2 Sheets—Sheet 1.

H. BRAND.

TENONING-MACHINE.

No. 169,336. Patented Nov. 2, 1875.

Fig. 1.

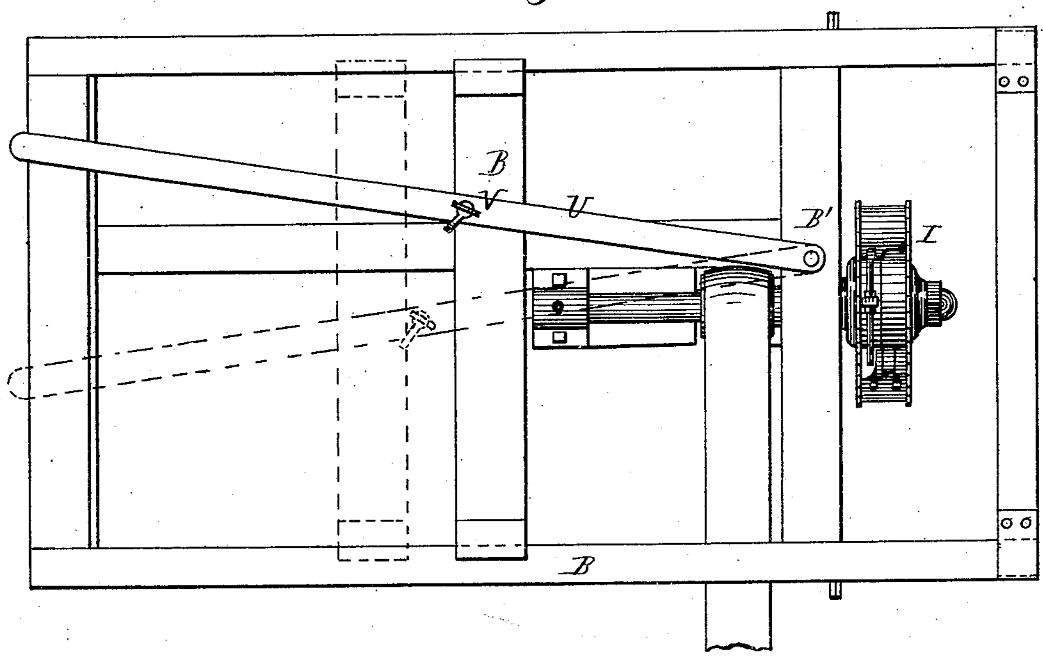
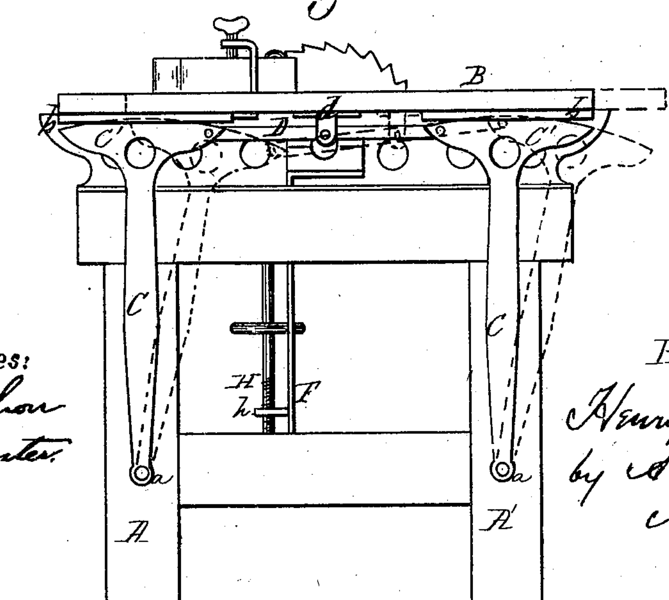


Fig. 2.



Witnesses:
Alex Mahon
John G. Center.

Inventor:
Henry Brand
by A. M. Smith
Attorney

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

2 Sheets—Sheet 2.

H. BRAND.

TENONING-MACHINE.

No. 169,336. Patented Nov. 2, 1875.

Fig. 3.

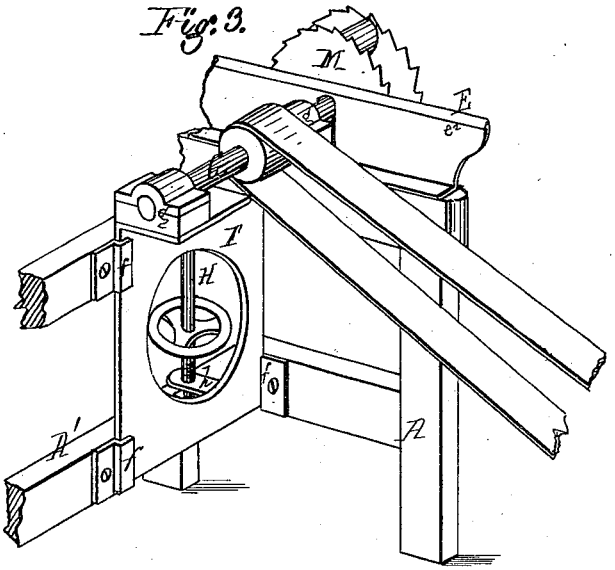


Fig. 4.

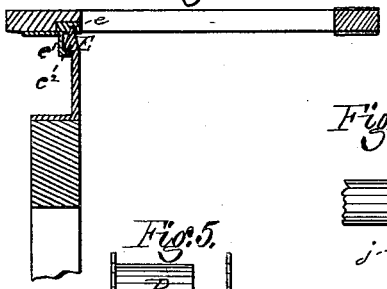


Fig. 6.

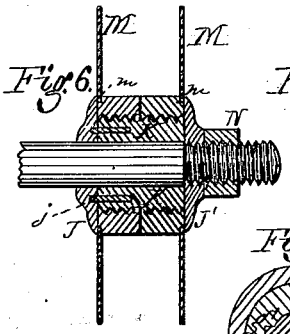


Fig. 7.

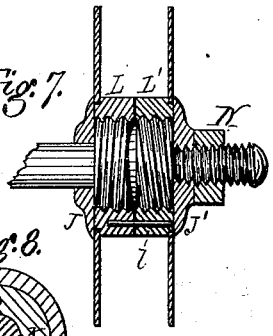


Fig. 5.

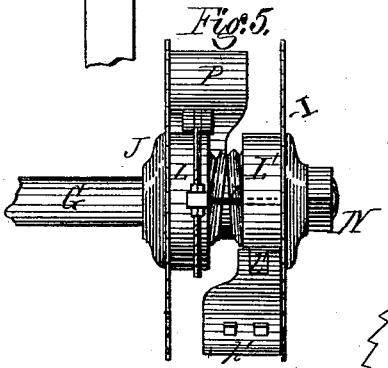


Fig. 8.

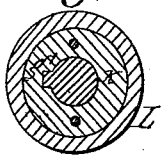


Fig. 11.

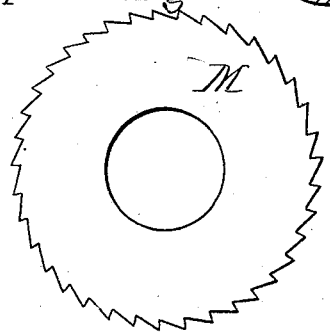


Fig. 9.

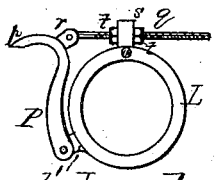
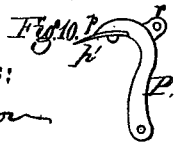


Fig. 10.



Witnesses:
Alex Mahon
John F. Benton

Inventor:
Henry Brand
by A. M. Smith
Attorney

UNITED STATES PATENT OFFICE.

HENRY BRAND, OF ST. PAUL, MINNESOTA.

IMPROVEMENT IN TENONING-MACHINES.

Specification forming part of Letters Patent No. **169,336**, dated November 2, 1875; application filed March 24, 1875.

To all whom it may concern:

Be it known that I, HENRY BRAND, of St. Paul, county of Ramsey, State of Minnesota, have invented a new and useful Improvement in Tenoning-Machine, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, making part of this specification, in which—

Figure 1 is a plan or top view of my improved machine. Fig. 2 is an end elevation of the same, and Figs. 3, 4, 5, 6, 7, 8, 9, 10, and 11 represent details or parts of the machine hereinafter described.

Similar letters of reference denote corresponding parts of the machine in all of the figures where used.

The invention consists in supporting the table or carriage, or one end thereof, upon pivoted vibrating segments or parallel links, the swinging ends of which are formed in arcs of circles, of which the pivots upon which the arms swing are the centers, in such manner that the carriage resting on said vibrating segments will move in right lines, thereby obviating to a great extent the friction due to the movement of the carriage upon the fixed ways ordinarily used, and greatly diminishing the labor of operating the carriage. The invention further consists in a novel construction of the cutter-head itself, as hereinafter described.

In the accompanying drawings, A A′ represent an upright rectangular frame, of any suitable construction, and B is the reciprocating carriage mounted thereon, also made in any usual or preferred manner. The carriage B is supported at its rear end, or that end opposite to the cutter-head, (or it may be at both ends, if preferred,) upon parallel links C C, pivoted at their lower ends at *a* to the uprights or posts A. The upper end of these links, expanded in width at C′, are formed each in the arc of a circle of which its pivot *a* is the center, and move in grooved guiding plates or ways *b*, secured to the lower surface of the table B, and which serve to give direction and steadiness to the movement of the table, which moves on the face of said segments as on the periphery of large wheels having fixed pivotal centers. The adjacent ends of these segments are connected with each other by a pivoted link, D, which is also pivoted midway of its length to a pendent bracket, *d*, attached to the table, said link serving to maintain the vibrating segments in proper working relation to each other and to the table, and also to limit their throw. These pivoted segments may be applied at both ends of the carriage or table, but for giving precision of movement I prefer to employ, at the cutter-head end, an inverted V-shape or knife-edged guiding-rail, E, matching correspondingly-grooved rails or guides *e*, secured to the lower face of the table, this form diminishing the friction, while at the same time it prevents deflection in the line of movement of the table. If preferred, small, grooved friction-rollers may be applied to the table in lieu of the fixed guides *e*. An angle-iron, e^1, engaging with a lip or shoulder at e^2, on the guide-rail E, holds the carriage firmly down on said rail. In suitable guiding-brackets *f*, attached to the frame, is mounted a vertical carriage, F, consisting either of an upright angular plate, as shown, or of a frame of any preferred construction, upon the upper end of which, in bearings *g*, is mounted the longitudinal shaft G, which carries the head, and to which motion is communicated in any suitable way. The rear face of the plate or frame F has a perforated bracket or ear, *h*, formed upon or attached to it, in which a screw-thread is cut matching a screw formed on a vertical shaft, H, mounted and rotating in bearings in the frame-bars A′, and by the rotation of which a vertical movement is imparted to the frame F for adjusting the shaft G and cutter-head as desired. The cutter-head I, shown in Figs. 1 and 5, and in detail and sectional views, Figs. 6, 7, 8, 9, 10, and 11, is constructed as follows: Upon the shaft G is keyed a collar-plate, J, and outside of said collar the shaft is feathered at *g′*, (see Fig. 8,) and has a sleeve, K, placed upon it, said sleeve being grooved to match, and rotating with said shaft. The periphery of this sleeve has a right and left handed screw formed upon it, adapting it to receive internally-threaded rings L L′, the relative rotation of which to each other is prevented by interlocking pins or spurs *l*, and these, in connection with the feather *g′* and pins *j* on the collar J, entering holes in the sleeve K,

effectually prevent any rotary movement of the parts of the head to each other when in place on the shaft G. These rings L L′ are passed upon the sleeve K from its opposite ends, and are drawn together or into the desired proximity by the action of the right and left hand screws when the sleeve is rotated, the pins *l* preventing the relative rotation of the rings. The rings L L′ have each a rabbet or shoulder formed at their outer faces at *m* to receive the annular saws M, which are clamped in place between the rings L L′ and the fixed and removable collars J J′ by a clamping-nut, N, on the end of the shaft G. The rings L L′ have perforated lugs or ears *l′* formed upon them, in which the cutter arms or shanks P are pivoted, these arms reaching out to or near to the periphery of the saws M. These cutter-arms are expanded in width at their outer ends, so that those upon one ring shall overlap those of the other ring, as shown in Figs. 1 and 5, and are bent into the form, substantially as shown in Figs. 9 and 10, for bringing the outer cutting-face into or nearly into line coincident with the circular path described thereby. This cutting-edge may be formed directly upon the ends of the pivoted arms P, but I prefer to make them separately, as shown in Figs. 5 and 10 at *p′*, in which case a socket or depression is formed in the outer ends of the arms for their reception, and the detachable cutters or cutter-lips *p′* are secured therein by means of bolts or set-screws, as shown. Under this latter construction the cutting-lips *p′* can be readily removed for sharpening, and for the substitution of new ones when worn out or broken. They can be slotted for making them adjustable, if desired, but it is preferred to effect this adjustment by means of screw-rods *q*, pivoted to lugs or ears *r* formed on the rear face of the arms P, and passing through lugs or ears *s* on the rings L L′, as shown in Fig. 9. The rods *q*, and with them the cutters *p′*, are set in or out, as desired, by means of jam-nuts *t* on the rods *q*, on opposite sides of the lugs *s*. The saws M (see Fig. 11) may be of any usual or preferred construction, and by simply removing the cutter-head and using a single circular saw, the carriage, constructed as described, may be used for sawing lumber instead of as a tenoning-machine. Upon the carriage B a gage-bar, U, is pivoted to the carriage-frame bar B′, adjacent to the cutter-head, and the outer swinging end of said bar is held by a clamp, V, or other equivalent device for holding said bar, at any desired angle to the path of the carriage for determining the angle of the tenon-shoulder. The peripheries of the segments C′ may be knife-edged or V-shaped, matching corresponding grooves or guides on the lower face of the carriage, and guide or steadying straps or bars may be used for preventing lateral deflection of the segments, thereby insuring precision in the movements of said carriage.

Having now described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The pivoted vibrating segment C′, constructed and applied to the reciprocating carriage B, substantially as described, whereby said carriage is supported by and adapted to be moved in right lines upon said segments, for the purpose and substantially as set forth.

2. The cutter-head sleeve K, provided with the right and left hand screws, as described, in combination with the rings L L′, to which the cutters are attached, substantially as described.

3. The cutter-arms P, hinged to the rings L L′, in combination with the adjusting-rods *q*, arranged and operating substantially as described.

4. The cutter-heads, constructed substantially as described—that is to say, having the saws M M and the intermediate sleeve and adjustable cutters, arranged and operating substantially as described.

In testimony whereof I have hereunto set my hand.

HENRY BRAND.

Witnesses:
J. H. ELWARD,
E. S. CHITTENDEN.