No. 609,161. Patented Aug. 16, 1898.

W. E. NICHOLS.

MACHINE FOR CUTTING BOX CORNERS.

(Application filed Sept. 20, 1897.)

(No Model.) 3 Sheets—Sheet 1.

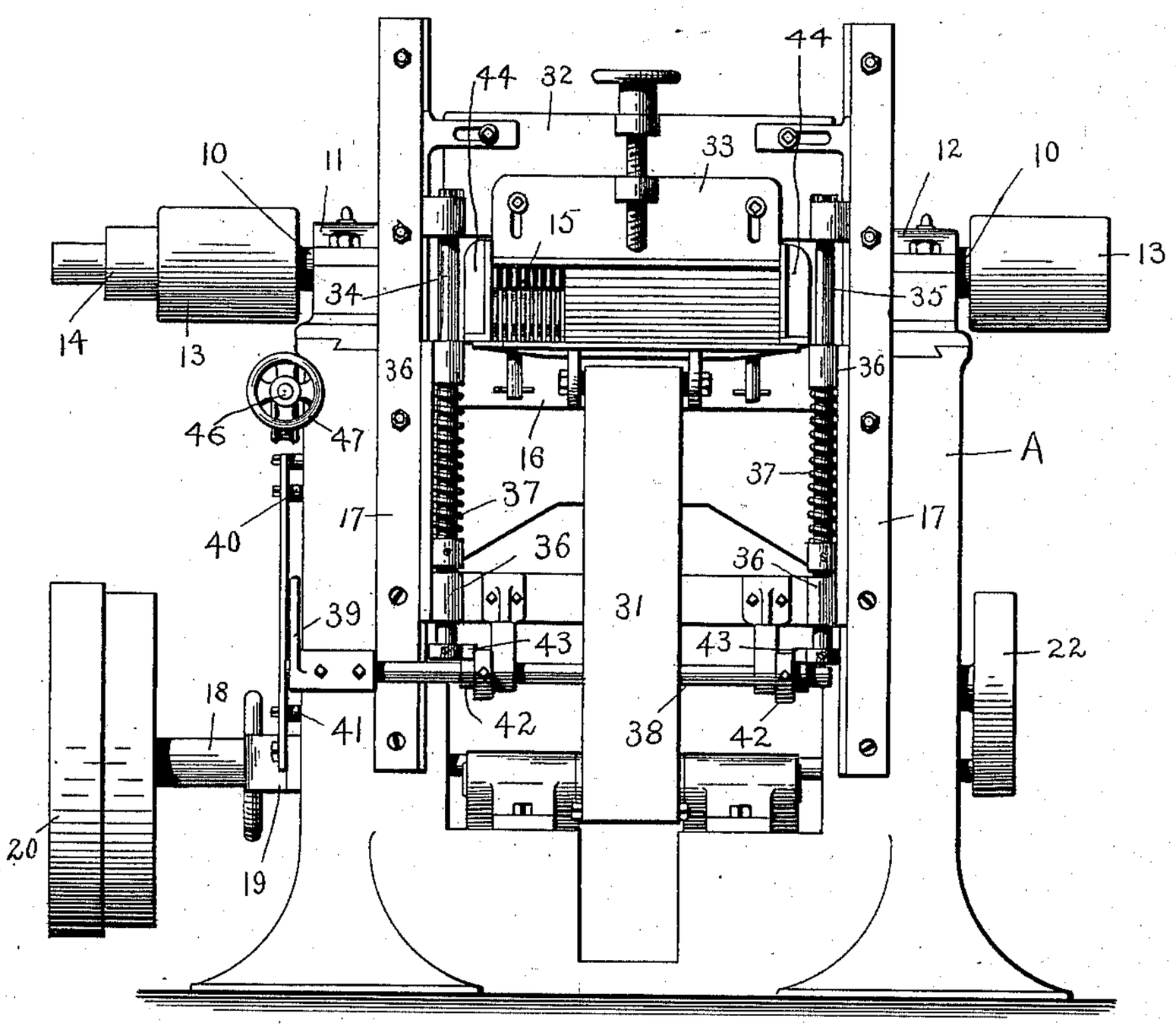

Fig. 1.

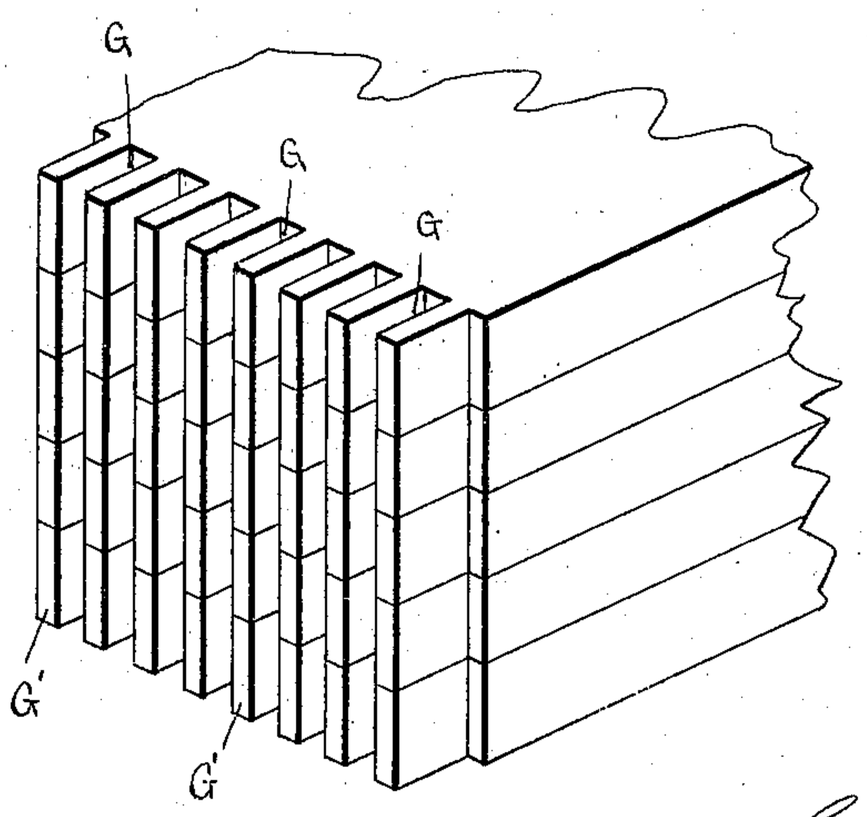

Fig. 2.

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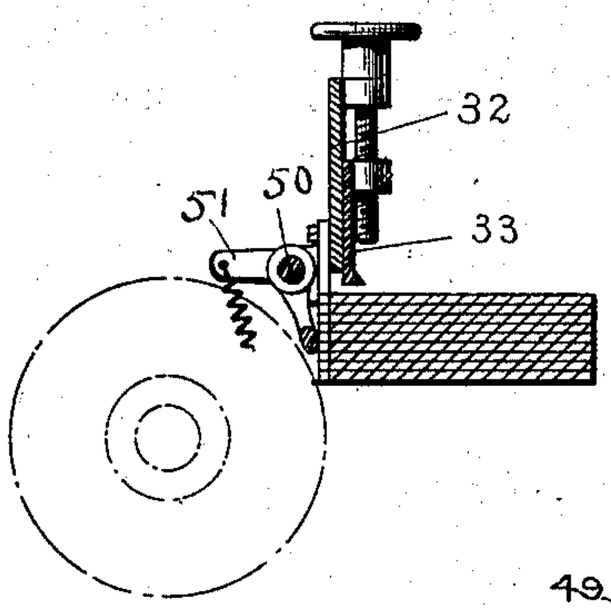


Fig. 4.

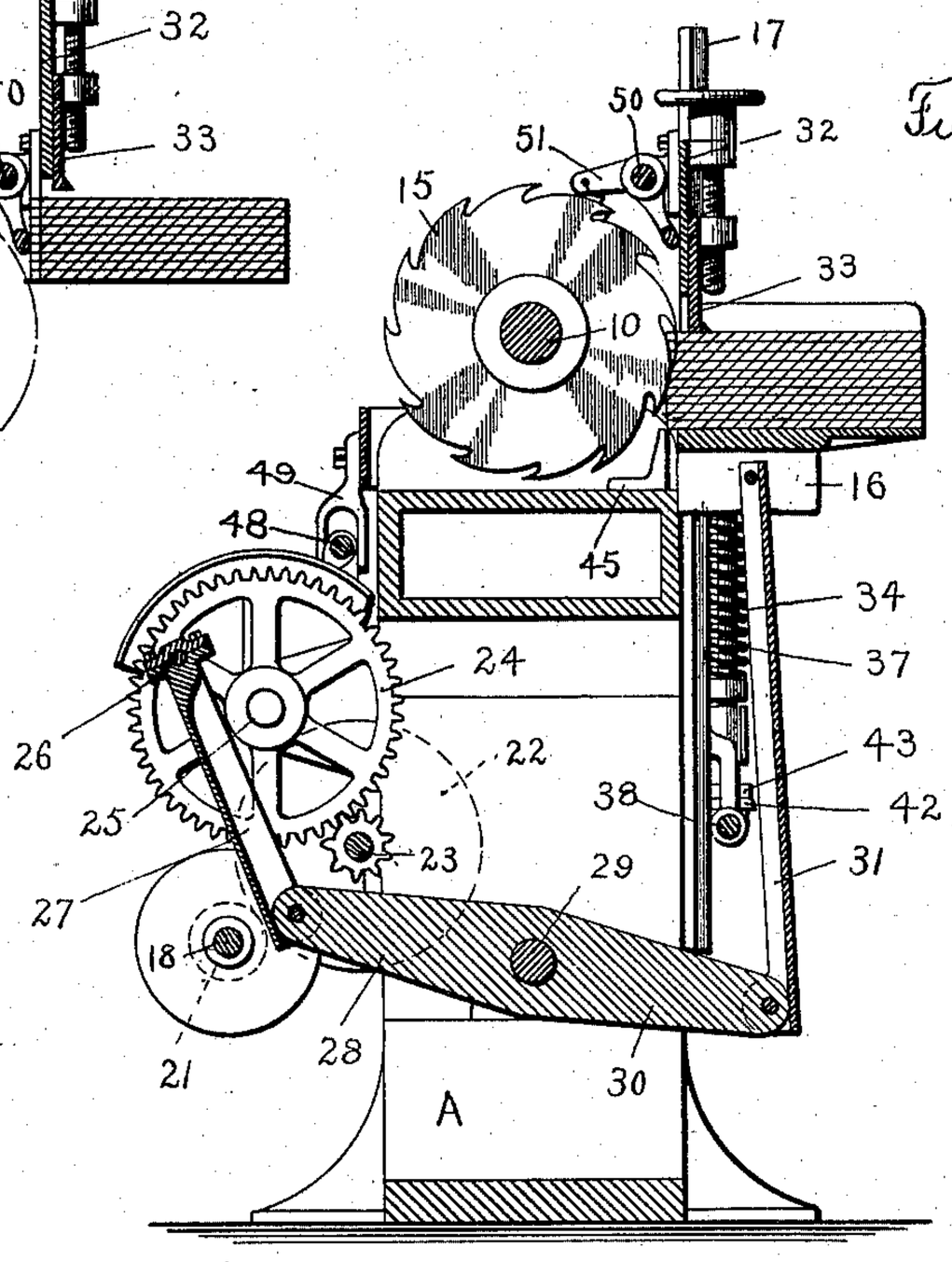
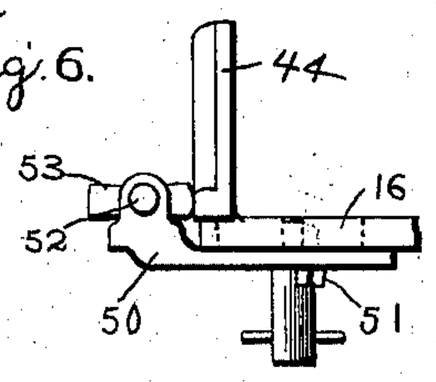


Fig. 3.

Fig. 6.



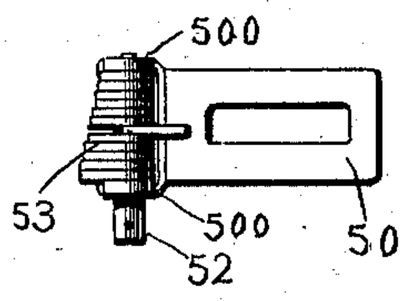


Fig. 7.

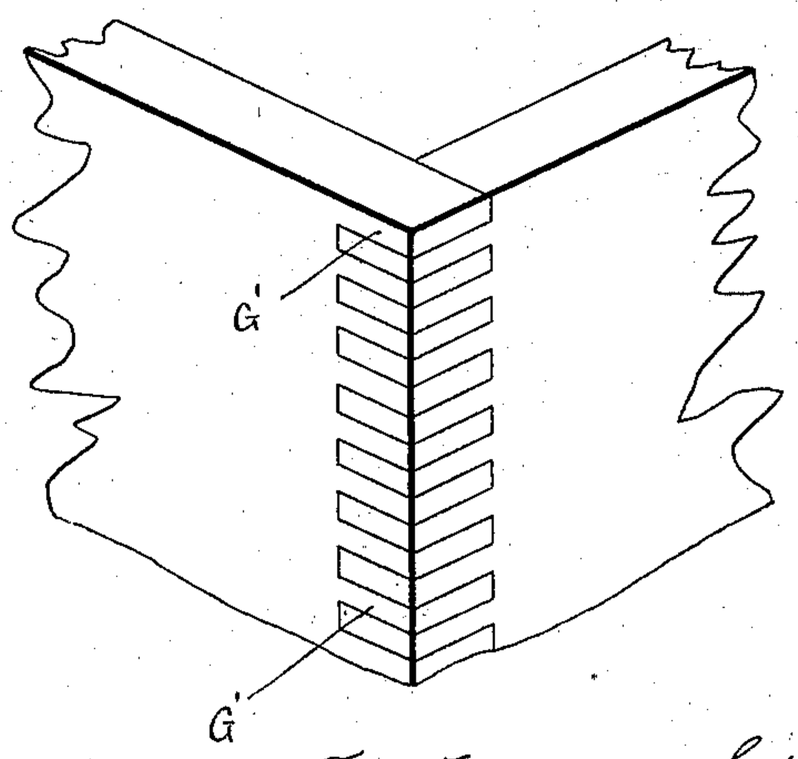


Fig. 5.

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(No Model.) 3 Sheets—Sheet 3.

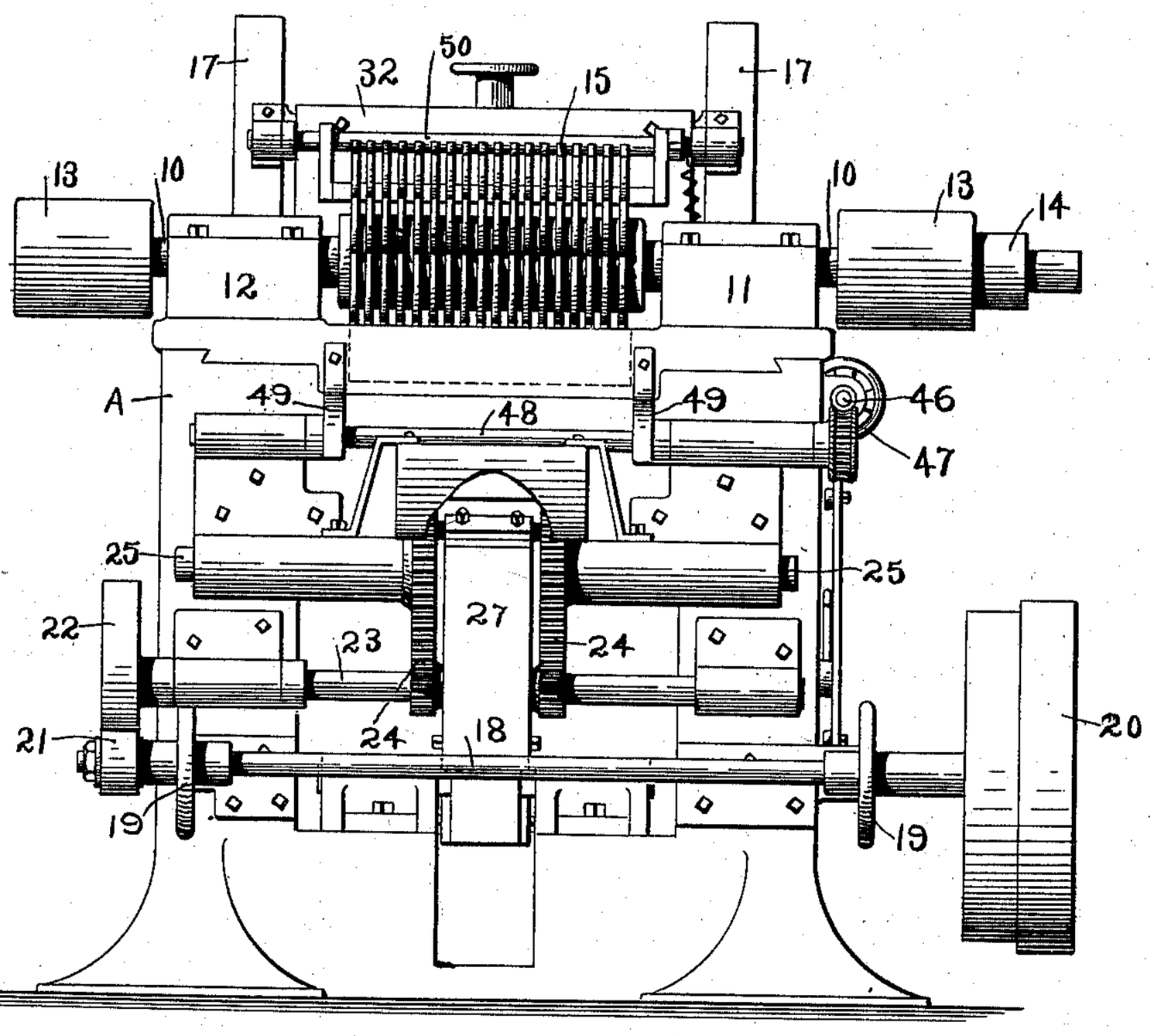

Fig. 8.

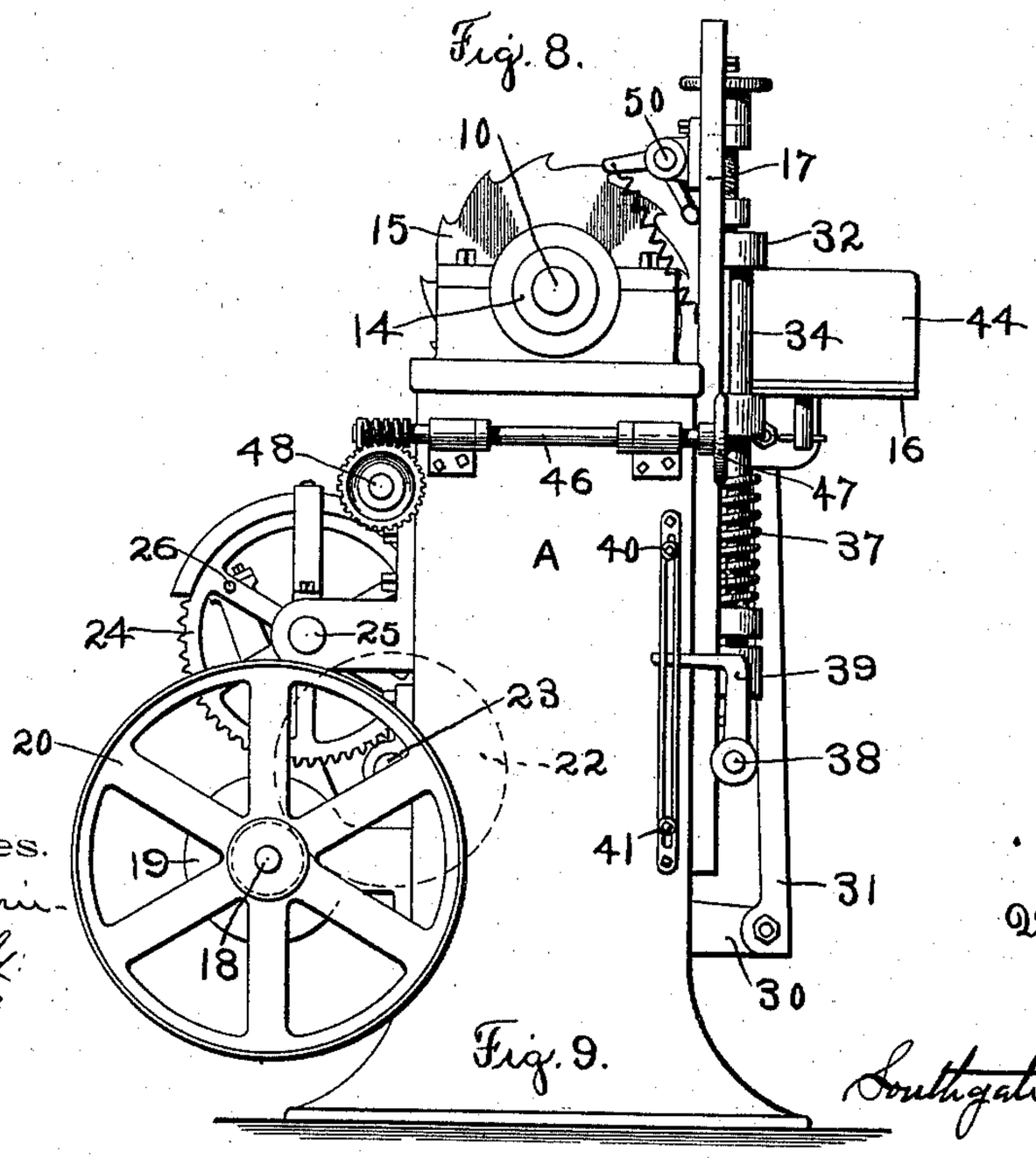

Fig. 9.

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UNITED STATES PATENT OFFICE.

WILLIAM E. NICHOLS, OF WINCHENDON, MASSACHUSETTS.

MACHINE FOR CUTTING BOX-CORNERS.

SPECIFICATION forming part of Letters Patent No. 609,161, dated August 16, 1898.

Application filed September 20, 1897. Serial No. 652,329. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM E. NICHOLS, a citizen of the United States, residing at Winchendon, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Machines for Cutting Box-Corners, of which the following is a specification.

My invention relates to a woodworking-machine; and the object of my invention is to provide a strong, simple, and efficient machine for cutting grooves in the end of a series of boards or a block to leave tongues which may be intermeshed to form box-corners.

To this end my invention consists of the parts and combinations of parts, as hereinafter described, and more particularly pointed out in the claims at the end of this specification.

In the accompanying two sheets of drawings, Figure 1 is a front view of a machine constructed according to my invention. Fig. 2 is a perspective view showing one end of the boards after the same have been operated upon by my machine. Fig. 3 is a transverse sectional view of the machine. Fig. 4 is a detailed view showing the position of the clamping-jaw when the same is released from the work, it being assumed in this view that the feed-table has reached the top of its stroke and is again descending. Fig. 5 is a detailed view of a box-corner formed by the boards which have been tongued by my machine. Figs. 6 and 7 are views of a detail herein referred to. Fig. 8 is a rear view of a machine constructed according to my invention, and Fig. 9 is a side view of the same.

A box-corner machine constructed according to my invention comprises a cutter preferably formed by a series of saws, a feed-table for carrying the work, and means for moving the table to present the work to the saw. A spring-pressed clamping-jaw is arranged to engage the work and hold the same in position on the feed-table while being operated upon.

When the work has been moved past the cutters, the clamp-jaw will be automatically moved out of engagement with the work, and a kick-out device may be employed for throwing the work back from the cutters.

Referring to the drawings and in detail, A designates the base or frame of the machine, which is preferably cast in box form, with suitable supporting-feet, as shown.

A main shaft 10 is journaled in boxes 11 and 12, adjustably mounted on the frame A.

Secured to the main shaft 10 are pulleys 13, to which power may be applied for driving the machine. Secured to the end of the main shaft 10 is a step-cone 14.

15 designates the cutter. This cutter preferably comprises a number of saws, which are set some distance apart, so that when a plank or block is moved past the same a number of grooves will be cut in the end thereof, leaving a series of tongues.

A feed-table 16 is movably mounted on vertical ways 17 at the front of the machine.

The gearing which I preferably employ for operating the feed-table 16 comprises a shaft 18, journaled in overhanging boxes 19, secured to the base A. Upon one end of the shaft 18 is secured a step-cone 20, which may be driven by a belt from the step-cone 14. At its opposite end the shaft 18 is provided with a friction-wheel 21, shown in dotted lines in Fig. 3, which bears upon and drives a wheel 22, secured to a counter-shaft 23.

Secured on the counter-shaft 23 are pinions which mesh with and drive geared-wheels 24, carried on shafts 25. Connecting the gear-wheels 24 is a crank-pin 26.

27 designates a pitman which connects the crank-pin 26 with an arm 28, extending from the shaft 29. Extending from the opposite side of the rock-shaft 29 and preferably formed integrally with the arm 28 is an arm 30, which is connected by a pitman 31 to the feed-table 16.

By means of this construction it will be seen that the feed-table 16 will be moved up and down past the cutters 15.

The spring-pressed clamp-jaw which I employ for securing the work in place on the feed-table 16 comprises a slide 32, mounted on the ways 17 of the machine, and a jaw 33, adjustably secured to the slide 32.

Extending down from the slide 32 are rods 34, which extend through lugs 36 of the feed-table 16.

Mounted on the rods 34 are spiral springs 37, which normally tend to move the clamping-jaw into engagement with the work.

A rock-shaft 38 is mounted in bearings extending down from the feed-table 16.

Secured to the end of the rock-shaft 38 is a bell-crank lever 39.

Adjustably mounted on the frame A, in position to coöperate with the bell-crank lever 39, are adjustable stops 40 and 41.

Cam-pieces or rockers 42 are secured on the rock-shaft 38 in position to engage foot-pieces 43, secured to the lower ends of the rods 34. By means of this construction it will be seen that when the feed-carriage 16 is moved up the bell-crank lever 39 will engage its stop 40 to turn the rock-shaft 38, so that the rockers or cams 42 will raise the clamping-jaw out of engagement with the work. In a similar manner when the feed-table 16 reaches the lower end of its stroke the bell-crank lever will engage its adjustable stop 41, turning the rock-shaft 38 in the opposite direction and again raising the clamping-jaw.

Suitable side gages 44 are secured in the feed-table 16 and may be held in an adjusted position by means of clamping-handles in the ordinary manner.

A back or depthing gage 45, as shown in Fig. 3, may be secured to the frame A.

The means which I preferably employ for adjusting the depth of the cut comprises a shaft 46, having a hand-wheel 47 at the front of the machine.

A cross-shaft 48, as shown in Fig. 3, may be driven from the shaft 46 by the ordinary worm-gearing and is provided with small cams for engaging pieces or brackets 49. By means of this construction the boxes 11 and 12 of the main shaft 10 can be moved toward or away from the front of the machine, and they may be clamped in their adjusted position by means of the ordinary clamping-bolts, which need not be shown or described herein.

In some cases I contemplate employing a spring-press kick-out for moving the work back from the cutters, and I have illustrated such a construction in Figs. 3 and 4. As shown in these figures, the rock-shaft 50 is journaled on a cross-piece secured to the ways 17 of the machine.

A spring is secured to the end of an arm 51, extending from the rock-shaft 50, and normally tends to turn the rock-shaft, so as to push the work back in position to be clear of the cutters during the return stroke of the feed-table.

In Fig. 4 the work is shown in the position which it would assume after the feed-table has completed its upstroke and is again descending. During the latter part of the upstroke of the feed-table the clamp-jaw will be released by means of the connections before described and the kick-out will act substantially as a cam to push the successive boards or planks back as the same move up past the transverse bar thereof, so that when the feed-table is again upon its descending stroke, as illustrated in Fig. 4, all portions of the work will have been moved back free from the cutter.

The operation of the machine as thus constructed is as follows: The gages are first set to the desired position and the main shaft 10 is adjusted on the frame to produce the desired depth of the cut. The saws will be rotated by belt at a comparatively high rate of speed, and by means of the gearing before described the work-table will be moved up and down in front of the cutters. The operator then takes the work, which may be either a block of lumber or a number of boards, and places it in position on the feed-table to bear against one or both of the side gages and on the depthing-gage. This is done when the feed-table is in its lowest position. As the table moves up the work will come in contact with the spring-pressed jaw and will raise or carry said spring-pressed jaw with it. This will tightly clamp the work in position on the feeding-table while the saws are cutting the grooves in the end thereof. When the feed-table reaches the upper end of its stroke, the rock shaft 38 will be operated and the clamping-jaw will be moved out of engagement with the work and the kick-out will move the work back, so as not to engage the cutters when the feed-table descends. The operator can then turn the work around and repeat the operation to cut the other end of the work.

In Fig. 2 I have shown one end of the work after the same has been operated upon. The work, as before stated, can consist either of a block or of a series of boards. If the work consists of a block, the same is sawed into boards after the ends thereof have been grooved by the machine. By thus forming grooves G in the ends of the boards B the tongues G′ left between the grooves may be meshed together to form the corner of a box, as shown in Fig. 5.

The side gages 44 can be suitably adjusted so that a clear space will be left on one side of the piece operated upon, in which the groove for the cover can be cut. To set the gage, I provide a suitable adjusting mechanism, which is shown in Figs. 6 and 7. This adjusting mechanism consists of a piece 50, which is held by a screw 51 to the under side of the table 16. This piece has two upwardly-projecting lugs 500, in which is secured a shaft 52. On this shaft 52 are set a number of gages or fingers 53 of gradually-varying lengths, so that by turning the proper finger 53 into position the side gages 44 can be properly set to leave the desired blank space without any measurement.

I am aware that changes may be made in the construction of box-cornering machines by those who are skilled in the art. For example, the kick-out may be omitted and different forms of driving-gearing can be employed without departing from the scope of my invention as expressed in the claims.

I do not wish, therefore, to be limited to

the construction which I have shown and described; but

What I do claim, and desire to secure by Letters Patent of the United States, is—

1. In a machine for the purpose stated, the combination of a series cutter or plurality of circular saws, a reciprocating feed-table mounted in ways, rods mounted in lugs formed on said table springs engaging said rods, and means for automatically relieving the clamping-jaw when the table is at the end of its stroke in either direction, substantially as described.

2. In a machine for the purpose stated, the combination of a series cutter or plurality of circular saws, a vertically-movable feed-table, rods mounted in said feed-table, a clamping-jaw carried by said rods, springs for normally holding said clamping-jaw into engagement with the work, a rock-shaft mounted in the table cam-pieces or rockers secured to said rock-shaft to raise the clamping-jaw, and means for operating said rock-shaft to release the clamping-jaw when the table is at the end of its stroke in either direction, substantially as described.

3. In a machine for the purpose stated, the combination of a bed piece or frame, a vertically-movable feed-table, a main shaft having a series cutter or a plurality of circular saws, means for adjusting the main shaft to regulate the depth of the cut, spring-pressed rods mounted in the feed-table, a clamping-jaw carried by said rods, a rock-shaft having cam-pieces or rockers for relieving said clamping-jaw, and adjustable stops for operating said rock-shaft when the feed-table is at the end of its stroke in either direction, substantially as described.

4. In a machine for the purpose stated, the combination of a feed-table, an adjustable gage mounted thereon, and a setting mechanism for the gage, comprising a number of varying-sized fingers 53, any one of which can be turned so that the gage can be set against the same, substantially as described.

5. In a machine for the purpose stated, the combination of a feed-table, an adjustable gage as 44 journaled thereon, a piece 50 carrying shaft 52, and a number of fingers 53 of different lengths, any one of which may be turned into position so that the gage can be adjusted thereby, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

WILLIAM E. NICHOLS.

Witnesses:

LOUIS W. SOUTHGATE,

E. M. HEALY.