No. 734,185. PATENTED JULY 21, 1903.

S. LEVAN.

MITER CUTTING MACHINE.

APPLICATION FILED DEC. 16, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

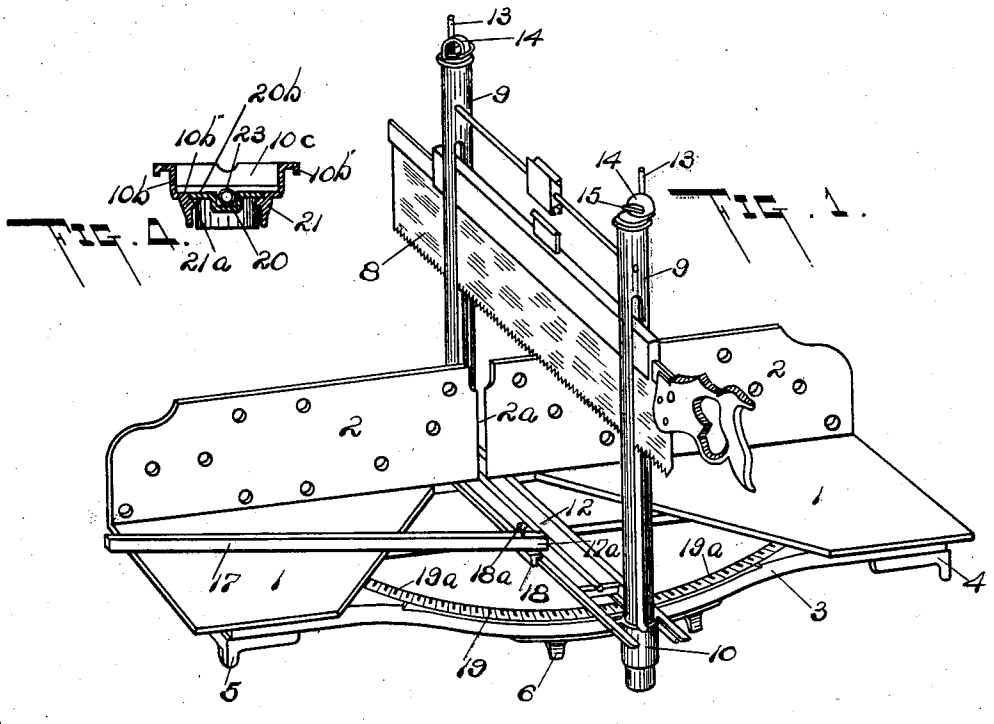
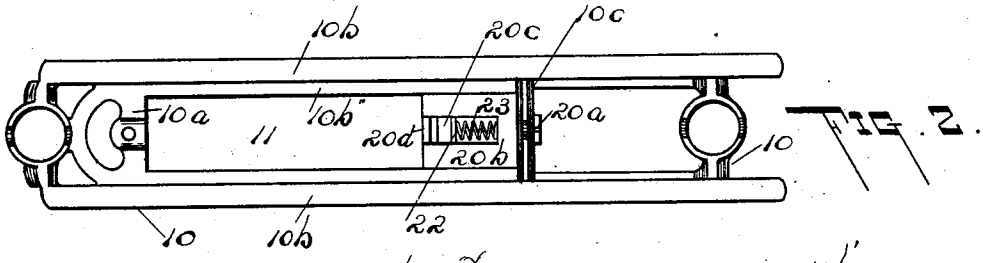


FIG. 1.

FIG. 2.



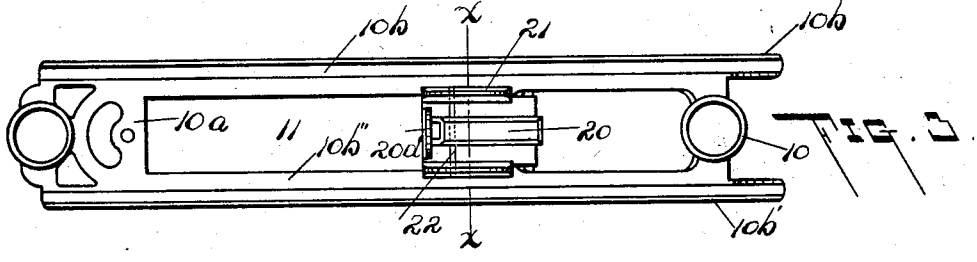


FIG. 3.

WITNESSES:

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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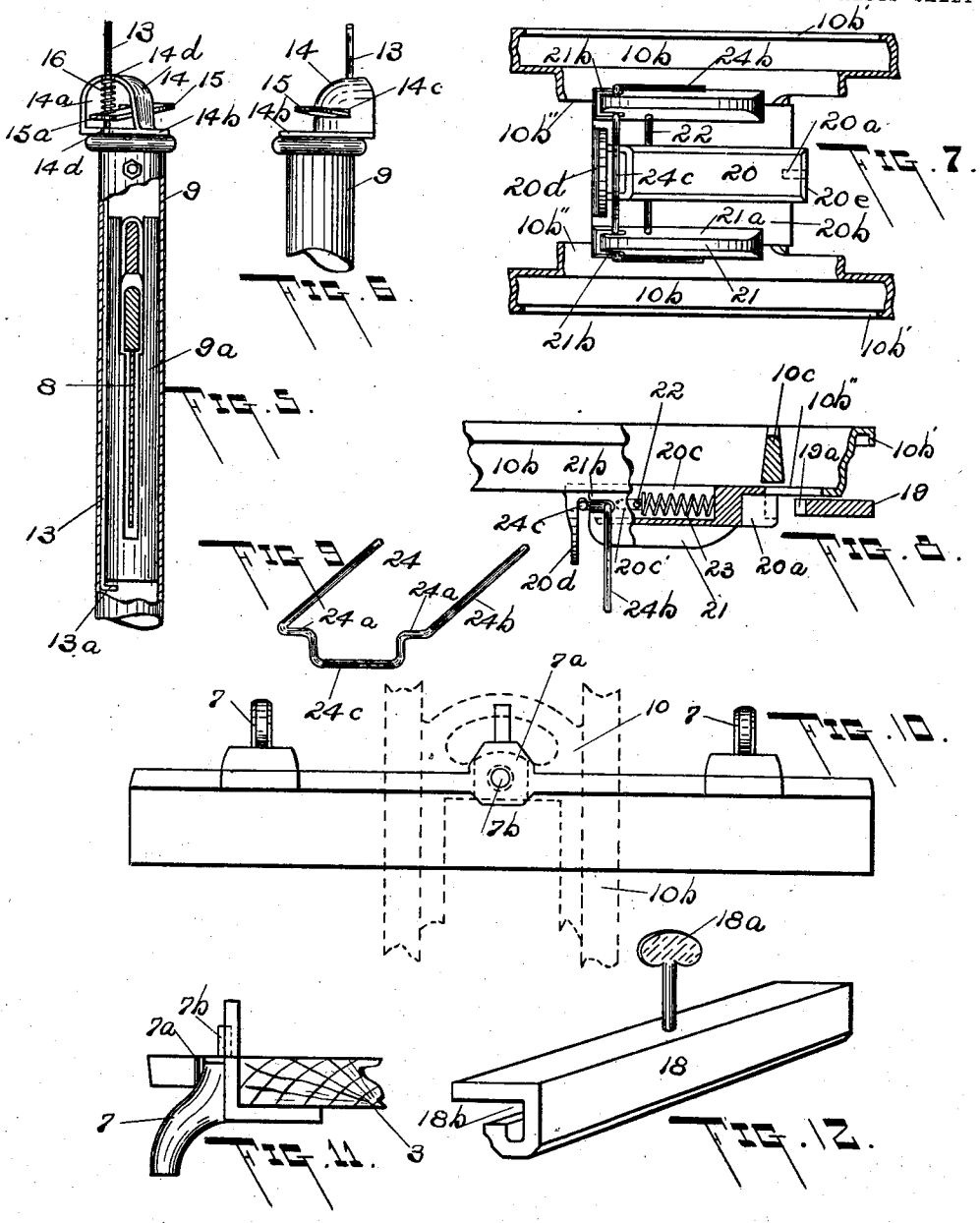


FIG. 5.

FIG. 6.

FIG. 7.

FIG. 8.

FIG. 9.

FIG. 10.

FIG. 11.

FIG. 12.

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No. 734,185. Patented July 21, 1903.

UNITED STATES PATENT OFFICE.

SAMUEL LEVAN, OF SAGINAW, MICHIGAN.

MITER-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 734,185, dated July 21, 1903.

Application filed December 16, 1902. Serial No. 135,421. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL LEVAN, a citizen of the United States, residing at Saginaw, in the county of Saginaw and State of Michigan, have invented certain new and useful Improvements in Miter-Cutting Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to miter-cutting machines, and more particularly to improvements in miter-cutting machines of the class described in Patent No. 646,228, issued to me March 27, 1900.

The improvements consist in means for cutting tenons on the ends of timbers, means for regulating the depth to which the tenons shall be cut, means for cutting skew or double miters, and for adapting a miter-cutting machine having a relatively small arc to cut wide angle-bevels, a simple device for locking the guides in position to cut any bevel, and a pivot arrangement whereby the saw may be swung through the full arc with a minimum opening in the back of the miter-box.

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

Figure 1 is a perspective view of a miter-box having my improvements. Fig. 2 is a top plan view of the pivoted frame in which the saw-guides are secured with the latch in place. Fig. 3 is a reverse view of the same. Fig. 4 is a cross-section on the line xx of Fig. 3. Fig. 5 is an elevation, partly in section, of the device for regulating the depth of the cut. Fig. 6 is a detail pertaining to the same. Fig. 7 is a bottom view of the locking device. Fig. 8 is an elevation of the same, partly in section. Fig. 9 is a detail of the lever for operating the latch. Fig. 10 is a plan view of the back pair of legs with a portion of the pivoted frame dotted in position. Fig. 11 is an end view of the back pair of legs. Fig. 12 is a detail of a sliding block.

My invention has a work-table 1 and a back 2, secured to a light framework 3, supported by pairs of feet 4 and 5 at each end and pairs of feet 6 and 7 midway the front and back. The framework may be of metal and the feet formed integral with it; but in practice I prefer to make it of wood and secure the feet to it by screws or otherwise.

The saw 8 is guided in a pair of blocks 9^a, vertically slidable in tubular slotted standards 9. These standards are fixed at their lower ends in a metal frame 10. Passing through a bridge 10^a in front of the rear standard is a pivot 7^b, carried by a lug 7^a, midway between the back pair of feet 7. The center of the pivot 7^b lies in the plane of the back 2. The saw works in a narrow slit 2^a, and when it is swung through an arc to make a bevel cut its pivoted center lies always in the plane of the back. There is therefore no lateral movement of that part of the saw that passes through the slit 2^a, and the slit may therefore be very narrow. This feature of my invention permits of cutting very accurately small pieces that could not be held in place if the slit 2^a were wide.

The frame 10 consists of two parallel bars 10^b, substantially Z-shaped in section, connected at the ends where the standards are secured and also by a rib 10^c, near the position of the locking device. An opening 11 is left between the side bars, through which a timber may be passed up from below for mortising its ends or cutting tenons thereon. This opening is closed by a wooden block 12 when not in use.

To quickly adjust the device for limiting the depth of cut, I provide within the standard 9 a vertical rod 13, having its lower end 13^a bent horizontally to form a stop for the guide-block 9^a, as is shown in Fig. 5. A cup 14, with a mouth 14^a and a flanged bottom 14^b, is secured to the top of the standard. It has holes 14^d through its top and bottom to guide the rod 13. A stiff metal strip 15, having a hole 15^a, through which the rod passes, projects through a slot 14^c in the cup opposite its mouth. The rod is free in the strip only when perpendicular to it.

A helical spring 16 on the rod between the top of the cup and the strip causes the strip normally to bind on the rod. By pressing down the outer end of the strip 15 it is brought perpendicular to the rod 13, which may be lowered easily. When the strip is released, the rod cannot be lowered, although it can be raised.

I prefer to make the device for holding the rod as shown and described; but it is appar-

ent that a guide for the rod and a clamping-strip held normally at an angle to bind on the rod are the essential features.

To permit the cutting of skew bevels or double miters, I provide a pair of bars 17, of which one is shown in Fig. 1. One end of the bar is secured by a thumb-screw 18^a to a block 18, slidable on the side bar 10^b of the frame 10. These blocks have longitudinal grooves 18^b, adapted to engage the top flanges of the side bars, which have downward flanges $10^{b'}$ on their outer edges. The inner ends 17^a of the bars reach to the blade of the saw. These bars may be set to support the work at any angle with the back 2 for cutting them beveling in two directions when the saw is swung to any angle of its arc. The bar 17 may also be clamped at any angle with the saw and used as an auxiliary back for cutting an angle greater or less than that permitted by the swing of the frame 10.

The angles to be cut are measured on a quadrant 19, graduated to degrees each way from the center, fixed to the framework 3 beneath the pivoted frame 10. The quadrant has a deep slit 19^a on its inner side at each degree-point, into which fits a knife-blade 20^a on the latch 20, carried by the pivoted frame 10.

The latch 20 consists in a plate 20^b, having a depressed longitudinal recess 20^c and a downward flange 20^d at the rear end. It is slidably held between the lower flanges $10^{b''}$ of the side bars of the frame by inward flanges 21^a on depending lugs 21, integral with the side bars 10. The latch is secured to the frame by a pin 22, passing through slotted holes $20^{c'}$ and fixed in the lugs 21 at its ends. A compressible coiled spring 23 for operating the latch is held in the recess between its front end and the pin 22. A forwardly-extending guiding-flange 20^e projects under the quadrant.

To operate the latch, I provide a double bell-crank lever 24. (Shown in Fig. 9.) It is supported by its trunnions 24^a in slots 21^b in the rear ends of the lugs 21. When the latch is forward, the ends 24^b of the lever are parallel to the side bars 10^b, as in Fig. 7. By pulling down either end the loop 24^c of the bell-crank lever is brought to bear on the flange 20^d, forcing the latch backward against the spring 23, as shown in Fig. 8. The latch will stay in this position till the lever is turned up again.

By the means above described I have provided a miter-cutting machine in which may be cut all the ordinary forms of bevels and which, in addition, will cut tenons on the ends of timbers, double or lap miters, and also angles not ordinarily permitted by the swing of the miter-saw. I have provided simple and easily-operated devices for regulating the depth of cut and for securely locking the saw to cut at any angle with the back. I have, moreover, reduced to a minimum the opening in the back for the passage of the saw, thereby adapting the machine for use in cutting very small pieces, that could not be held in place if the opening were large.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A miter-cutting machine comprising in combination a supporting-framework; a work-table; a back at right angles to the table; a metal frame formed with a vertical opening adapted to receive the ends of timbers for tenoning, said frame being movable about a pivot in the plane of the back; a removable wooden block adapted to fill the opening in the frame; a block slidable lengthwise on the side of the frame; a bar pivoted to said slidable block; a graduated quadrant under the frame, said quadrant having an interior radial slit at each graduation; a spring-actuated latch slidable lengthwise said frame, said latch having a projecting blade adapted to fit the slits in the quadrant and hold the frame stationary; said latch being normally held by its spring to engage the quadrant; means for sliding the latch against the action of the spring and for automatically holding it out of engagement with the quadrant; a vertical tubular standard fixed in each end of the frame; a saw-guiding block slidable vertically within each standard; a vertical rod within and extending above each standard, said rod having its lower end turned horizontally under the guiding-block; a guide for the rod at the top of the standard; a metal strip formed with a hole through which the rod passes freely only when perpendicular to the strip, said strip being movable about a fulcrum in proximity to said guide; and a spring to hold the strip normally oblique to the rod.

2. In combination with a miter-cutting machine of the class described a frame carrying vertical standards having sliding guide-blocks therein, said frame being pivoted at a point between said standards to turn about an axis in the plane of the back of the miter-cutting machine.

3. In combination with a miter-cutting machine of the class described having a frame carrying vertical standards with sliding guide-blocks therein; a vertical opening in the frame adapted to receive the ends of timbers for tenoning; and a removable wooden block adapted to fill said opening.

4. In combination with a miter-cutting machine of the class described having a swinging frame carrying vertical standards for guiding the saw; a block slidable lengthwise on the side of the frame; a screw for fixing the block on the frame; and a bar pivotally secured to the block.

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

SAMUEL LEVAN.

Witnesses:
P. M. HOLDSWORTH,
JAMES C. HANSON.