(No Model.)

3 Sheets—Sheet 1.

E. TOTMAN.

TENONING MACHINE.

No. 395,526. Patented Jan. 1, 1889.

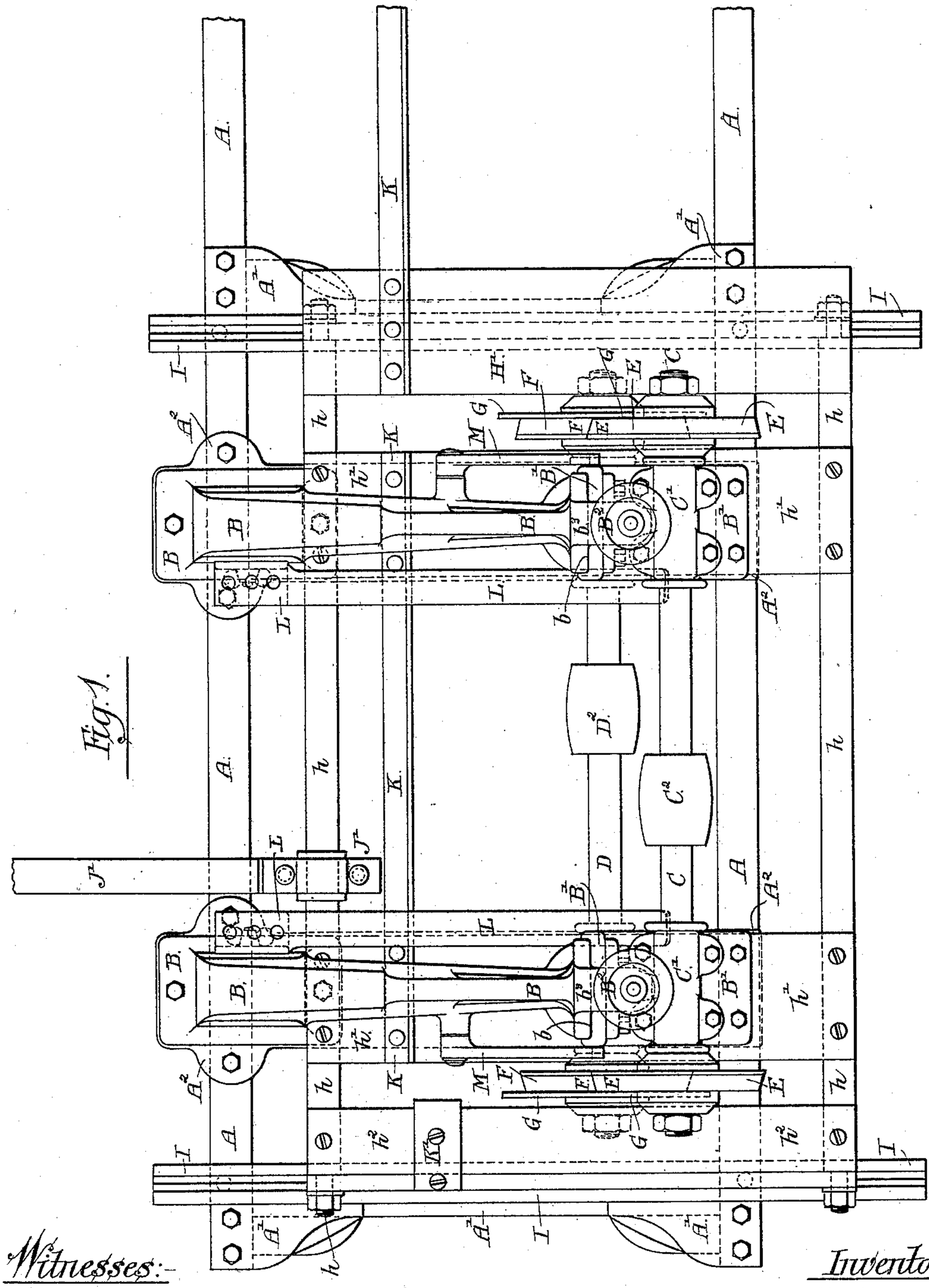

Fig. 1.

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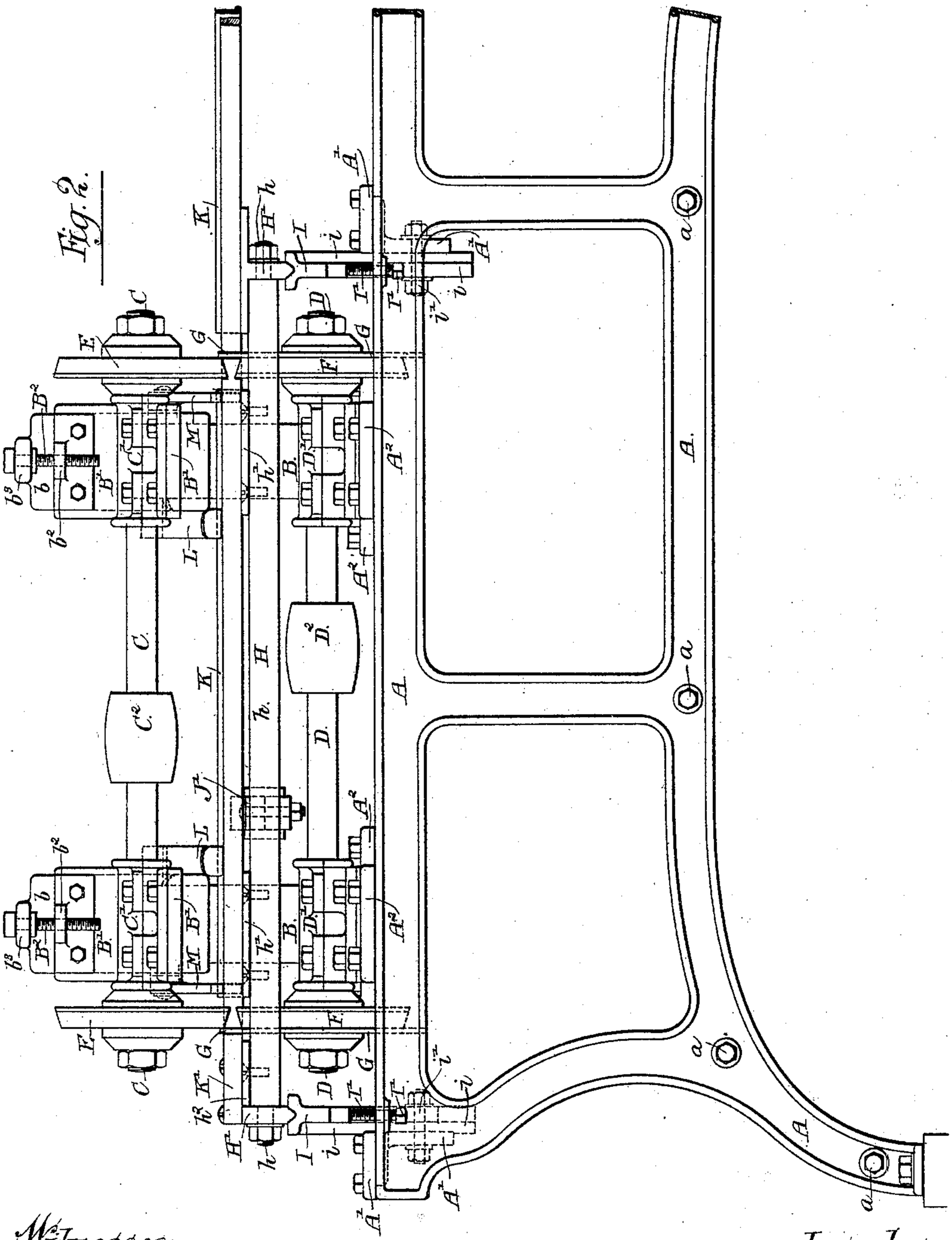
Fig. 2.



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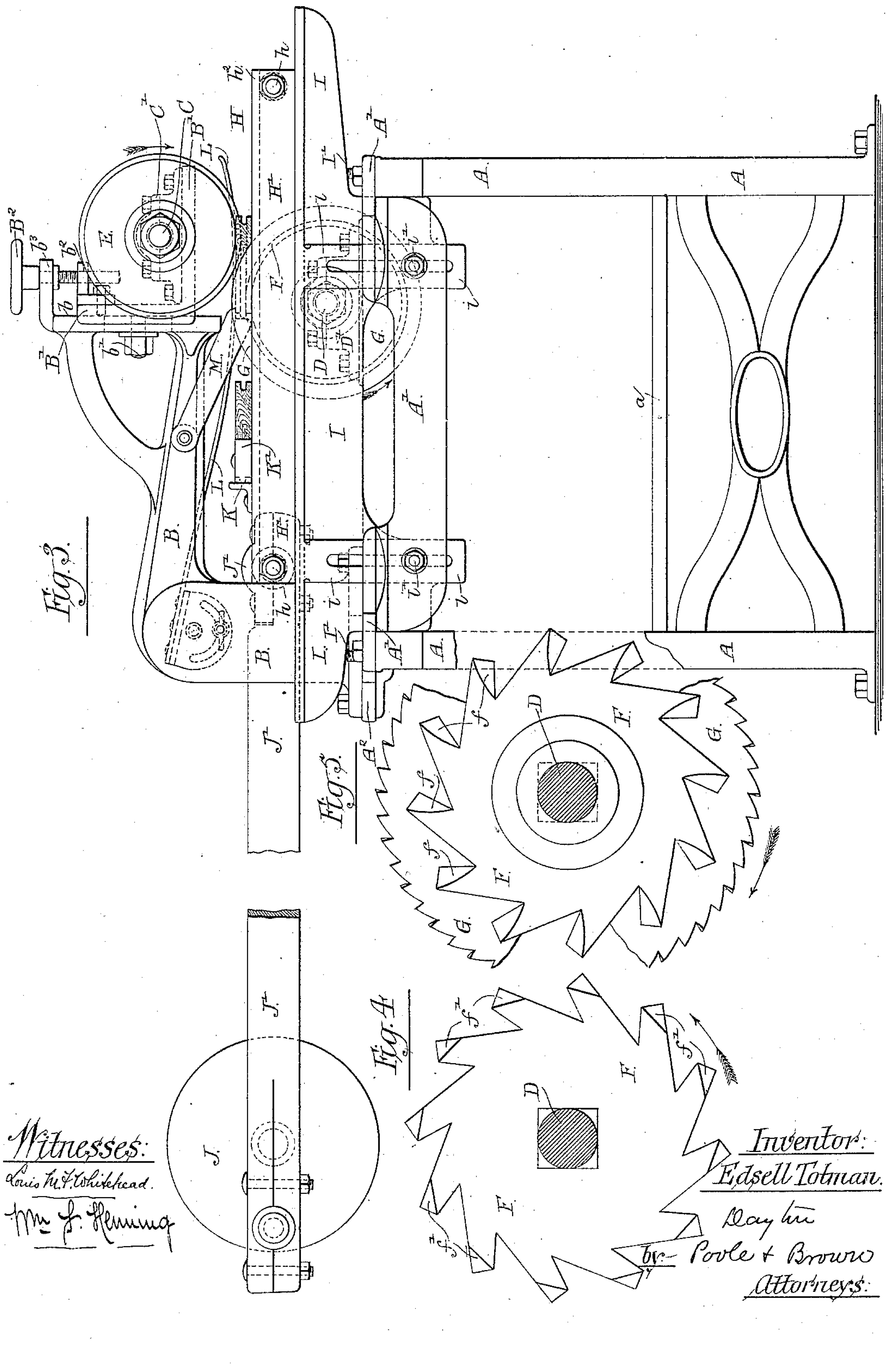

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UNITED STATES PATENT OFFICE.

EDSELL TOTMAN, OF LA GRANGE, ILLINOIS.

TENONING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 395,526, dated January 1, 1889.

Application filed April 21, 1888. Serial No. 271,426. (No model.)

To all whom it may concern:

Be it known that I, EDSELL TOTMAN, of La Grange, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Tenoning-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to an improved dovetailing or tenoning machine adapted for cutting dovetailed or other tenons upon both ends of a piece of wood at the same time.

The invention consists of the matters hereinafter described, and pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a plan view of a machine embodying my invention. Fig. 2 is a front elevation of the same. Fig. 3 is a side elevation of the same. Fig. 4 is a side view of one of the cutters removed from the machine. Fig. 5 is a view of that face of the cutter opposite to that shown in Fig. 4, showing also the saw attached to the cutter.

As illustrated in said drawings, the main part of the machine-frame consists of two parallel frame-plates, A A, connected with each other at their lower parts by girts *a a*. At the upper margins of said plates, near the ends of the latter, are attached two cross-girts, A′ A′, and between said girts are located two flat horizontally-arranged bars, A^2 A^2.

B B are two L-shaped frame-arms or "goose-necks," which are attached to the horizontal frame-bars A^2 A^2 at one side of the frame, and overhang the main part of the frame, in the manner clearly shown in Fig. 3.

C is a cutter-mandrel mounted horizontally in bearings C′ C′ upon the overhanging ends of the frame-arms B B, and D is a cutter-mandrel mounted in bearings D′ D′, secured to the frame-bars A^2 A^2. The mandrel C is provided with a belt-pulley, C^2, and with toothed cutting-disks E E, preferably located outside of the bearings C′ C′. The lower mandrel, D, is provided with a belt-pulley, D^2, and is provided near its ends with cutting-disks F F, against the outer faces of which are secured saws G G. The cutting-disks E E and F F are arranged to operate upon opposite ends of pieces or strips of wood, so as to form dovetailed or other tenons thereon, the cutting-teeth of the disks being shaped according to the kind of work to be done. The said cutting-disks are separated vertically a distance sufficient to form a tenon of desired thickness when the work is carried horizontally between them, and in order to enable the thickness of the tenon made by the cutters to be varied as desired, the mandrels C and D are made adjustable as to their distance apart vertically. For this purpose, in the machine shown, the bearings C′ C′ of the upper mandrel, C, are made vertically adjustable upon the frame-arms B B by means as follows: Each of said arms B B is provided at its free or overhanging end with a flat vertical surface, *b*, against which is secured an L-shaped plate, B′, having vertically-adjustable attachment to the arm by means of a bolt, *b′*, which passes through the plate and through a vertical slot in the vertical part of the arm. The bearings C′ are bolted to the horizontal part *b* of the plate B′.

For convenience in adjusting the plate B′ vertically, said plate is provided near its upper end with a lug, b^2, through which passes a vertical adjusting-screw, B^2, which is mounted to rotate in a horizontal lug, b^3, at the upper end of the surface *b*.

The cutting-disks E E are not mounted directly above or over the cutting-disks F F, but somewhat to one side of the latter, this construction being employed to prevent contact of the saws G G (which are secured against the outer faces of the cutting-disks F F) with the said cutting-disks E E.

H is a horizontally-reciprocating work-holding carriage which is supported in such position and is so moved as to carry the strips or pieces to be operated upon past or between the cutting-disks, the carriage being adapted to receive and move a long piece or strip from which shorter pieces are to be cut, so that pieces of a desired length may be severed by the saws G G at the same time that the tenons or dovetails are being formed upon the ends of the pieces.

The carriage H consists, as herein shown,

of two side bars, H′ H′, cross-bars *h h* connecting them and flat strips *h′ h′*, which form the work-supporting surface of the carriage. The carriage is sustained upon the machine-frame by means of two guide-bars, I I, which are attached to the girts A′ A′ of the frame, and are provided in their upper surfaces with guide-grooves engaged by projecting tongues or ridges upon the side bars, H′ H′, of the carriage.

Means for adjusting the vertical position of the carriage are provided as follows: The guide-bars I I, attached to the girts A′ A′ by means of vertical slotted lugs *i i* upon the guide-bars, and bolts *i′ i′* passing through said lugs and through the girts A′ A′. To afford means for accurately adjusting the position of the guide-bars and carriage, set-screws I′ I′ are inserted through the flanges of the frame-plates in position to bear upwardly against the said guide-bars, as clearly shown in the drawings.

The lower mandrel in the machine illustrated is not made vertically adjustable, the distance between the cutting-disks being changed solely by shifting the position of the upper mandrel. The work-carriage is made vertically movable, as described, in order to enable the same to be adjusted to correspond with the thickness of the stuff being operated upon, and also to bring the work into the proper vertical position with relation to the cutting-disks after the latter have been separated or brought together by the adjustment of the upper mandrel in the manner above stated.

The carriage H is given a horizontal reciprocatory motion during the operation of the machine by means of a crank-disk, J, and pitman J′. Upon the said carriage, at the rear of the cutting-disks, is located an abutment strip or ledge, K, against which the work is placed and by which the same is carried forward toward the said cutting-disks in the operation of the machine. The said abutment strip or ledge is herein shown as secured to the supporting-strips *h′ h′* of the carriage, which latter are arranged at right angles to the cutter-mandrels and near the cutting-disks, so as to sustain the work at points close to said disks.

K′ is an end stop located upon the carriage outside of and adjacent to the saw G at one end of the machine for accurately determining the position of the end of the blank-strip with relation to the cutting-disks, as said blank-strip is fed endwise to the machine by the attendant. Said stop K′ is herein shown as secured to one of the strips h^2, hereinbefore referred to.

L L are two spring-arms attached to the frame-arms B B and extending forward over the work-carriage in position to press downwardly against the work as the latter passes the cutting-disks, thereby holding the work flat upon the carriage at such time and pressing or dragging it backwardly against the ledge K, so that it will always be brought to the cutting-disks in a position at right angles to the said disks. Said arms are herein shown as adjustably secured to the frame-arms B B by means of flat plates pivoted to the vertical side faces of said frame-arms and provided with concentric slots through which pass clamp-nuts for holding the springs at a desired angle.

To prevent the wooden strips carried forward to the cutting-disks from being drawn backwardly in the return movement of the carriage, I pivot pawls M M to the frame-arms B B with their free ends in a position to engage the rear edges of said strips at the forward limit of the movement of the carriage, as clearly shown in Fig. 3.

As an improved construction in cutting-disks adapted for forming dovetailed tenons, I make the cutting-edges of the teeth of said disks inclined in such manner that the end of the cutting-edge which is adjacent to the outer or thicker end of the tenon is in advance (having reference to the direction of motion of the teeth in cutting) of the opposite end of the cutting-edge which acts upon the inner and thinner part of the tenon, as clearly shown in Figs. 4 and 5. By this construction each cutting-edge operates with a draw cut, and cuts from the outer or thicker part of the tenon inwardly, thereby greatly lessening the liability of breaking or splitting the wood at the outer angles of the tenon.

The cutting-edges, beveled or inclined in the manner described, are shown in the drawings, Figs. 4 and 5, as formed by means of oblique or beveled surfaces *f f* at the forward or advance faces of the teeth, and other beveled surfaces, *f′ f′*, at the rear surfaces of the teeth.

In the operation of the machine, made as above set forth, the long strip from which relatively short pieces, tenoned at both ends, are to be cut is fed endwise over the table from one side of the machine, the operator thrusting the strip along the top of the table, when the latter is at the rearward part of its movement, until the end of the strip strikes the stationary stop K′. The carriage then advances, carrying the entire strip endwise with it, until the strip has been carried a sufficient distance to insure the severing of the strip by the saw. In such advance movement of the strip the tenon will not usually be finished; but the strip will remain in the position shown in Fig. 3 until the end of the strip is again placed in front of the ledge in the succeeding rearward movement of the carriage and the latter has advanced with the new strip, when the strip already severed will be thrust forward past the cutting-disks by the action of the strip behind it. The saws G G at both ends of the mandrel obviously serve to cut the ends of the tenons accurately with relation to the shoulders and side faces thereof, so that all the tenoned pieces produced will be of exactly the same shape and dimensions.

The construction above set forth, wherein the upper cutting-disks are supported upon overhanging frame-arms or goose-necks, and in which a reciprocating carriage is employed to carry the work from a point at the inner or rear ends of the goose-necks outwardly or forwardly to the cutting-disks, has the important advantage of enabling the long strip to be fed to the machine and to be carried with the carriage in its movement toward the cutting-disk, so that short pieces are severed from the blank-strip at the same time the tenons are made and short pieces are discharged freely at the front of the machine. Only a single handling of the lumber is thus required to cut the pieces to a desired length and to form the tenons thereon. It will of course be understood that the upper cutting-disks might be mounted in a frame having overhead support, or otherwise arranged to avoid interference with the lateral movement of the long strip or blank as the latter moves with the carriage. By the construction set forth, embracing overhanging frame-arms, however, I am enabled to make the machine with a single frame of compact and rigid form, to provide rigid supports for the cutting-disks, enabling the latter to be accurately adjusted and held in position, and at the same time to so arrange the parts that long strips may be conveniently fed to the machine and the finished pieces easily discharged therefrom.

I claim as my invention—

1. A tenoning-machine comprising a machine-frame, two parallel mandrels mounted therein, a revolving cutting-disk mounted upon each end of each of said mandrels, saws attached to both ends of one of said mandrels outside the cutting-disks, drive-pulleys upon the mandrels, and a reciprocating carriage provided with a ledge to sustain and carry forward the work between said cutting-disks, whereby dovetailed tenons are formed upon both ends of a piece or strip and the same is cut the proper length at each reciprocation of the carriage, substantially as described.

2. A tenoning-machine comprising a frame provided with two overhanging arms or goose-necks, a mandrel mounted horizontally upon the frame, a second mandrel mounted upon said arms above and parallel with the first mandrel, cutting-disks upon each end of each of said mandrels, and a reciprocating carriage located and moving beneath the said overhanging arms, said carriage being provided with a ledge arranged to support and carry forward the work between the opposite pairs of cutting-disks, substantially as described.

3. A tenoning-machine comprising a machine-frame, two pairs of revolving cutting-disks, a reciprocating carriage and pawls pivoted upon the machine-frame and located in position to engage at their free ends with the work at the forward limit of the movement of the carriage to prevent the work being drawn backwardly with the carriage, substantially as described.

4. A machine for making dovetailed tenons, comprising a reciprocating carriage provided with a ledge to sustain and carry forward the work and two pairs of revolving cutting-disks for cutting the dovetails, each of said cutting-disks having a series of oblique cutting-edges arranged with those parts of the edges which act upon the outer or thicker parts of the tenons in advance, referring to the direction of motion of the cutters, of those parts of said edges which act upon the inner or thinner parts of the said tenons, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

EDSELL TOTMAN.

Witnesses:

C. CLARENCE POOLE,

O. N. WILLIS.