5 Sheets--Sheet 1.

G. W. PARKER.

Machine for Tenoning Chair-Rounds.

No. 161,818. Patented April 6, 1875.

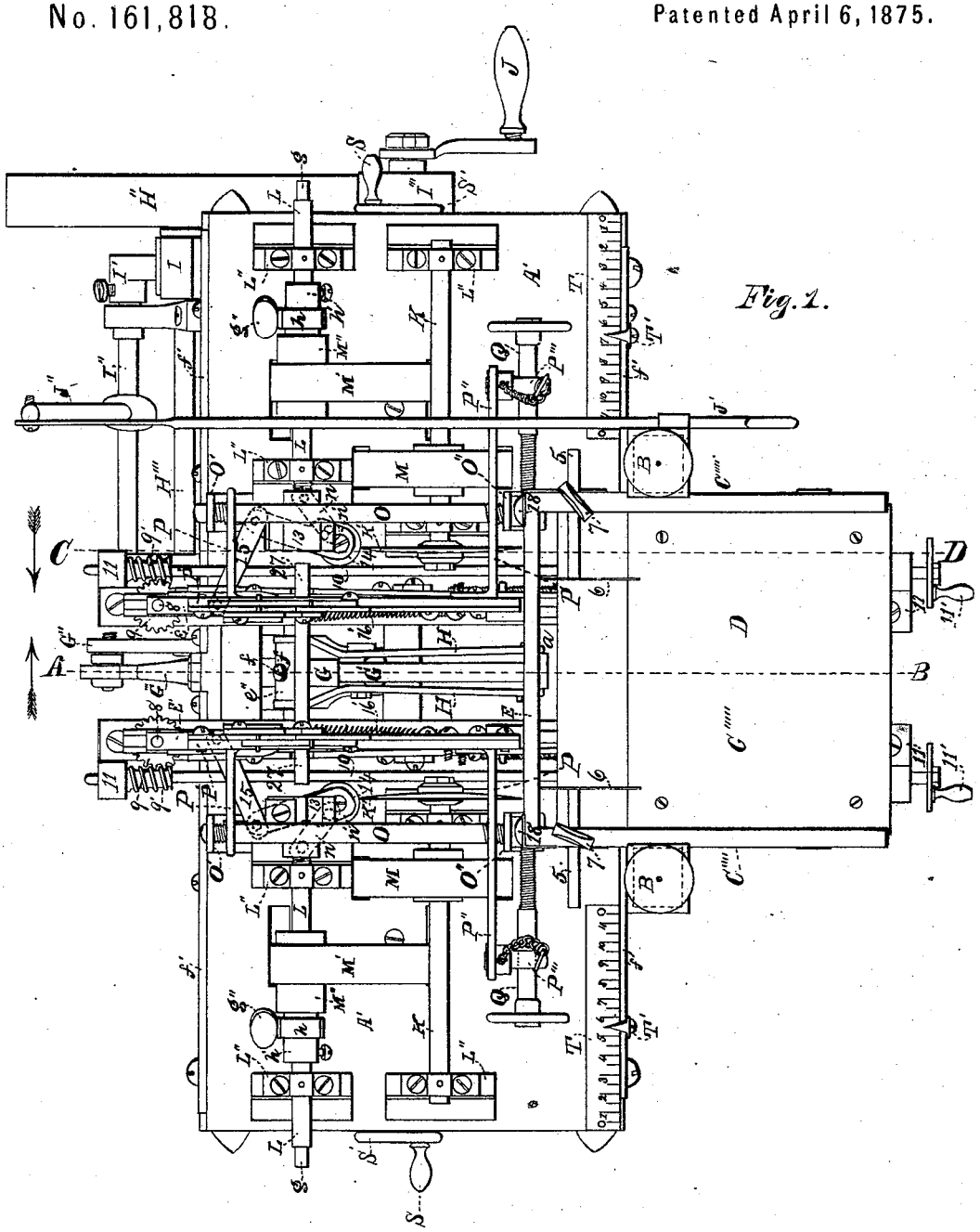

Fig. 1.

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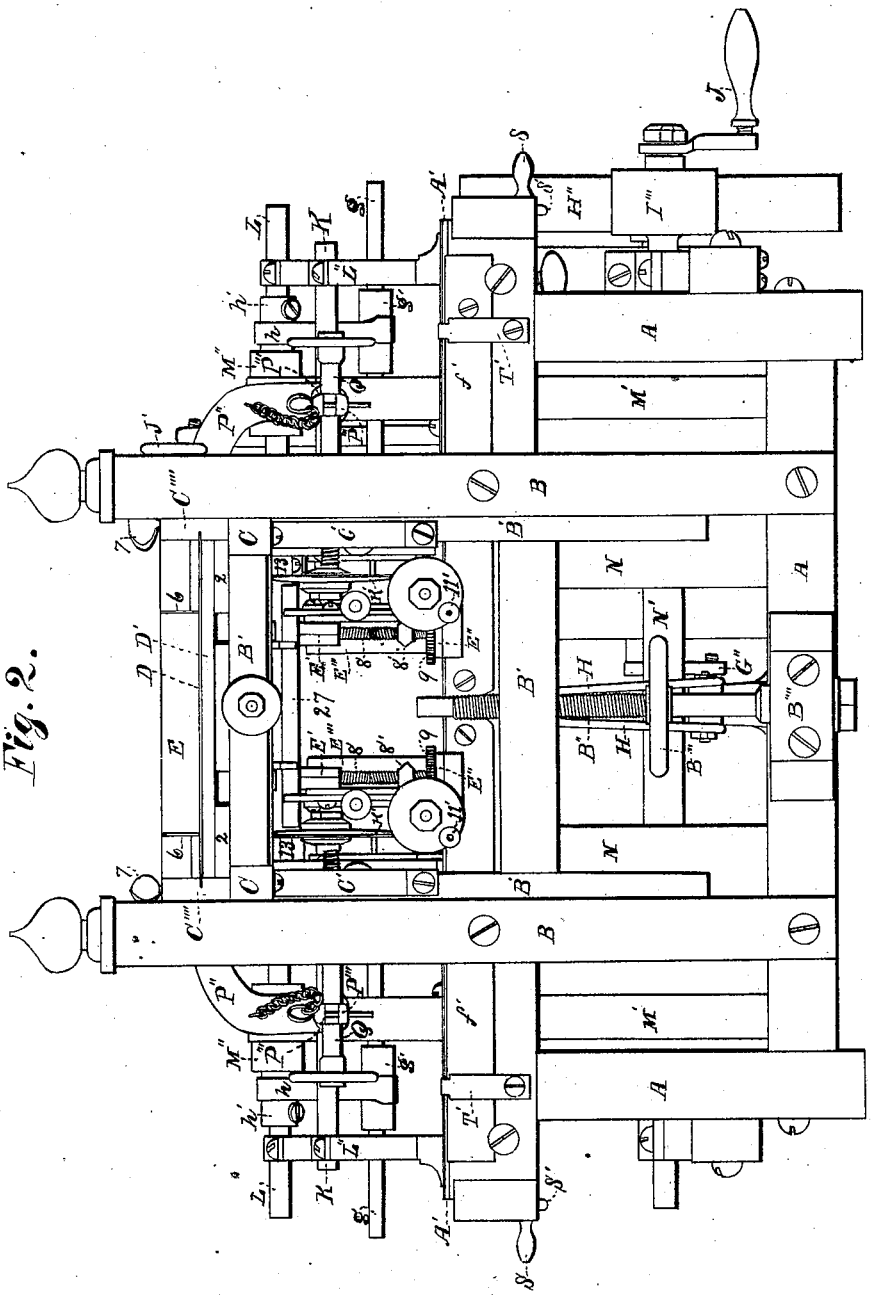

Fig. 2.

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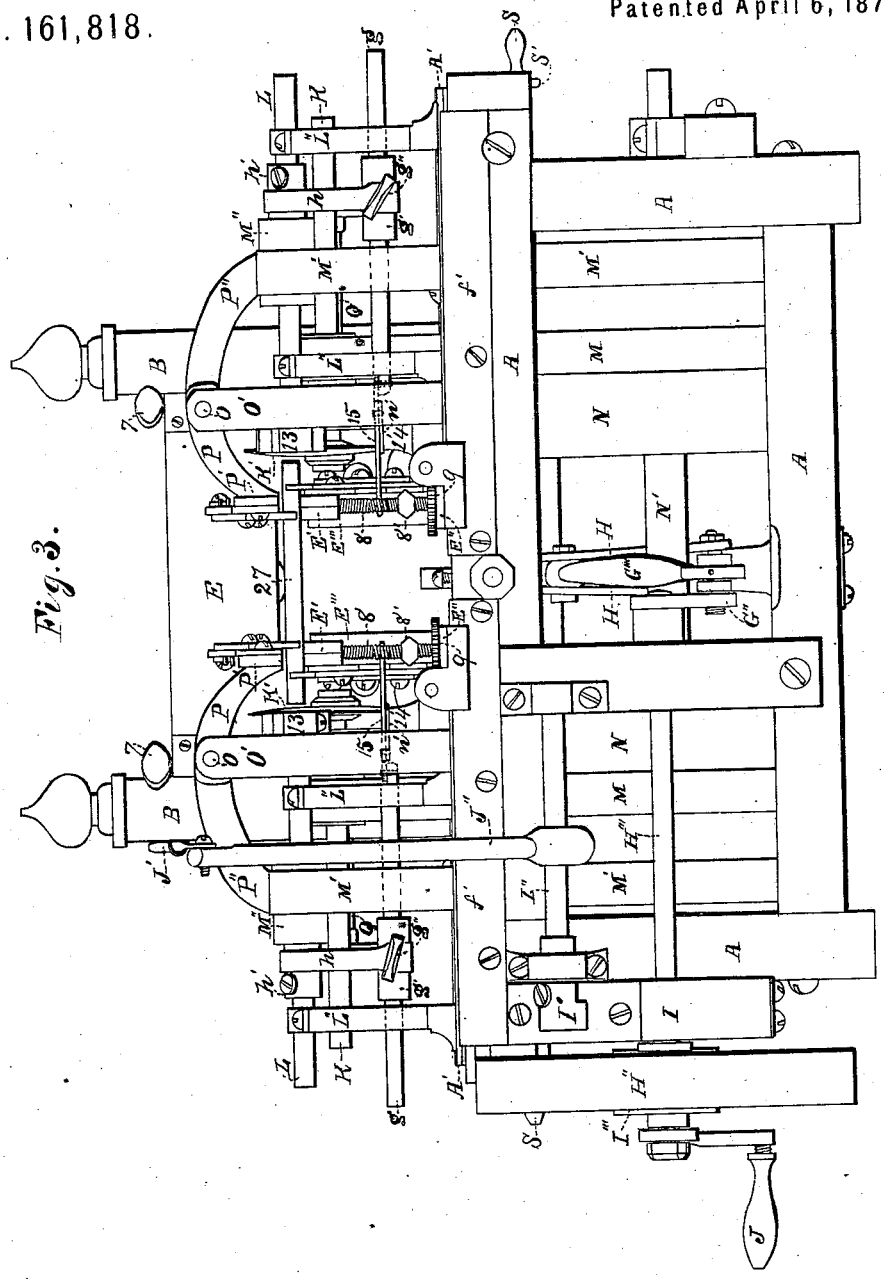

Fig. 3.

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G. W. PARKER.

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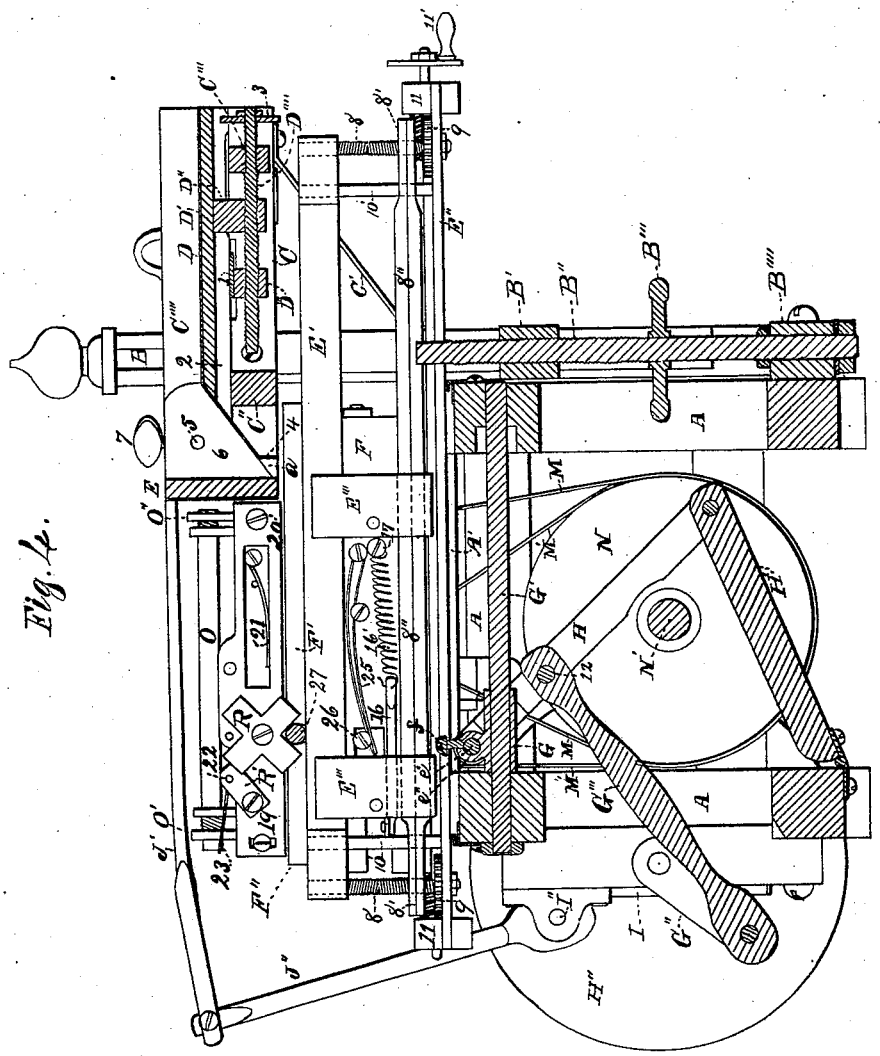
Fig. 4.



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G. W. PARKER.

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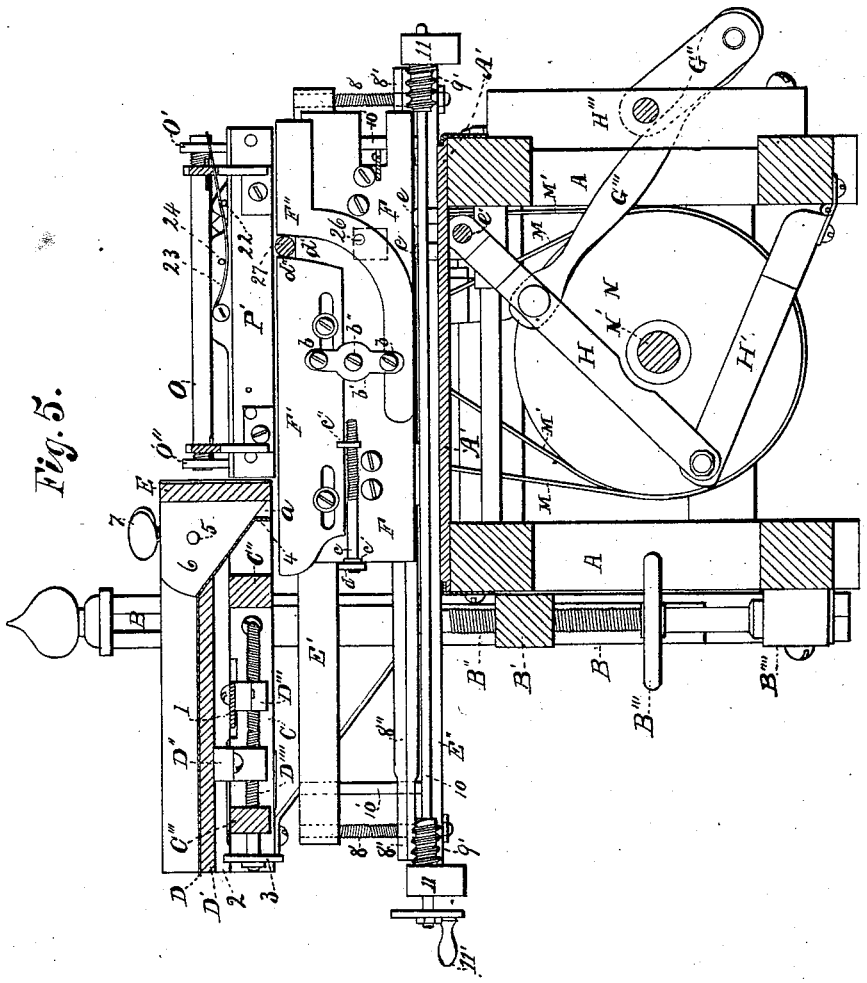
Fig. 5.



Witnesses:

Thos. H. Dodge
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Inventor:

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UNITED STATES PATENT OFFICE.

GEORGE W. PARKER, OF GARDNER, MASSACHUSETTS.

IMPROVEMENT IN MACHINES FOR TENONING CHAIR-ROUNDS.

Specification forming part of Letters Patent No. **161,818**, dated April 6, 1875; application filed October 13, 1874.

To all whom it may concern:

Be it known that I, GEORGE W. PARKER, of Gardner, in the county of Worcester and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Machines for Tenoning Chair-Rounds, and for other purposes; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 represents a top or plan view of my said improved machine. Fig. 2 represents a front view. Fig. 3 represents a rear view. Fig. 4 represents a vertical central section on line A B, Fig. 1; and Fig. 5 represents a longitudinal vertical section on line C D, Fig. 1.

To enable those skilled in the art to which my invention belongs to make and use the same, I will proceed to describe it more in detail.

In the drawings, the parts marked A represent the frame of the machine. To the front of the frame are secured two standards, B B, between which a vertically-sliding frame, B′, is arranged, and which sliding frame can be adjusted up and down by means of a screw-spindle, B″, a balance-wheel, B‴, being secured to said screw-spindle for the purpose of turning it. The lower end of screw-spindle B″ is fitted with a journal to turn in a bearing, B⁗, secured to the lower side of the main frame A. The upper end of screw-spindle B″ works in a female thread formed in the lower piece of vertically-sliding frame B′, said frame being retained in position, as it is moved up and down, by means of tongues upon its sides, which work in corresponding grooves in the inner sides of standards B B. From the upper end of each side piece of sliding frame B′ projects forward a feed-table-supporting piece, C, each piece being supported by a brace, C′, from the side pieces of sliding frame B′. The projecting pieces C are connected together by cross-pieces C″ and C‴. Upon the side pieces C are supported side pieces C⁗ of the feed-table C⁗′, said side pieces being connected by means of a cross-piece, 1, which can slide back and forth in slots in the upper sides of pieces C. The bottom D of the feed-table, in this instance, is made of sheet metal, the sides of which work in grooves in the side pieces C⁗. The sheet-metal covering D is secured to a wooden base-piece, D′, which, in turn, is fastened to and supported by longitudinal pieces 2, the outer edges of which have a bearing upon the projecting pieces C. To the lower side of part D′ is secured a projection, D″, and to the lower side of the cross-bar 1 is secured a projection, D‴, and through these projections is passed a screw-spindle, D⁗, having a right and left hand screw-thread to fit corresponding threads in the respective projections D″ and D‴, said screw-spindle being fitted to turn in a bearing in the upper cross-piece of sliding frame B′, which retains the spindle in a fixed position, whereby, when said spindle is turned by means of wheel 3 in one direction, the side pieces C⁗ will be drawn forward, and the table C⁗′ will be moved back, and vice versa, thus enlarging or contracting, as the case may be, the opening *a* between the cross-piece E (which connects the rear ends of side pieces C⁗, and which consequently moves with them) and the rear depressed end 4 of the metal covering D of feed-table C⁗′, the center of said opening always remaining in the same vertical plane, in consequence of the action of the right and left hand screw-threads upon spindle D⁗.

The object of this adjustment is to regulate the size of the throat or opening *a* to the size of the chair-round or other stick to be fed into the machine.

Holes are made in the rear ends of the side pieces C⁗, to receive rods 5, attached to the stock guides 6. Said rods are held in position, when once adjusted, by means of thumb-screws 7, screwed into the edges of side pieces C⁗, the object of stock-guides 6 being to define the proper position of the stick longitudinally when it is fed into the machine, and these stock-guides can be adjusted in and out to admit the feeding of longer or shorter sticks, as occasion may require. Two stock-supporting rails, E′, are arranged equidistant from the middle of the machine, and are supported at each end by a screw-spindle, S, having a right-hand screw-thread upon one end,

and a left-hand screw-thread on the other. The upper end of each screw-spindle 8 screws into one end of a rail, E′, while the other end of each screw-spindle screws through a flattened end, 8′, of a diamond-shaped bar, 8″, one of which is arranged below each of said stock-supporting rails E′. The lower ends of screw-spindles 8 are provided with smooth journals, which are fitted to turn in suitable bearings in the ends of plates E″, arranged parallel with and below diamond shaped bars 8″, said plates being securely fastened to the upper sides of slide-plates A′. Screw-spindles 8 have heads on their lower ends, which prevent them from being drawn out of their bearings in the ends of plates E″. They also have attached to their lower ends, just above plates E″, cog-gears 9, which take into their respective worm-gears 9′ upon the ends of shafts 10, which are supported and turn in suitable bearings 11 11, secured to the outer ends of plates E″. Each shaft 10 has a hand-crank, 11′, by means of which it can be turned easily in either direction, as occasion may require.

When the cranks are turned in one direction their respective rails E′ will be elevated, and their respective diamond-shaped bars 8″ will be lowered, together with their respective guide-pieces E‴, through which they pass, there being two guide-pieces, E‴, on each side, their upper outer corners being cut out, so as not to bind against their respective rails E′ when they are raised and lowered, as before explained.

Near each end of rails E″ is secured a guide-rod, 10′, which passes up through holes in the flattened end of the diamond-shaped bar 8″, and in the end of stock-supporting rail E′, and which rods guide their respective parts 8″ and E′ when they are moved up and down by the adjusting-screws 8.

To the lower outsides of each set of guide-pieces E‴ are secured plates F. These plates are fitted to work back and forth with their respective guide-pieces E‴, to which they are rigidly attached, said guide-pieces being supported and sliding upon their respective diamond-shaped bars 8″, which pass through corresponding-shaped holes in the lower ends of their respective guide-pieces E‴.

It will be thus seen that the upper notched ends bear against the insides of their respective rails E′, while their respective plates F bear against the outsides of their respective rails E′, thereby, in connection with the guide-rods 10, keeping the parts in the proper relative position during the operation of the machine.

To the outside of each plate F is secured an adjustable plate, F′, while an arm, F″, is connected to each plate F′, as shown at *b*. The rear end of each arm F″ is connected to its respective adjustable plate F′ by means of a link or yoke-piece, *b*′, which, in turn, is pivoted to its respective plate F, at *b*″. Each plate F is provided with an adjusting-screw, *c*, the outer end of which turns in a bearing, *c*′, secured to said plate F, while the screw end passes through a lug, *c*″, secured to its adjusting-plate F′, and by this arrangement, when screw *c* is turned, by means of its head *d*, in one direction, it will draw plate F′ back, and, by means of yoke *b*′, the rear end of arm F″ will be forced forward, thereby increasing the distance or space *d*′ between the end *d*″ of adjusting-plate F′ and the upper end of arm F″, and vice versa, said space being increased and diminished on each side of a vertical plane passing through the center of said opening or space.

Each set of guide-pieces E‴, together with their respective plates F F′ and arms F″, is moved back and forth upon the diamond-shaped bars 8″ as follows: From the rear end of each plate F projects two prong or fingers, *e e*, with a space between them sufficient to receive the rod *e*′, which passes through a tubular projection, *e*″, upon the upper side of a tubular slide-piece, G, which, in turn, is fitted to slide upon the stationary spindle G′, the ends of said spindle being supported in the upper front and rear cross-pieces of the main frame A. The tubular parts G and *e*″ are made in one piece, the holes being arranged at right angles to each other, one being arranged above the other, however, as indicated in Fig. 4 of the drawings. Rod *e*′ is held in place by a set-screw, *f*. The tubular slide-piece G *e*″ is moved back and forth on spindle G′ by means of crank G″, which is connected, by means of the pitman G‴, to the hinged coupling-pieces H H by means of a pivot, 12, which passes through both arms and one end of the pitman G‴, which works between them. The upper ends of coupling-pieces H H are spread out so as to embrace the tubular part *e*″, and are also provided with holes, through which the ends of rod *e*′ project.

The lower ends of coupling-pieces H are hinged to the swinging arm H′, thus giving to the pitman G‴ a vibrating and easy motion when the crank G″ is in operation, and which crank is driven, in this instance, by means of a friction-pulley, H″, on the outer end of its shaft H‴, the outer journal of which shaft is supported in a hinged bearing-piece, I, which can be pressed back by means of cam I′ on the end of rocking shaft I″, so that friction-pulley H″ will be pressed against friction-pulley I‴ with such force that when the latter pulley is turned or put in motion by means of crank J, or otherwise, motion will also be imparted to friction-pulley H″, and through that, by means of shaft H‴, to crank G″. Cam-shaft I″ can be operated by the operator of the machine while standing at the feed-table C⁗ by means of a sliding rod, J′, connected with the upright arm J″ and cam-shaft I″. Each slide-plate A′ extends over and covers one end of the frame A, and said slide-plates are held in place by means of flange-pieces *f*′ *f*′, secured to the main frame A. To the top of each slide-plate are attached the stands which support the shafts K K of

the saws K′ K′, and also the stands which support the shafts L L of the tenoning-cutters 13. The saw-shafts K are provided with pulleys to receive belts M M, and tenoning-cutter shafts L L are provided with pulleys to receive belts M′ M′, by which said shafts are driven with the necessary speed from drums N N on a common central shaft, N′, and to one end of which the friction-pulley I‴ is secured. The tenoning-cutter shafts are fitted to slide back and forth longitudinally, and for accomplishing this back-and-forth longitudinal motion at the proper time sliding rods *g* are fitted to slide in suitable bearings in the stands L″ L″, which support the tenoning-cutter shafts L L, said slide-rods *g* being arranged parallel with and below the cutter-shafts L, and having tubular collar-pieces *g′* arranged thereon, and fastened thereto by thumb-screws *g″*.

Collar-pieces *g′* have arms *h*, which project up sufficiently far to permit shafts L to pass through and turn in holes in their upper ends. Collars *h′* are secured to shafts L L, so as to confine the upper ends of arms *h* between said collars and pulleys M″ on shafts L. It will thus be seen that when slide-rods *g* are moved back and forth they will impart a corresponding back-and-forth motion to shafts L and their tenoning-cutters 13, and such back-and-forth motion is automatically produced, when the machine is in operation, in the same manner on both ends of the machine; consequently it will be only necessary to describe the operation of the slide-rod on one end, which is as follows: To the inner end of each slide-rod *g* is pivoted the outer end of a short link, *n*, the inner end of said link being pivoted near one end of link-piece *n′*, which, in turn, is fulcrumed at 14 upon the top of stand-piece 14′, made fast to the sliding plate A′. The other end of link-piece *n′* is pivoted to one end of link-piece 15, the other end of link-piece 15 being pivoted to the rear end of rod 16, which passes through the rear guide-piece E‴, and has the rear end of a spiral spring, 16′, secured to it, the other end of said spiral spring 16′ being connected by means of screw 17 to the inside of plate F, so that when said plate is moved back and forth by means of crank G″, as before explained, the rear end of link-piece 15 will be drawn back and forth, together with link-pieces *n n′*, and when drawn forward it will draw spindle *g*, together with its shaft L and its tenoning-cutter 13, forward just before it reaches its extreme forward motion, and then when it is moved back into the position shown in the drawings, spindle *g*, shaft L, and its cutter-head 13 will be moved back into the positions shown in the same drawings.

In consequence of the peculiar arrangement of the link devices which connect spindles *g* to their respective rods 16, spindles *g* and shafts L rest from their longitudinal movements for a considerable length of time after they have been drawn forward, and also after they have been moved back, the forward rest allowing sufficient time for the tenoning-cutter 13 to cut the tenons, and the back rests sufficient time for a new round or stick to be moved into the proper position to be tenoned, and the tenoned stick or round delivered from the machine.

In case any obstruction prevents the tenoning-cutters, or either of them, from moving forward to the proper distance when plates F are moved forward, spring or springs 16′, as the case may be, will yield, and thus prevent breakages of the machine.

Rocking shafts O O, one on each end of the machine, are supported in standards O′ O″, the lower ends of which are securely fastened to their respective sliding plates A′. To each rocking shaft O are secured a set of curved arms, P, one arm P at each end of each rocking shaft O. To the front ends of each set of the curved arms P plates P′ are secured, said plates being arranged directly above the stock-supporting rails E′ E′. Each rocking shaft O is provided with an outwardly-projecting arm, P″ P″, having a slotted stud, P‴, projecting toward the front side of the machine to receive the bearing of a screw-spindle, Q, said spindle being held in place in its slotted bearing by a pin passing through a hole in the end of the slotted stud, the pin being connected to arm P″ by means of a chain or cord, to prevent its being lost. The front ends of adjusting-screws Q Q screw into corresponding screw-holes in stands 18, secured to projections on the standards O″ by means of turning joints, so that when the holding-pins in the slotted bearings P‴ are removed, the outer ends of screw-spindles Q can be turned round against the standards B B, thus permitting the stock-holding plates P′ to be swung up without the necessity of removing adjusting screw-spindles Q.

When adjusting-screws Q are turned in one direction, their respective stock-holding plates P′ will be depressed, and vice versa, thus enabling the operator to increase or diminish, as occasion may require, the space between the stock-supporting rails E′ and stock-holding plate P′.

Upon the inside of each stock-holding plate P′ is arranged a self-adjusting spring-plate, 19, pivoted at its front end to its respective plate P′ at 20, its rear end being held down by spring 21, secured at one end to plate P′, while its other end presses upon the lower side of a rectangular opening or slot. To give said spring greater force, its tension is increased by passing it under a pin projecting from the inner side of plate P′. (See Fig. 4.) Back of the rectangular slots in the respective plates 19 are star-wheels R, which turn upon journals projecting from the insides of said plates; and back of said star-wheels, star-wheel-holding dogs R′ are journaled to the insides of plates 19, said dogs being provided with pins 22, which project over both plates 19 and P′, and under a spring, 23, at-

tached to the outer side of an upward-projecting part of plate 19, the tension of said spring being increased by passing under a pin, 24, projecting from the outside of plate 19.

Said dogs, as will be seen by reference to Fig. 4, are so arranged, in relation to their respective star-wheels, as to prevent their turning, except in one direction, for a purpose hereafter explained.

The rear upper end of each arm F″ is held up in the position shown in the drawings by means of a spring, 25, attached to the inside of its plate F, which acts upon a stud, 26, projecting from the inside of arm F″ through a slot in plate F, as indicated in full and dotted lines, Figs. 4 and 5. The slots in plates F are large enough to permit the upper edges of the rear ends of arms F″ to be depressed down below the upper edges of stock-supporting rails E′ in any adjusted position in which said rails may be used. From the bottom of each slide-plate A′ a lug projects, into which a screw-spindle is fitted, the outer ends of said spindles turning in bearings in the cross-pieces of their respective ends of the main frame, whereby, when said spindles are turned by means of hand-cranks S in the balance-wheels S′, attached to the outer ends of said screw-spindles, said sliding plates, together with all the operating parts of the machine attached to their upper sides, can be moved out or from each other, and vice versa, thus enabling the operator to quickly adjust the machine for cutting off and tenoning the ends of rounds or sticks of different lengths; and to enable him to set the cutting-off and tenoning mechanism of each end equidistant from the center of the machine, gage-plates T, properly marked with division or index lines, are secured to the front edge of each slide-plate A′, while an index or pointer, T′, is secured to the front upper edge of each end of the main frame A, with its index or finger projecting over said gage-plates, as fully indicated in Fig. 1 of the drawings. Long slots are cut in the sliding plates A′, so that the necessary motions of the belts which drive the cutting-off and tenoning shafts will not be impeded, or the belts unduly chafed or worn, when said shafts are moved longitudinally back and forth. Said shafts are also provided with long pulleys, which allow the belts to change their positions on the pulleys as the latter are moved back and forth with their driving-shafts. The ends of the stock-holding plates P′ next to the feed-table are set a little lower than they are at their rear ends, and so near the stock-supporting rails E′ that when the round or stick is forced between them it will be held from turning while the saws are cutting off the ends. The rear ends of the plates 19 are set so that their lower edges will press upon the round or stick after it is moved from under the star-wheels, and this pressure is sufficient to keep the round or stick in position until it leaves the machine. From the foregoing description it will be seen that the machine is so constructed that it can be easily adjusted to receive and tenon rounds or sticks of different sizes.

The operation of feeding in, cutting off, and tenoning the rounds or sticks is as follows: The operator places any desired number of sticks or rounds to be cut off and tenoned on the feed-table C′′′′′, and then adjusts the stick-guides 6 to the proper position to receive the sticks, plates A′ having been previously adjusted so as to bring the saws and tenoning-cutters the proper distances apart. The machine now being put into operation, a rapid rotary motion will be imparted to saw-shafts K and tenoning-cutter shafts L, while a reciprocating motion will be imparted to plates F and the parts secured thereto. The operator now takes a round or stick and places it between stock-guides 6, and allows it to fall down into the opening or mouth *a*, when its ends will rest and be supported upon the upper edge of adjustable plates F′, until said plates have been moved forward, and until the opening *d* between the adjustable plates F′ and arms F″ is brought directly under the round or stick, which falls down into said opening, and until its ends rest upon the stock-supporting rails E′; and when plates F, together with the parts secured thereto, are moved back, the round or stick 27 is carried back, and as it passes the saws its ends are cut off, after which the round or stick is carried still farther back, until its ends are forced directly under the star-wheels R, in which position it is firmly held by said star-wheels while the tenoning-cutters are drawn forward to cut the tenons on its ends, and which longitudinal motion of the tenoning-cutters is produced by the forward motion of plate F, as before explained.

When plate F is moved forward after having carried a round or stick, 27, to the position shown in Fig. 4, the upper ends of adjustable arms F″ spring down and are drawn forward under the stick, and as soon as their rear ends are drawn beyond the round or stick, they spring up into position again, ready to receive and hold another round or stick when the opening *d*′ is brought under the mouth or opening *a*, as before explained. With the next back motion of plates F, the rear ends of arms F″ come in contact with the tenoned stick, and forces it along upon stock-supporting rails E′, and under self-adjusting spring-plates 19, until it is delivered from the machine into any proper receptacle arranged for that purpose below the rear ends of stock-supporting rails E′. The star-wheels are turned during this operation into the proper position to allow the next round or stick to be forced or carried into the proper position for being held while the tenons are being cut, as before explained, and as shown in Fig. 4 of the drawings.

The operator may fill the space above opening *a*, and between stock-guides 6, with rounds or sticks, from which they will fall one at a time into the openings *d'* during the operation of the machine, thus relieving the operator from constant attendance and the necessity of placing each round or stick into the mouth or opening *a* during the operation of the machine.

Hoppers of different shapes may be employed to receive the rounds or sticks in lieu of the one shown in the drawings, and in some cases it may be desirable to combine a friction-roll with said hopper, for the purpose of insuring the regular descent of a round or stick into the openings *d'* at each forward motion of plates F.

When the machine is made, the link arrangements, by which the guide-rods *g g* are connected to the plates F, or other suitable parts of the working mechanism, are to be constructed and arranged so as to give an extreme motion to the guide-rods *g g*, sufficient to cut any desired length of tenon. Then, by moving or adjusting collar-pieces *g' g'* back on their respective guide-rods *g g*, a shorter tenon can be cut, as desired.

If it be desired to cut tenons upon rounds or sticks larger than those shown in the drawings, then the operator adjusts or raises the feed-table, and also adjusts the parts so as to increase the width of the opening or mouth *a*, and also the width of the opening or space *d'*. He also lowers the rails E' and raises plates F, thereby increasing the openings *d* in height in the same proportion that they are widened. The stock-holding plates P' are also raised the proper distance.

If desired in any case, the star-wheels, and the self-adjusting plates to which they are attached, may be dispensed with, and the upper stock-holding rails so arranged as respects the lower stock-supporting rails that the stick will be held sufficiently firm between them to retain the round or stick in proper position while the tenons are being cut.

Having described my improvements in machines for cutting off and tenoning chair-rounds, and for other purposes, what I claim therein as new and of my invention, and desire to secure by Letters Patent, is—

1. The combination of the feed-table proper C'''' with the side pieces C''', said feed-table and side pieces being adjustable in a horizontal plane, and operated to move simultaneously in opposite directions, for the purpose of varying the size of the feed-opening or throat, substantially as and for the purposes set forth.

2. The combination, with the vertically-adjustable frame B', of the horizontally-adjustable feed-table C'''' and side pieces C''', arranged and operating substantially as shown and set forth.

3. The combination, with rails E'', of guide-bars 8'', stock-supporting rail E', and intermediate right and left threaded adjusting-screws 8, by the rotation of which said stock-supporting rails and guide-bars are moved simultaneously in opposite directions, substantially as and for the purposes set forth.

4. The combination, with stock-supporting rails E', guide-bars 8'', rails E'', screws 8, and shafts 10, of gears 9 and worm-gears 9', substantially as and for the purposes set forth.

5. The combination of slide-plates F with the guide-pieces E''', guide bars 8'', and stock-supporting rails E', substantially as and for the purposes set forth.

6. The combination, with the slide-plates F, of the plates F' and arms F'', adjustable to and from one another, to vary the size of the stock-receiving openings between them, substantially as and for the purposes set forth.

7. The combination, with slide-plates F, plates F', and arms F'', of hinged yoke-piece *b* and adjusting-screw *c*, substantially as and for the purposes described.

8. The combination, with slide-plates F and arms F'', of springs 25 and pins or screws 26, substantially as described.

9. The combination, with the guide-rods *g g* and slide-plates F F, of the rods 16 and links *n n'* and 15, substantially as and for the purposes set forth.

10. The combination, with the slide-plates F, guide-rods *g*, and links *n n'* and 15, of the rods 16 and springs 16', substantially as and for the purposes set forth.

11. The combination, with the slide-plates F and tenoning-shafts L, of the guide-rods *g*, connected with the plates F, and provided with adjusting collars and screws *g' g''* and arms *h*, connected with and adapted to impart endwise movement to the tenoning-shafts, at the times and in the manner set forth.

12. The combination, with the stock-holding plates P', of rock-shafts O, arms P P'', and adjusting-screws Q, substantially as and for the purposes stated.

13. The combination, with the adjusting-screws Q, of the slotted bearings P''' and turning bearings 18, substantially as and for the purposes set forth.

14. The combination, with the stock-supporting rails E', of the stock-holding plates P' P', plates F F', and arms F'', substantially as and for the purposes set forth.

15. The combination, with the stock-holding plates P', of the self-adjusting plates 19, substantially as and for the purposes set forth.

16. The combination, with stock-holding plates P' and self-adjusting plates 19, of springs 21, for the purposes set forth.

17. The combination, with stock-supporting rails E', and the sliding stock-carrying frame moving thereon, of the stock-holding plates, arranged above said sliding frame, and the star-wheels and holding-dogs, mounted on and carried by said plates, under the arrangement and for operation as set forth.

18. The combination, with sliding plates F, slide-rod G′, and cranks G″, of pins or projections *e*, tubular sliding piece G *e*″, rod *e*′, pitman G‴, coupling-pieces H, and hinged swinging piece H′, substantially as and for the purposes set forth.

19. The combination of the laterally-projecting rod *e* with the plates F and sliding piece G *e*″, substantially as described, whereby both slide-plates will be thrown forward and back the same distance each time, whatever the lateral adjustment of the sliding plates A′ may be.

20. In combination with the reciprocating stock-carrying frame, the feeding, cutting-off, and tenoning mechanisms, mounted each side of the said reciprocatory frame, on frames adjustable in a horizontal plane at right angles to the path of movement of the said reciprocating stock-carrying frame, substantially as shown and described.

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Witnesses:
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