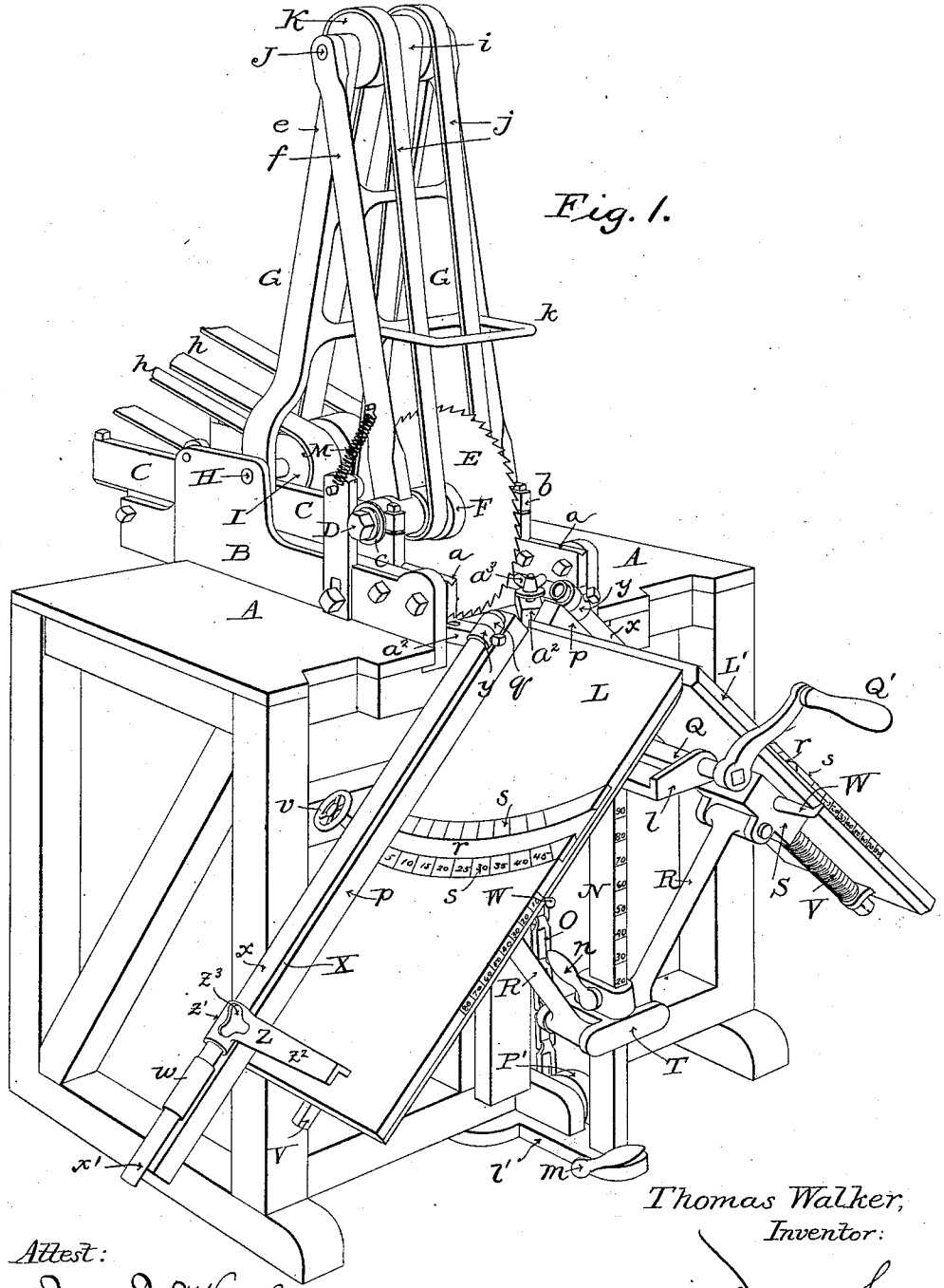
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T. WALKER.

UNIVERSAL JOINER.

No. 362,338. Patented May 3, 1887.

Fig. 1.



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Fig. 2.

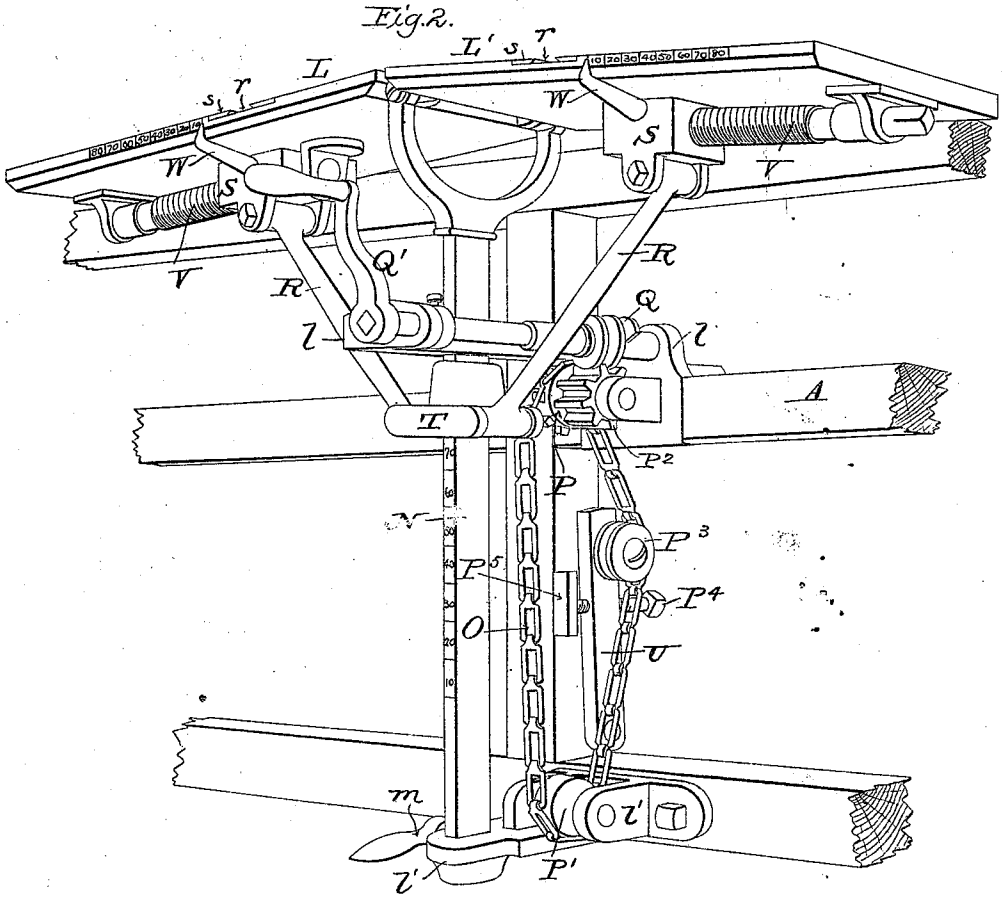
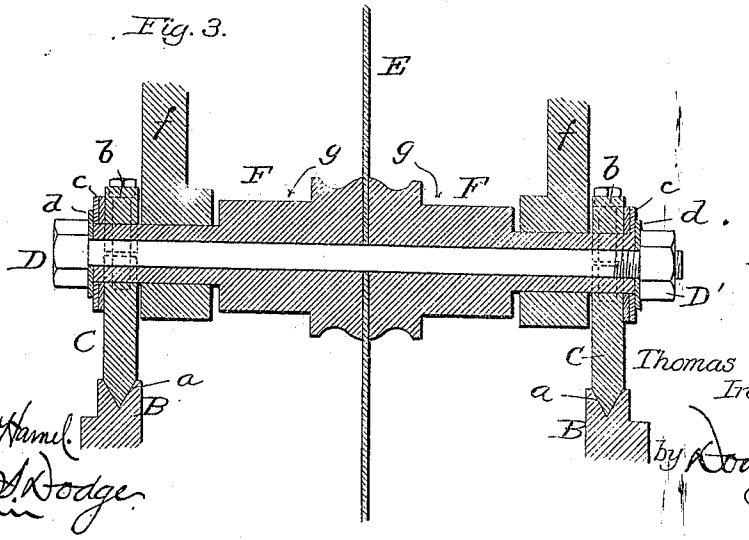


Fig. 3.



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Fig. 4.

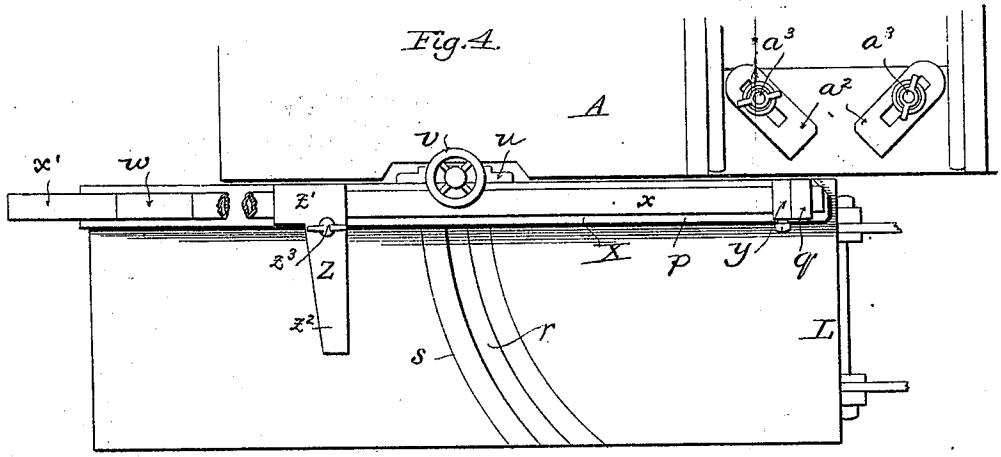


Fig. 5.

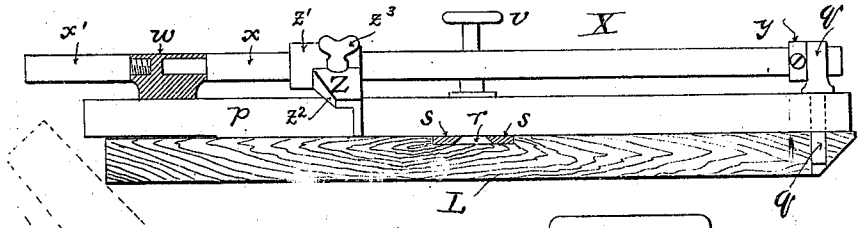


Fig. 6.

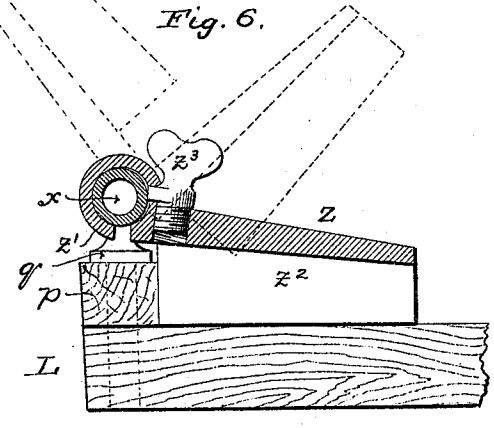
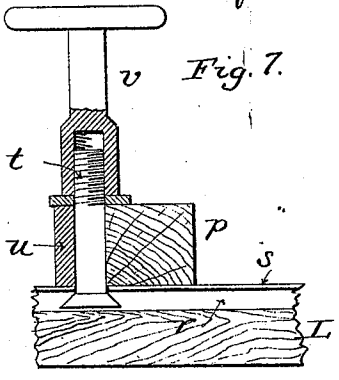


Fig. 7.



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UNITED STATES PATENT OFFICE.

THOMAS WALKER, OF PORTLAND, OREGON.

UNIVERSAL JOINER.

SPECIFICATION forming part of Letters Patent No. 362,338, dated May 3, 1887.

Application filed September 13, 1886. Serial No. 213,372. (No model.)

To all whom it may concern:

Be it known that I, THOMAS WALKER, of Portland, in the county of Multnomah and State of Oregon, have invented certain new and useful Improvements in Universal Joiners, of which the following is a specification.

My invention relates to that class of machines known as "universal joiners," and is designed for beveling, mitering, square sawing, &c.

The invention consists in various novel features of construction, but more particularly in a traveling saw and means for imparting motion thereto, whereby side strain is avoided and an extremely smooth and clean cut secured; in a work-table consisting of two leaves or sections capable of simultaneous and of independent adjustment from a horizontal plane to any desired angle; in means for varying the angle of inclination; in mechanism for bodily raising and lowering the work-table, and in guides for holding the work and presenting it to the cutting-tool.

In the annexed drawings, Figure 1 is a perspective view of a machine embodying my improvements; Fig. 2, a perspective view showing the mechanism for raising and lowering the work-table and varying the inclination of its leaves or sections; Fig. 3, a longitudinal section, enlarged, of the cutter-supporting devices; Figs. 4, 5, 6, and 7, detail views illustrating the construction of the work-supporting table.

A, Fig. 1, indicates a strong frame, which may in practice be of wood or of metal.

B indicates a secondary frame, mounted or formed upon the upper part of frame A and provided with V-grooved ways *a*, upon which slides a traveling saw-carriage, C.

The carriage C is suitably braced and stiffened, and carries at its forward end a saw-arbor of the construction best shown in Fig. 3, in which D indicates a central rod or bolt passing through the saw E and through two tubular sleeves, F F, the opposing end faces of which are enlarged to form clamping-disks to bear upon and hold the saw.

The ends of the sleeves F F pass through boxes *b* in the sides of the sliding carriage C, and constitute the journals of the arbor, the journals being elongated to permit a longitudinal movement through the boxes for the purpose of accurately adjusting the saw laterally. This adjustment is effected by placing washers *c* upon either or both the journals of the sleeves F F, outside of carriage C, and then tightening the central bolt or rod, D, the head of which bears against the outer end of the sleeve, while the nut D′ bears against the end of the other sleeve either directly or through the intervention of washers *d*, smaller than the journals of the sleeves F F. Thus it will be seen that by applying a suitable washer or washers to one or the other of the journals and tightening the central rod or bolt, the saw may be shifted toward the side to which the washer is applied a distance equal to the thickness of the washer, and held firmly against any further lateral movement by the bolt.

Whenever it becomes desirable to remove the saw from its arbor, it is merely necessary to remove the nut D′ and withdraw the bolt or rod D, whereby the saw is made free to slip out from between the clamping-disks.

For the purpose of giving motion to the saw and permitting it to travel back and forth with carriage C, I employ a jointed frame or connection, G, composed of two parts or members, *e f*, one hung or pivoted upon a shaft, H, journaled in frame B and carrying a triple pulley, I, which receives motion from the engine or other motor, and the other similarly pivoted or mounted upon the elongated ends of the arbor-sleeves F F, as plainly shown in Fig. 1. The upper ends of the parts *e f* are connected by a shaft, J, on which is mounted a triple pulley, K.

As shown in Fig. 3, the sleeves F F of the arbor are each formed with a pulley, *g*, so that when the saw is in position there is a band-pulley at either side of the saw. Two belts, *h h*, transmit motion from any convenient source to the outer sections of triple pulley I, while a belt, *i*, transmits the motion to the central section of the triple pulley K. Two belts, *j j*, extend around the outer sections of pulley K to and around the pulleys *g g* of the saw-arbor. By this arrangement of pulleys and belts, the sliding carriage C is permitted to move freely back and forth without in any manner affecting the action of the belts, and the saw is caused to run free and without

side strain upon it or its arbor, such as might be occasioned were the saw driven by a single belt at one side only. The arrangement set forth insures a perfect equalization of strains at both ends of all the shafts and pulleys. The travel of sliding carriage C is such as to carry the saw-blade E back and forth across a work-supporting bed or table, L L', upon which the work is held stationary while the saw operates upon it, the saw being drawn forward by means of a bail or hand-piece, *k*, on part *f* of jointed frame G, and returned by springs M M, or equivalent means, as indicated in Fig. 1.

It will of course be readily understood that ropes or bands may be attached to part *f* of frame G, carried backward over pulleys, and provided with weights, which will draw the saw and its carrying-frame back in essentially the same manner as the springs shown. If deemed desirable, anti-friction rollers may be employed beneath sliding carriage C, though ordinarily they are not deemed necessary; but the V-guides are perhaps less liable to permit lateral play of the carriage in its travel.

As shown in Figs. 1 and 2, the work-table or bed consists of two sections or leaves, L L', placed end to end and separated sufficiently to permit the saw-blade to pass through between them. Both the leaves or sections L and L' are hinged to the forked upper end of a vertical post or standard, N, which passes vertically through brackets *l l'* of the main frame A, and is clamped or fastened at any desired elevation by a binding-screw, *m*, or an eccentric provided with a suitable lever or hand-piece.

By loosening the clamping device, the post or standard N is made free to rise and fall, and thus the table may be raised and lowered to present the work to the saw, as desired, the face of the table being raised above the lower edge of the saw if it be desired to cut entirely through the wood, or lowered if less than a through-cut is desired, as in mortising, gaining, grooving, dovetailing, and like work.

For the purpose of conveniently raising and lowering and accurately adjusting the standard and table, I propose, in some cases, to employ a screw-stem passing through a correspondingly-threaded lug on the standard, journaled in suitable supports in the main frame, and rotated by miter-gear or equivalent means, or I may employ a pinion meshing with a rack formed upon or secured to the standard. In practice I prefer, however, to employ an endless chain, O, passing over a sprocket-wheel, P, and about a pulley, P', and attached to the standard, either directly or through suitable intermediate connection.

P^2, Fig. 2, indicates a worm-wheel which is mounted upon the same shaft that carries sprocket-wheel P, the two wheels being preferably cast integral. If desired, the journals may likewise be cast integral with the wheels P P^2, instead of employing a separate shaft.

Rotary motion is imparted to the worm-wheel when desired, by means of a worm or journaled in the upper bracket, *l*, or other convenient support, and furnished with a winch or handle, Q', by which to turn it. As the screw is turned in one or the other direction the wheels P P^2 are rotated to right or left and the chain caused to elevate or lower the standard and table, and when the desired adjustment is reached the standard is locked by the set-screw *m*, as mentioned.

To vary the inclination of the leaves or sections of the work-table, I employ brace-rods R R, which are jointed at one end to the under side of the table or to a block or bracket, S, at said point, and at the other end to a block, T, which slides vertically upon the post or standard. When the block T is employed, as I prefer it should be, the chain is attached thereto, so that if the chain be raised or lowered it shall carry with it the block, and if the block be at any time made fast to the post or standard shall also carry said post or standard up or down, the clamping-screw *m* being first caused to release the same.

To lock the block T upon the post or standard at any desired height, to retain the leaves or sections of the table at the proper elevation, I provide said block with a set-screw or clamp, *n*, as shown in Fig. 1.

Under the construction and arrangement of parts thus set forth it is only necessary to tighten the clamping-screw *m*, release the clamping-screw *n*, and turn worm or screw Q in order to raise or lower the block T, and thereby to vary the inclination of the leaves or sections L L' of the table, which rise and fall simultaneously and equally; or, if it be desired to raise or lower the table bodily without varying the inclination of the leaves, the set-screw *n* is tightened, set-screw *m* loosened, and the worm turned as before, whereupon the block T, standard, and table move with the chain. When at the desired elevation the post is clamped and the table made fast.

A tightener-pulley, P^3, is carried by a swinging arm or lever, U, and serves to tighten the chain O more or less, as required, the tension being regulated by a screw, P^4, which is passed through arm U and bears against a lug, P^5, on an upright of frame A, and serves to hold the arm and its pulley more or less over toward the chain, as shown in Fig. 1.

The face of post or standard N is graduated, and the graduations are numbered, as shown in Figs. 1 and 2, so that by noting the mark at the upper face of block T the angle of inclination of the leaves L L' of the work-table may be definitely ascertained, and the adjustment to a given degree of inclination greatly facilitated.

It is desirable to make the connection of rods R to the leaves or sections of the table as close to the pivot or hinge of the latter as practicable, in order that the leaves may be raised and lowered quickly and with slight rotation of the worm or screw Q; but for heavy work a support further from the pivot or hinge is required.

To provide for shifting the support outward

when necessary, I mount the blocks S each upon a heavy screw, V, journaled in bearings or hangers on the under side of the leaf or section of the table, as shown in Figs. 1 and 2. The outer end of each screw is squared to receive a wrench or key, by which to turn it, and when the screw is turned the block S, which is threaded to fit the screw, will be caused to move along the same from one end toward the other, the direction depending upon that in which the screw is turned. This construction also enables the operator to adjust the two leaves independently to different angles of inclination, thus enabling him to present two pieces of material simultaneously to the saw at different angles.

Each block S carries a pointer, W, which travels over a series of numbered graduations on the edge or face of the leaf to which the block is applied, and serves to indicate by the numbers or marks of the graduations the precise position of the block, so that the relative positions of the two blocks and the relative inclination of the two leaves or sections of the table may at all times be ascertained.

X X indicate work-supporting guides, each consisting of a bar, *p*, of wood or other suitable material, having at one end a stud or pin, *q*, Fig. 5, which enters a socket in the upper face of the leaves L at the end nearest the cutting-tool. The bars *p* extend lengthwise of the leaves L L′, and are adapted to swing upon the pin *q* as a pivot across the face of the leaves.

The leaves L L′ are each formed with a curved undercut slot, *r*, on their upper face, each slot being concentric with the pivot *q* on the leaf in which the slot is made. The edges of the slots are protected by plates *s*, which are provided with a series of graduations, the division-lines of which are radial to the pivots *q*, as shown in Fig. 1. The slots *r* are undercut or beveled for the reception of a headed bolt or stem, *t*, which passes upward through a bearing or socket, *u*, secured to the rear face of the bar *p*, and is threaded to receive a hand-nut, *v*. When the bar *p* is moved over the face of a leaf of the table and the desired angle is attained, the hand-nut *v* is screwed down upon the bolt *t*, and as the lower end of the nut *v* bears upon the upper face of the block *u* the turning of the nut will bind the arm *p* firmly to the leaf, and the guide will thereby be secured at any desired angle.

Journaled at one end in the head of pivot *q*, or in a separate bracket, and at the other end in a bracket, *w*, secured upon the bar *p*, is a cylindrical rod, *x*, which is free to oscillate or turn in its brackets. At one end the rod *x* is provided with a collar, *y*, and at the other end it is reduced in diameter to enter the bracket *w*, in order to prevent end-play. Upon the rod *x* is a stop Z, which is provided with a cylindrical hub, *z′*, to encircle the rod, and with a laterally-extending arm, z^2, which rests upon the table and supports the rear end of the material being operated upon, the stop Z being adjustable lengthwise upon the rod and secured in position by means of an eccentric, z^3, as shown in Fig. 1, or in any other suitable manner.

Now, according as long or short pieces are being cut, the stop Z may be moved lengthwise upon the rod to accommodate itself to the varying lengths, and is thus adapted to support the work, whether it be long or short.

When for any reason it is not desirable to use the stop Z it may be swung back upon or with the rod *x* out of the way, as shown in Fig. 6.

The bracket *w* for the rod *x* is threaded for a short distance to receive a section of rod *x′*, when it is found that rod *x* is not of sufficient length to allow the stop Z to be moved far enough to properly support the work. When the additional section, *x′*, is used the stop Z upon the rod *x* is either thrown back out of the way or else is removed from the rod and placed upon the extension *x′*.

The machine as constructed is peculiarly adapted for cutting gilded moldings, because, as the saw is not "set" and acts from the upper face downward through the material, no ragged or rough edge is left on the upper face of the material.

By my construction I am enabled to adjust the table so that the saw may cut entirely through the material, or only partially through. By the use of the adjustable leaves and the guides X X thereon, I can work with the utmost accuracy and secure a range of adjustment not heretofore secured, so far as I am aware.

The machine is specially adapted for cutting a compound bevel, which is accomplished by varying the inclination of the leaves and adjusting the guides carried thereby. Two pieces of material may be cut at different angles at the same time by varying the inclination of the two leaves.

Upon the bed A, opposite the pivotal ends of the bars *p*, are stops or blocks a^2, which are slotted longitudinally and secured to the bed A by means of thumb-screws a^3, as shown in Figs. 1 and 4. These blocks or stops a^2 are used when only one side or leaf of the table is being used, and they are made adjustable, so as to have the same general direction as the bars *p*. They are adapted to support the inner ends of the material lying against the bars *p*, in order to prevent vibration or wabbling of the same; or they may be so adjusted as to form stops, against which the end of the material may abut.

In using the term "cutter" I do not wish to be understood as meaning only a saw, as it is obvious that other devices may be equally well used in the machine—such, for instance, as slotters, molders, sandpapering-disks, &c.

Having thus described my invention, what I claim is—

1. In combination with bed B, sliding frame C, and pivoted A-shaped frame G, constructed substantially as shown and described, bolt D,

collars F F, mounted thereon and provided with elongated journals, boxes *b*, mounted on frame C, supporting the journals, cutter E, mounted upon the bolt D, between the collars F F, and a nut, D′, upon the end of bolt D, substantially as shown and described.

2. In combination with frame C, provided with boxes *b*, pivoted frame G, a bolt, D, collars F F, mounted thereon and provided with elongated journals, a cutter, E, mounted upon the bolt D, between the collars F F, a nut, D′, upon the end of bolt D, and washers *c d*, mounted, respectively, upon the journals and the bolt outside of the boxes *b*, as and for the purpose described.

3. In combination with post or standard N and leaves hinged thereto, a lifting device connected with the standard and independently-adjustable braces connecting the standard and the leaves, whereby the table may be bodily raised and lowered and its leaves adjusted independently relatively to the standard.

4. In a machine of the class described and shown, the combination of a post or standard, N, a table consisting of leaves L L′, hinged to said standard, a block movable upon the latter, connecting-bars extending from the block to the leaves of the table, a bolt or locking device serving to make the block fast to the standard or release it therefrom, and a lifting or elevating mechanism connected with the block and serving to raise or lower the table bodily or to raise and lower the leaves relatively to the standard as the block is secured to or released from the standard.

5. In combination with post N, leaves L L′, pivoted thereto, block T, mounted upon the post and adapted to be secured thereto, rods R R, pivotally connecting the leaves and the sliding block, and mechanism, substantially such as shown, connected with the sliding block T, for raising and lowering the same.

6. In combination with frame A, upright post N, mounted therein, leaves L L′, hinged to said post at its upper end, a block, T, mounted on the post, rods R R, pivotally connecting the leaves L L′ and block T, a fastening, *n*, for locking the block to the post N, a fastening, *m*, for locking the post to the frame A, and an operating mechanism connected to the block T, whereby the entire table may be raised and lowered bodily without changing the inclination of the leaves or the latter may be raised and lowered while the post remains stationary to vary their inclination.

7. In combination with post N, pivoted leaves L L′, a block, T, mounted loosely upon the post, a fastening, *n*, for securing the block to the post, blocks S upon the under side of the leaves, rods R, connecting the blocks S and T, mechanism for adjusting the blocks S, and mechanism, substantially such as shown, for raising and lowering the block T.

8. In combination with post N, leaves L L′, pivoted thereto, block T, mounted upon post N and adapted to be connected with or disconnected from the post, blocks S upon the under face of leaves L L′, rods R, connected at one end to the block T and at the other end to the blocks S, screws V, connected with the blocks S for adjusting the latter, pointers W, connected to the blocks S and adapted to move over a scale upon the leaves, and mechanism, substantially as shown, for raising and lowering the block T.

9. In combination with frame A and the vertically-adjustable table L L′, pulleys P P′, mounted upon the frame A, a chain or band, O, passing about the pulleys P P′ and connected with the table, a worm-wheel, P^2, mounted upon the frame and connected with wheel P or its shaft, and a worm, Q, mounted upon frame A and engaging with wheel P^2, substantially as shown.

10. In combination with frame A and the vertically-adjustable table L L′, pulleys P P′, mounted upon the frame A, a chain or band, O, passing about the pulleys P P′ and connected with the table, a worm-wheel, P^2, mounted upon the frame and connected with wheel P or its shaft, a worm, Q, mounted upon frame A and engaging with wheel P^2, and a belt-tightener pivoted to the frame A, substantially as shown.

11. In combination with frame A, provided with supports *l l′*, post N, mounted therein, a fastening, *m*, for locking the post to the frame, a block, T, mounted upon post N and provided with fastening *n*, leaves L L′, pivoted to post N and provided with adjustable blocks S, pointers W and a scale along their edge, rods R, connecting the blocks S S and T, a chain, O, connected to block T and passing about sprocket-wheel P and pulley P′, a worm-wheel, P^2, connected to sprocket-wheel P, and a worm, Q, meshing with wheel P^2, as and for the purpose described.

12. In combination with upright post N and the leaves L L′, pivoted thereto, the blocks S, adjustable on the under face of the leaves, a block, T, mounted upon the post and arranged to be connected therewith or disconnected therefrom at will, rods R, connecting the block T with the blocks S, and pointers W, secured to the blocks S and arranged to move over a scale upon the edge of the leaves, whereby the relative inclination of the leaves may be accurately read or determined.

13. In a machine of the class described, the combination, with a bed or frame, A, of an upright post, N, mounted thereon and adjustable vertically in relation thereto, a series of graduations upon the face of said post, a block, T, also mounted upon the post and adapted to be secured thereto, a device for locking the post to the bed or frame, leaves L L′, pivoted at their inner ends to the top of post N, and rods R, connecting the leaves and the block, all substantially as shown and described.

14. In combination with a traveling cutter, a table composed of the pivoted leaves L L′, adjustable vertically to and from the cutter and relatively to each other.

15. In a machine of the class described, the

combination, with a frame, A, of the adjustable leaves L L′ and the bars *p*, pivoted thereto and adapted to swing across the face thereof, substantially as shown.

16. In combination with bed or frame A, post N, mounted upon and adjustable vertically in relation thereto, and leaves L L′, pivoted or hinged to the upper end of said post, the leaves being adjustable independently of each other and adjustable together, with or independently of the post N, substantially as described and shown.

17. In combination with the pivoted leaves L L′, the bars *p*, pivoted thereto, rods *x*, journaled upon the bars *p* and adapted to be rocked thereupon, and stops Z, adjustable lengthwise upon the rod *x*, substantially as shown and described.

18. In combination with bed or frame A and the adjustable leaves L L′, bars *p*, pivoted to and adapted to swing across the face of the latter, and adjustable stops a^2, secured to the bed or frame A, to act in connection with the bars *p* to support the material being operated upon.

19. In combination with leaves L L′, bars *p*, pivoted thereto, rods *x*, journaled on the bars *p*, and brackets *w*, for supporting one end of the rods and threaded to receive an extension-piece, *x′*.

20. In combination with bed A, the leaves L L′, adjustable in relation thereto and provided with curved slots in their upper faces, having graduations along their edges, bars *p*, pivoted at one end to the leaves, rods *x*, journaled on the bars *p* and provided with adjustable stops Z, headed bolt or stem *t*, working in the slot and threaded at one end, and a hand-nut, *v*, screwing upon the stem *t* and bearing upon the arm *p*.

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