor pulley to the saw pulley, an idler pulley coöperating with the belt between the aforesaid pulleys, and pivoted arm and link devices coöperating with said idler pulley and movable in unison with the movements of the yoke to maintain automatically a predetermined degree of tension upon the belt irrespective of the relative positions of the motor shaft and saw arbor.

12. In a mitering machine, the combination of a stationary motor casing, a stationary frame supported upon the casing, means to secure the frame to the casing, a yoke pivoted at one end to the frame and movable around such pivot toward or from the casing, a gage bar secured at one end to the means for securing the frame to the casing, the free end of the yoke being movable along the gage bar in predetermined degrees, means to clamp said free end of the yoke to the gage bar in any desired position of adjustment, a saw arbor journaled in the yoke parallel to the axis of the motor casing, and means to drive the saw arbor irrespective of the position of the yoke.

13. The combination of a table top, a saw coöperating therewith in a plane perpendicular thereto, gage devices secured to the table top at one side of the saw to determine the length of a group of rules to be mitered, and means to lock the rules in position, said locking means including a plate pivoted to the table top and a lever actuated push bar bearing forcibly against the plate.

14. In a mitering machine, the combination of a table top, a saw coöperating therewith in a plane at an angle thereto, gage devices secured to the table top adjacent the plane of the saw and serving to position a group of slugs on the table top to be mitered by the saw, and means carried by the table top to clamp the slugs in the determined position, said clamping means including a plate adapted to bear against the slugs, a bracket secured to the table top and including a pair of parallel spaced flanges, a push bar slidable between said flanges closely parallel to the plane of the saw, said bracket having a lug constituting a fixed abutment, a jointed dog extending between said abutment and the push bar, and means acting upon the dog to control the position of the push bar.

15. The herein described locking device for mitering machines, the same comprising a table top, a gripping plate pivoted thereto, a bracket secured to the table top and including a pair of spaced parallel flanges, a push bar slidable freely between said flanges and against the free end of the pivoted plate, said push bar having a series of teeth along one edge, a jointed dog having one end coöperating with said teeth, the other end of the dog being sustained in a substantially definite position between the flanges, a spring acting upwardly upon the joint of the dog to thereby shorten the effective length thereof, and means to depress said joint and lengthen the dog to thereby cause a step-by-step forward movement of the push bar.

16. In a mitering machine, the combination of a frame, a table top slidable along the frame, a yoke connected to the frame and movable toward and from the table top, a saw journaled in the yoke and adapted thereby to project more or less above the plane of the table top, means to fix the yoke in any desired position with respect to the frame, and means to secure a group of slugs upon the table top at any desired length with respect to the plane of the saw, said saw having a series of radially disposed slots extending inwardly from its periphery, the rear edge of each slot being deflected laterally toward the slug holding devices and having a shaving edge and the periphery of the saw between adjacent slots being provided with cutting teeth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GROVER M. REPP.

Witnesses:
GEO. L. BEELER,
PHILIP D. ROLLHAUS.