(No Model.) 4 Sheets—Sheet 1.

G. W. BUGBEE & F. DANNER.

TENONING MACHINE.

No. 479,389. Patented July 19, 1892.

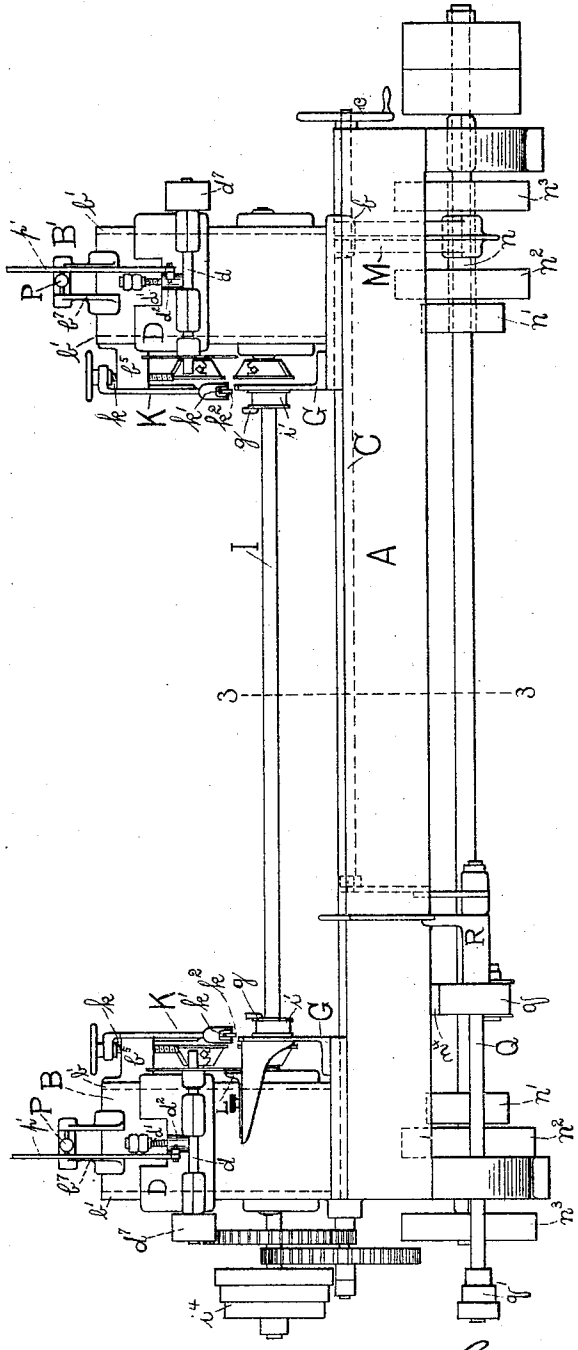

FIG. 1.

WITNESSES:

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H. H. Ralston.

INVENTORS:

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Frederick Danner

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G. W. BUGBEE & F. DANNER.

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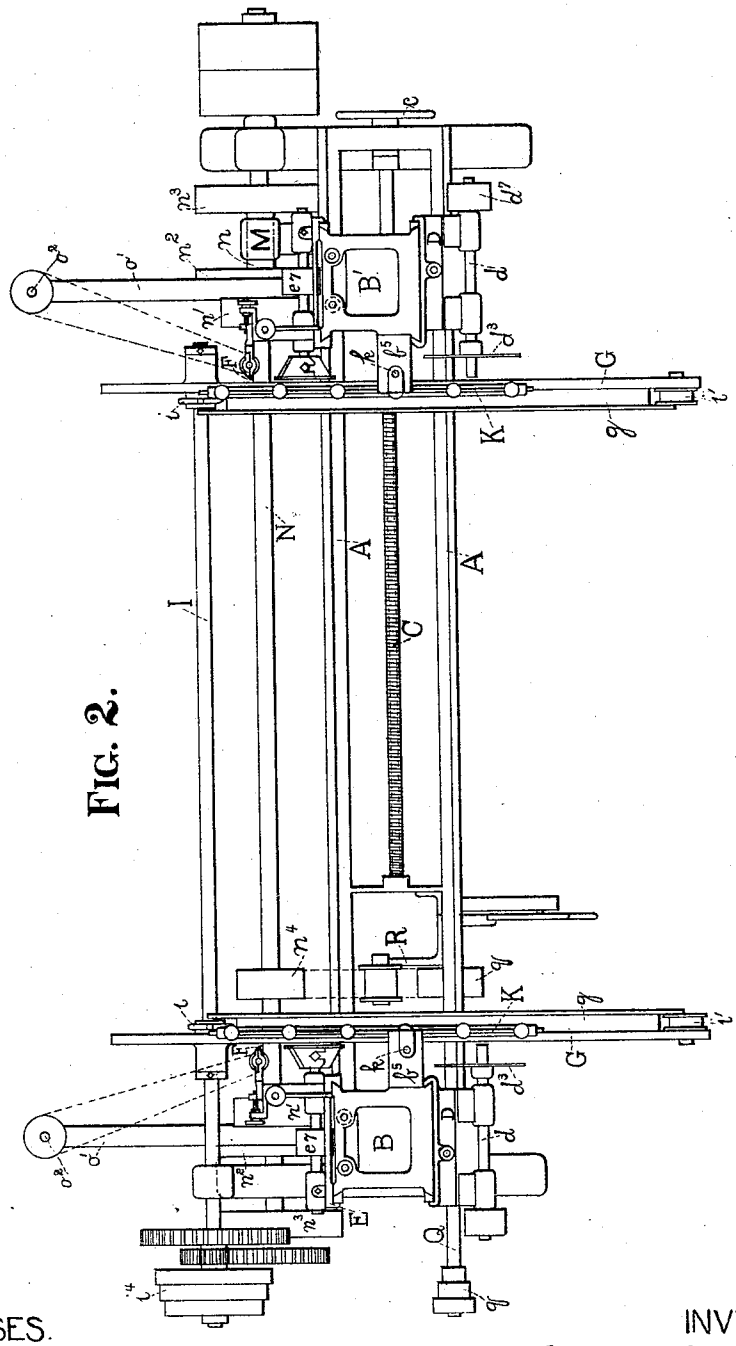

FIG. 2.

WITNESSES.

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(No Model.) 4 Sheets—Sheet 3.

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TENONING MACHINE.

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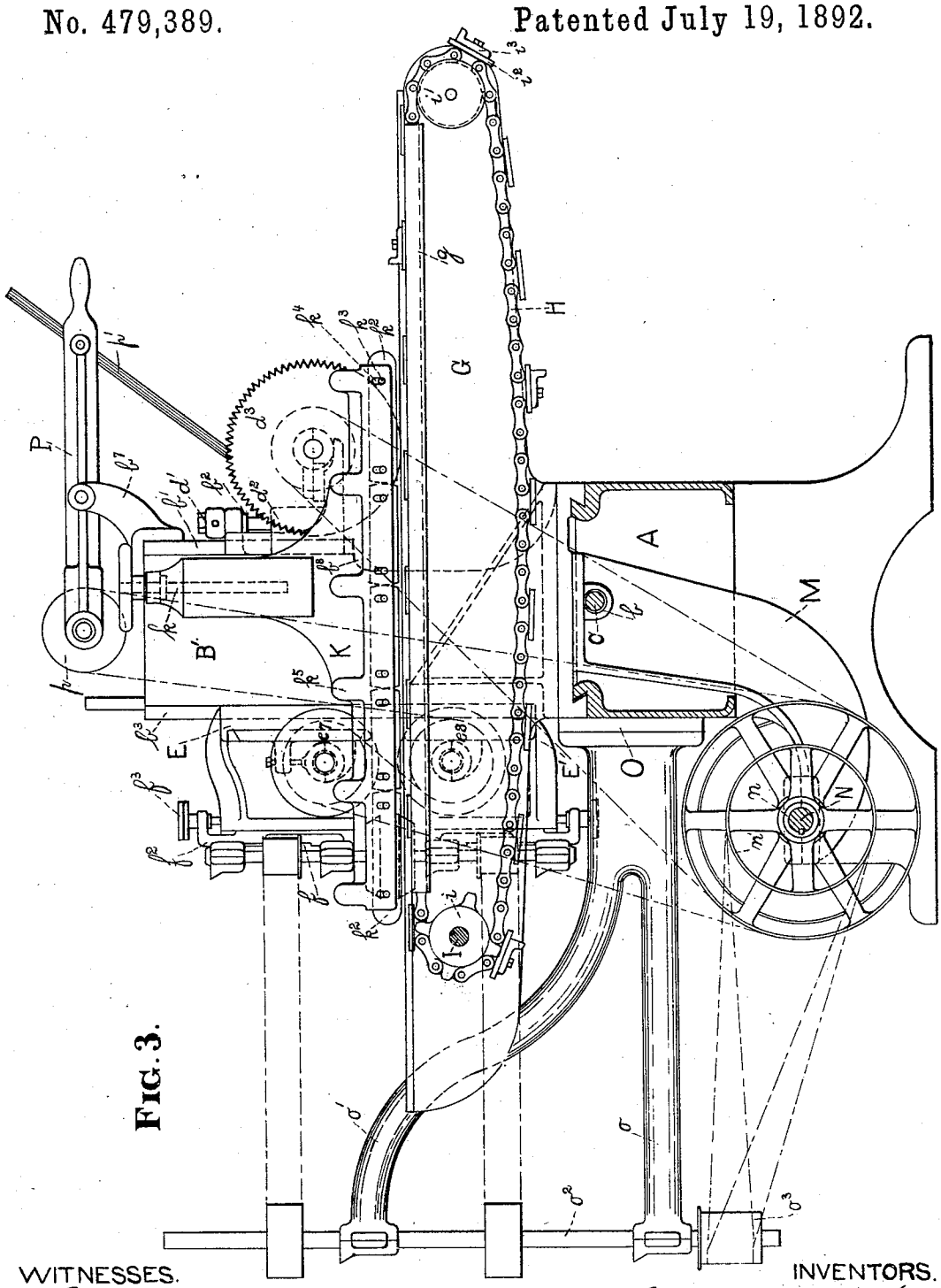

FIG. 3.

WITNESSES.

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(No Model.) 4 Sheets—Sheet 4.

G. W. BUGBEE & F. DANNER.

TENONING MACHINE.

No. 479,389. Patented July 19, 1892.

Fig. 4.

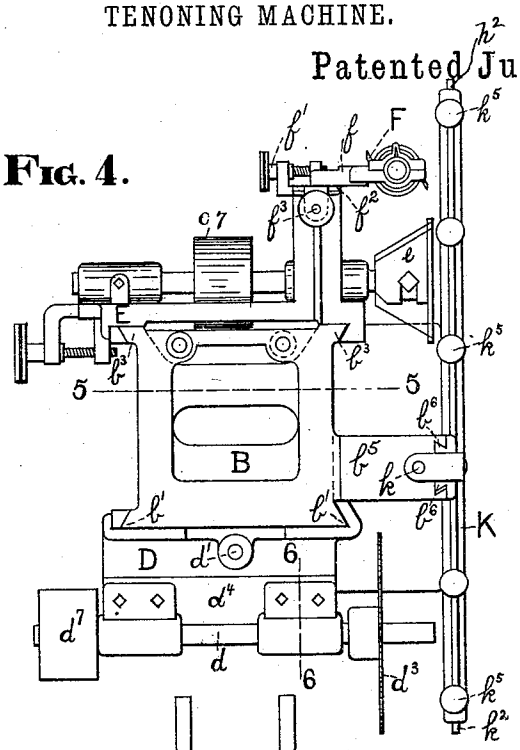


Fig. 5.

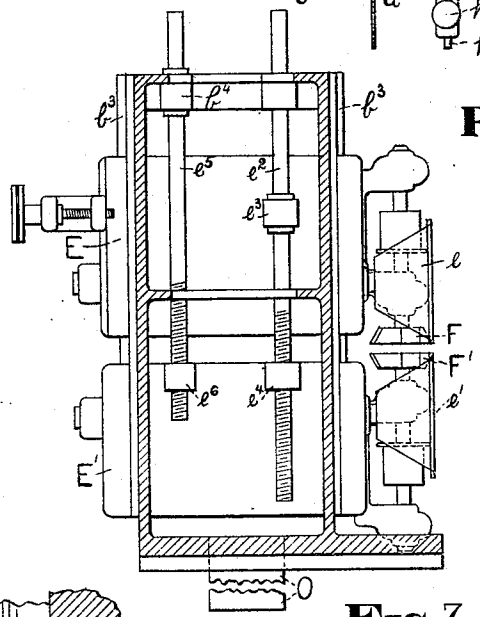


Fig. 6.

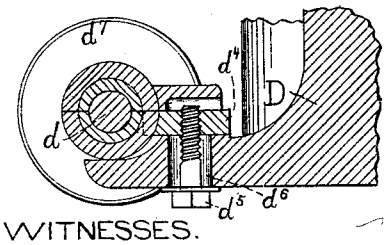
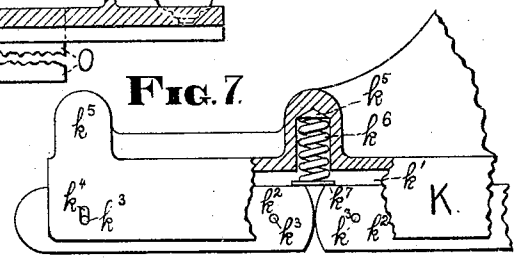


Fig. 7.



WITNESSES.

J. H. Bromwell

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INVENTORS.

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UNITED STATES PATENT OFFICE.

GEORGE W. BUGBEE, OF DELHI, AND FREDERICK DANNER, OF HOME CITY, ASSIGNORS TO THE EGAN COMPANY, OF CINCINNATI, OHIO.

TENONING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 479,389, dated July 19, 1892.

Application filed September 4, 1891. Serial No. 404,727. (No model.)

To all whom it may concern:

Be it known that we, GEORGE W. BUGBEE, residing at Delhi, in the county of Hamilton and State of Ohio, and FREDERICK DANNER, residing at Home City, in said county and State, citizens of the United States, have invented a certain new and useful Improvement in Tenoning-Machines, of which the following is a specification.

Our invention relates to that class of devices adapted to provide a board or similar article with tenons at both ends at one passage thereof through the machine; and it consists in the parts and arrangement and combinations of parts hereinafter more fully described and claimed.

In the drawings, Figure 1 is a side elevation of our improved apparatus. Fig. 2 is a top plan view of the same. Fig. 3 is a vertical cross-section on the line 3 3, Fig. 1. Fig. 4 is a top plan view of one of the supplemental frames, the belt-tightener thereon being omitted. Fig. 5 is a vertical cross-section of the same on the line 5 5, Fig. 4. Fig. 6 is a vertical cross-section on the line 6 6, Fig. 4, showing the means for horizontally adjusting the saw-arbor. Fig. 7 is a detail, partly in section, showing the construction of the pressure bar and plates.

A is a main frame or shears, on which are mounted two supplemental frames or columns B B′, one of which is preferably secured to one end of the shears, the other being given a longitudinal movement on the same by means of a screw-shaft C, journaled in the shears and taking through a nut b on the column and operated by a hand-wheel c. It is obvious that either or both the supplemeneal frames or columns may be made to move along the shears; but we prefer the construction shown. Each of the supplemental frames carries a series of devices, which we will now explain.

D is an extended support carrying a saw-arbor d and sliding on ways b' on the supplemental frame. An adjusting-screw d' is journaled to the supplemental frame at b^2 and takes into a nut d^2 on the support and serves as a means for raising and lowering it. The saw-arbor d carries a saw d^3, and is preferably mounted on a plate d^4, which in turn is adjustably secured to the support by having bolts d^5 extending through slots d^6 therein and taking into the plate d^4, thereby adjusting the saw-arbor in a horizontal plane.

E E′ are slides which carry tenon-cutters e e' and slide on ways b^3 b^3 on the supplemental frame. An adjusting-screw e^2 is journaled to the slide E at e^3 and takes through a nut e^4 on the slide E′ and adjusts the cutters the requisite distance apart, and an adjusting-screw e^5 is journaled in the supplemental frame at b^4 and takes through a nut e^6, thereby raising and lowering the pair of tenon-cutters to proper position. The slides E E′ may also carry so as to be adjustable therewith cope-cutters F F′, adapted to bevel the butts formed by the tenon-cutters or to cut the same into the desired shape. Each of the cope-cutters is also preferably given a vertical and horizontal adjustment independent of the tenon-cutters by mounting it on a horizontal slide f, movable to and fro by means of an adjusting-screw f', the horizontal slide f being mounted on a vertical slide f^2, which is raised and lowered on the tenon-cutter slides E E′ by means of a screw f^3. Each supplemental frame is also provided with a plate G, the upper edge of which serves as a table for the material which is fed to and through the machine, preferably by means of an endless traveling chain or feed H. The chain is propelled by passing at one end of its path of travel over a sprocket-wheel i, mounted on a shaft I. The sprocket-wheel of the movable frame is preferably provided with a feather taking into a groove in the shaft I, whereby it is permitted to slide along the same when the column is adjusted, but compelled to rotate therewith. At the other end of its path of travel the chain passes over a pulley i', mounted adjustably to give proper tension to the feed. The chain is provided at intervals with suitable plates or shoes i^2, having heels i^3 secured thereto so arranged as to project above the plane of the table and thereby propel the material through the machine. The endless feed preferably travels on and is supported by a bracket g, secured to the plate G.

K is a pressure-bar adapted to hold the ma-

terial against the table while passing through the machine. We have shown it secured to a bracket b^5, extending from the supplemental frame. It is made vertically adjustable, preferably by sliding on ways b^6 on the bracket, an adjusting-screw k being adapted to raise and lower it. The pressure-bar at its lower end is provided with a groove k', in which a series of pressure-plates k^2, which bear directly on the material, are inserted. These pressure-plates are so arranged that the forward end of one is in rear of the rear end of the next succeeding plate in front thereof, the lower edges of the plates being rounded, so that the material may readily pass under the same. The plates are provided near their ends with pins k^3, which take into slots k^4 in the pressure-bar, thereby allowing vertical movement thereof. The pressure-bar is provided above the ends of the pressure-plates with a series of sockets k^5. Suitable springs k^6, to the lower end of which washers k^7 may be secured, take into the sockets and yieldingly hold the pressure-plates up to their work. In this construction the pressure-plate will, if raised by a board, exert its pressure on the same and be returned to its normal position as soon as the board has passed beyond it, ready to exert pressure on the next succeeding board, making the movement of each plate independent of the others.

L is a gage against which the material to be fed to the machine is adapted to be placed.

From the movable frame their depends a hanger M, in which is journaled a sleeve n, splined to a shaft N, but capable of longitudinal movement along the same. The sleeve n carries a series of pulleys n', n^2, and n^3 for operating the various devices on the movable frame. Corresponding pulleys are secured to the shaft to operate the devices on the stationary supplemental frame.

Each supplemental frame is preferably provided with an apron O, to which arms o o' are secured. A vertical shaft o^2 is journaled in these arms and through the medium of belts passing over pulleys thereon and on the cope-spindles operates the cope-cutters. Power is transmitted to the vertical shaft by a belt passing over the pulley n' and a transmitting-pulley o^3 on the shaft. The tenon-cutters are operated by a belt passing over the pulley n^2 and pulleys e^7 and e^8 on the cutter-shafts. This belt also passes over a tightener-pulley p, mounted in an arm P, pivoted in a bracket b^7 on the column. The arm may be held in any desired position by being clamped at any desired point on a rod p', secured, preferably, to the extended support D, thereby regulating the tension on the belt and causing the tenon-cutters to rotate or remain idle at the will of the operator. The saw-arbor is operated by means of a belt passing over the pulley n^2 and a pulley d^7 on the saw-arbor. In our improved apparatus each of the cutting agencies is operated independently through independent belts and pulleys, enabling any of them to be thrown out of operation independently of the others.

The traveling feed is preferably operated by a belt taking over a pulley n^4 on the shaft N and a pulley q on the shaft Q, which also carries a pulley q', from which power is transmitted to a corresponding pulley i^4 on the shaft I. The pulleys q' and i^4 are preferably in the form of cone-pulleys, so that by shifting the belt from one to another step thereof the speed of the feed may be regulated. A belt-tightener R is adapted to regulate the tension of the belt passing over pulleys n^4 and q.

It has been customary in machines of this class to prepare the material to be tenoned by first sawing it to approximately the length of the finished product and then passing it through the tenoning-machine. In our improved apparatus the saws are arranged in front of the tenon-cuttters in extended supports and in advance of the columns on which they are mounted. Our improved construction permits a cutting of the piece to be tenoned from any length of board to just the length of the finished product and dispenses with the preparatory cutting of the same, and leaves a smooth edge on the product. The forward end of each column may be provided with a recess b^8 to increase the space between the cutting-edge of the saw and the column above the plane of the table of the machine.

We claim—

1. The combination, in a tenoning-machine, of a main frame, a pair of supplemental frames thereon, a screw-shaft or similar means for adjusting one or both of them longitudinally on the main frame, with a cutter head or heads on each supplemental frame, vertically-adjustable bearings in which they are mounted, a saw on each supplemental frame, an extended support in which the saw is mounted projecting in advance of the supplemental frame, and an adjusting-screw or similar means for raising and lowering the support, substantially as and for the purpose specified.

2. The combination, in a tenoning-machine, of a main frame, a pair of supplemental frames thereon, a screw-shaft or similar means for adjusting one or both of them longitudinally on the main frame, with a cutter head or heads on each supplemental frame, vertically-adjustable bearings in which they are mounted, a saw on each supplemental frame, an extended support in which the saw is mounted projecting in advance of the supplemental frame, an adjusting-screw or similar means for raising and lowering the support, and an endless traveling feed, substantially as and for the purpose specified.

3. The combination, in a tenoning-machine, of a main frame, a pair of supplemental frames thereon, a screw-shaft or similar means for adjusting one or both longitudinally on the main frame, with a tenon cutter or cutters on each supplemental frame, vertically-ad-

justable bearings in which they are mounted, a cope cutter or cutters in rear of the same and adjustable with and independently thereof, a saw on each supplemental frame, and an extended support in which the saw is mounted projecting in advance of the supplemental frame, substantially as and for the purpose specified.

4. The combination, in a tenoning-machine, of a main frame, a pair of supplemental frames thereon, a screw-shaft or similar means for adjusting one or both of them longitudinally on the main frame, with a cutter head or heads on each supplemental frame, vertically-adjustable bearings in which they are mounted, an extended support projecting in advance of the supplemental frame, a plate on the support, a saw-arbor mounted on the plate, and bolts or similar means for adjusting the plate relatively to the support, whereby the saw-arbor is adjusted in a horizontal plane, substantially as and for the purpose specified.

5. The combination, in a tenoning-machine, of a pressure-bar, a groove in the lower end thereof, a series of disconnected pressure-plates inserted in the groove, the forward end of one being in rear of the rear end of the next succeeding plate in front thereof, a series of sockets above the ends of the pressure-plates, and springs taking into the sockets and bearing against the ends of the plates, substantially as and for the purpose specified.

6. The combination, in a tenoning-machine, of a pressure-bar, a groove in the lower end thereof, a series of disconnected pressure-plates inserted in the groove, the forward end of one being in rear of the rear end of the next succeeding plate in front thereof, the pins k^3, taking through each pressure-plate independently near the ends thereof, the slots k^4 in the pressure-bar for receiving the pins, a series of sockets above the ends of the pressure-plates, and springs taking into the sockets and bearing against the ends of the plates, substantially as and for the purpose specified.

7. In a double-ended self-feed tenoning-machine, the combination of the main frame, a supplemental frame at each end thereof, means for adjusting the distance between them, the cutter-heads mounted on each of the supplemental frames, the adjustable saw-supports in front of the cutter-heads, and the driving-shaft underneath for driving both the cutter-heads and the saws independently.

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