(No Model.) 4 Sheets—Sheet 1.

S. F. TIBBETTS.

WOOD WORKING MACHINE.

No. 388,320. Patented Aug. 21, 1888.

FIG. 1.

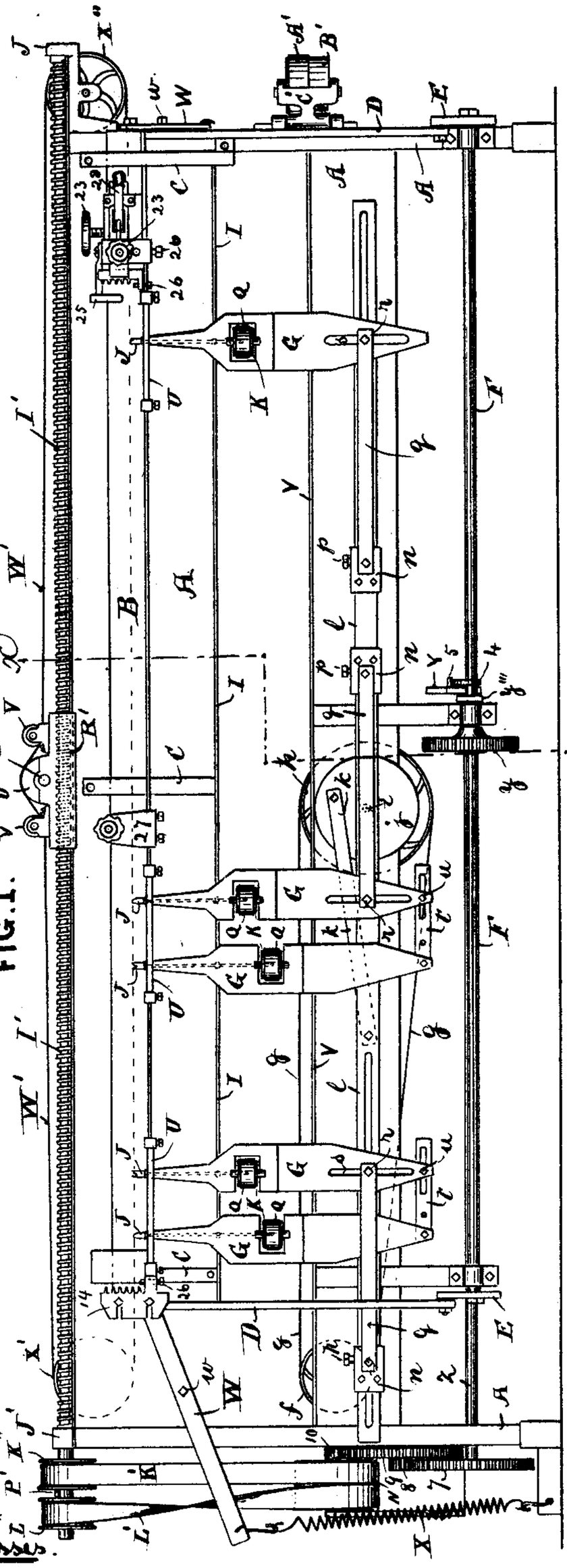


FIG. 8.

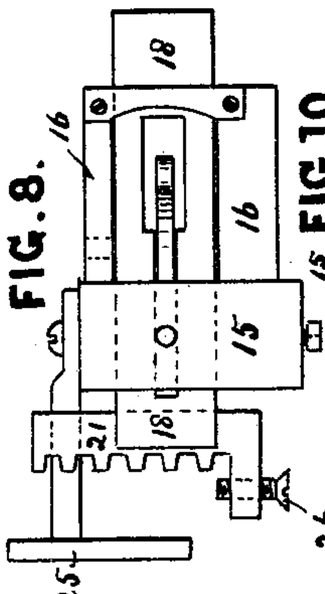


FIG. 10.

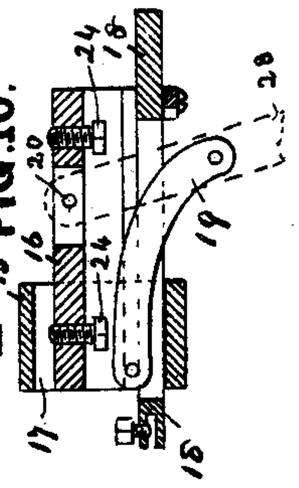


FIG. 9.

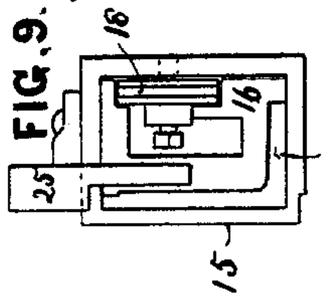
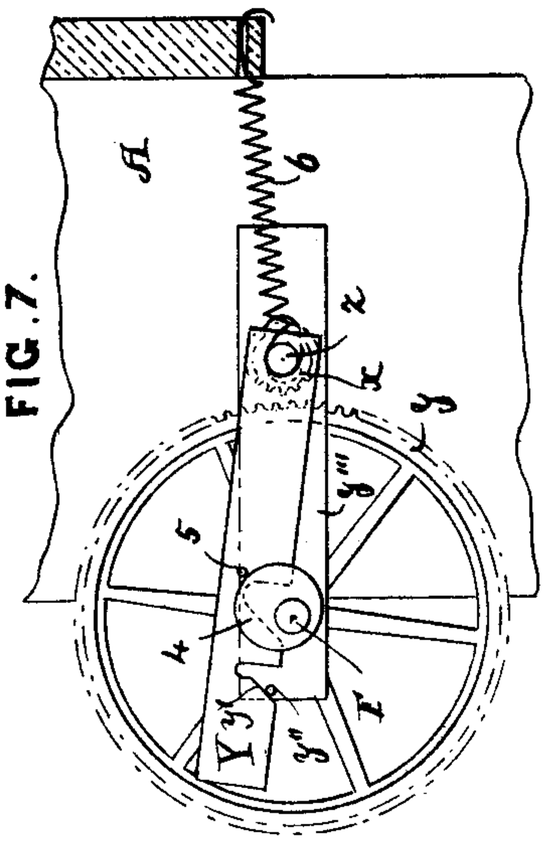


FIG. 7.



Witnesses.
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(No Model.)

4 Sheets—Sheet 2.

S. F. TIBBETTS.

WOOD WORKING MACHINE.

No. 388,320. Patented Aug. 21, 1888.

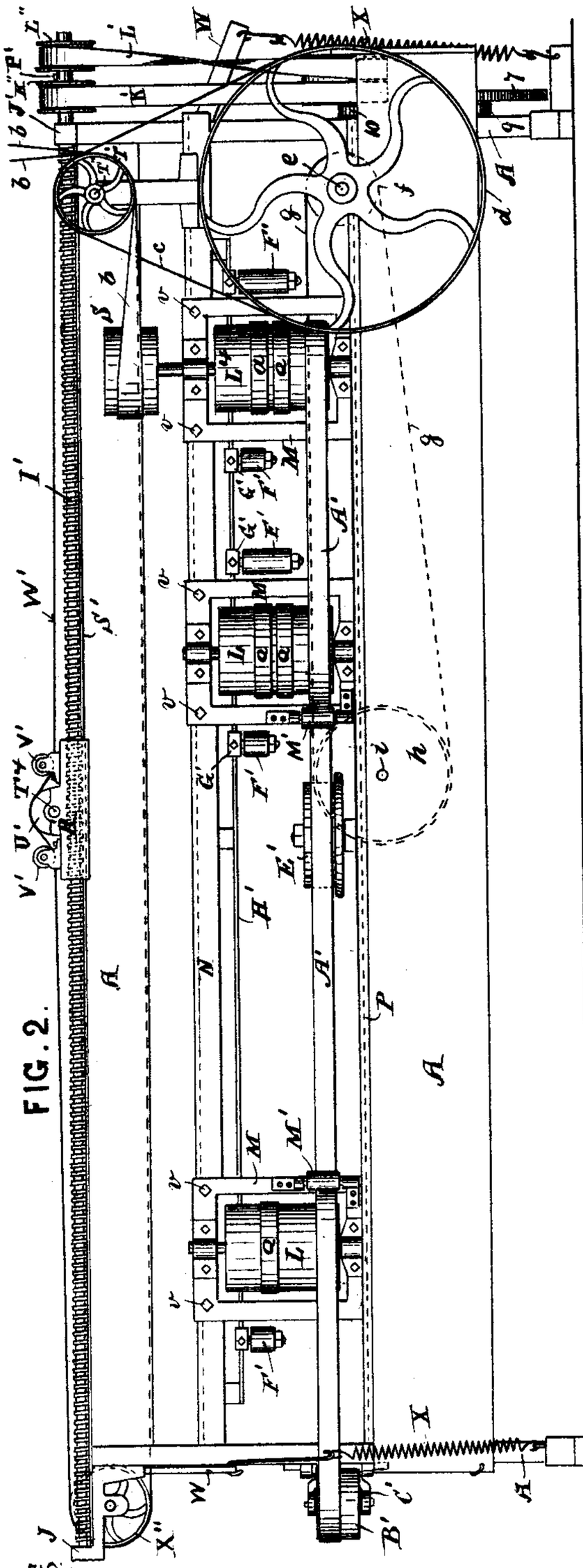

FIG. 2.

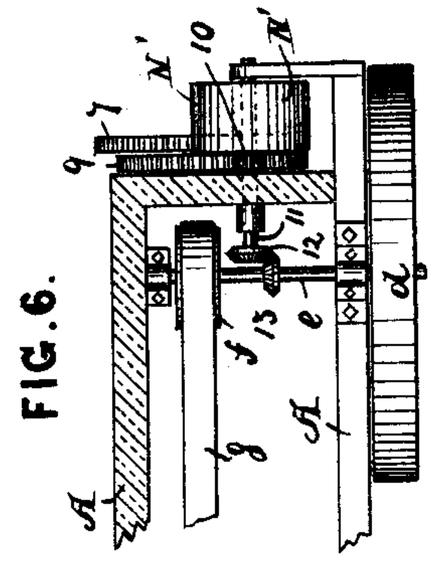

FIG. 6.

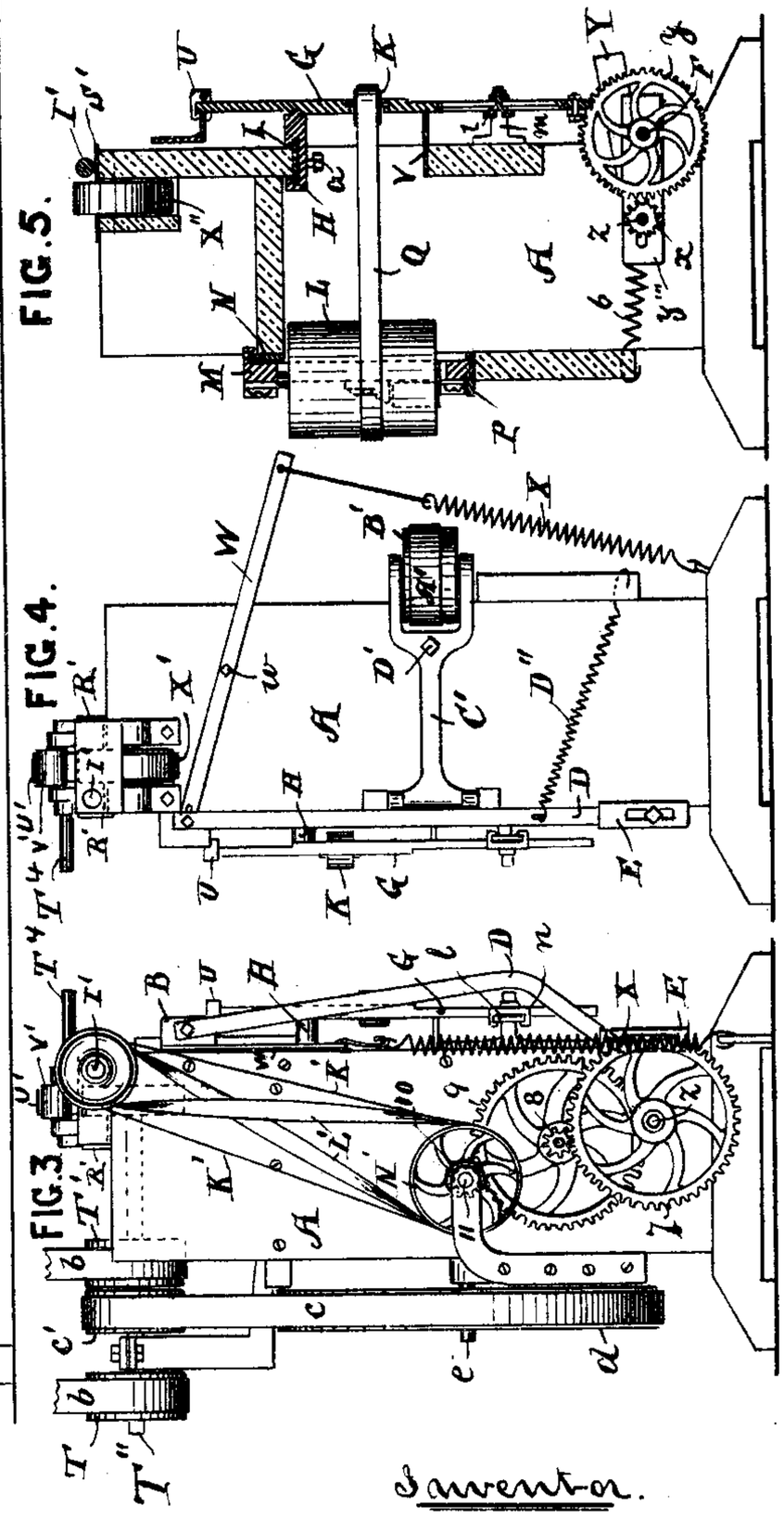

FIG. 5.

FIG. 4.

FIG. 3.

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(No Model.) 4 Sheets—Sheet 3.

S. F. TIBBETTS.

WOOD WORKING MACHINE.

No. 388,320. Patented Aug. 21, 1888.

FIG. 11.

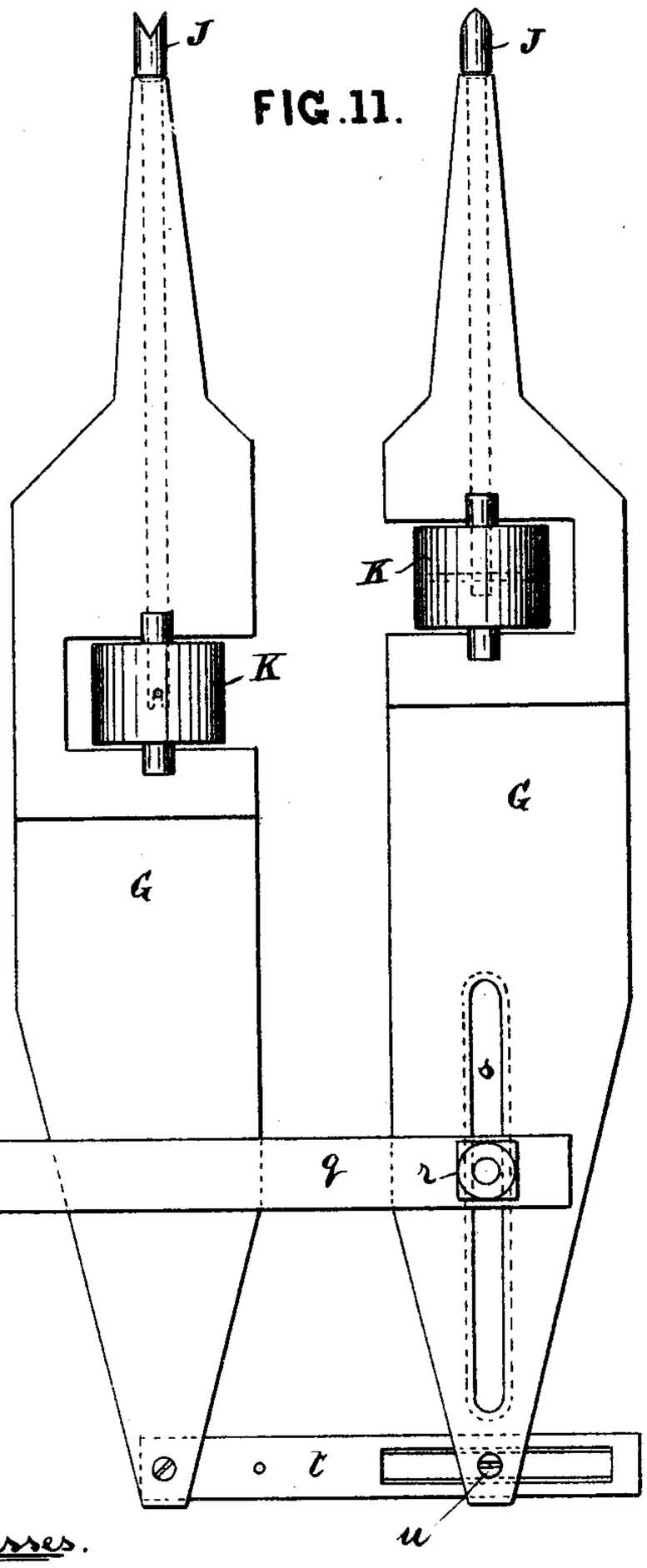
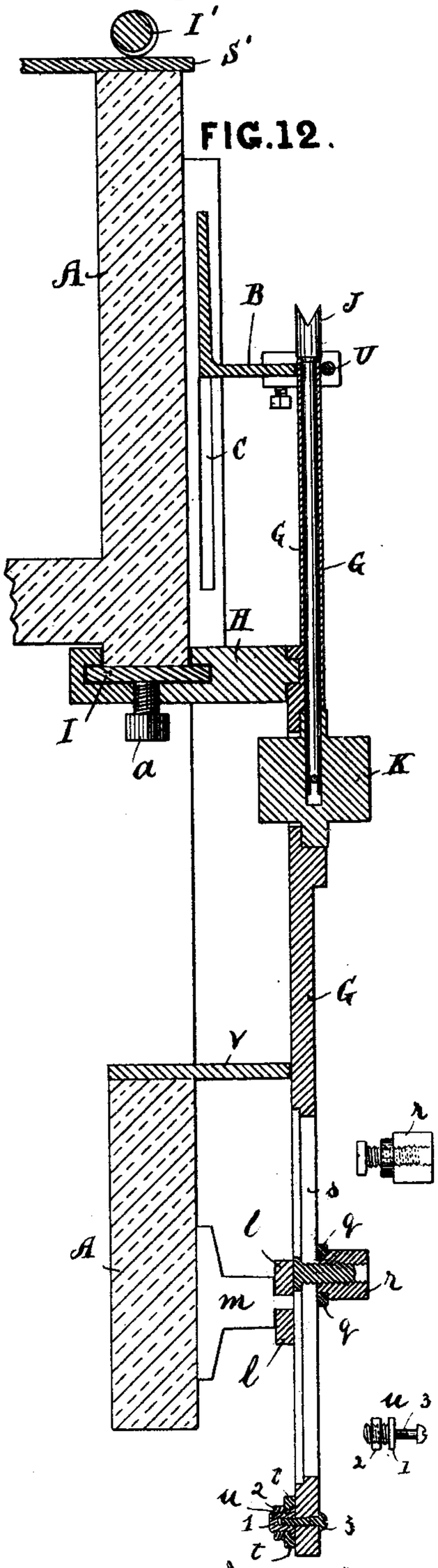


FIG. 12.



Witnesses.

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Attorney.

(No Model.)

4 Sheets—Sheet 4.

S. F. TIBBETTS.

WOOD WORKING MACHINE.

No. 388,320. Patented Aug. 21, 1888.

FIG. 14.

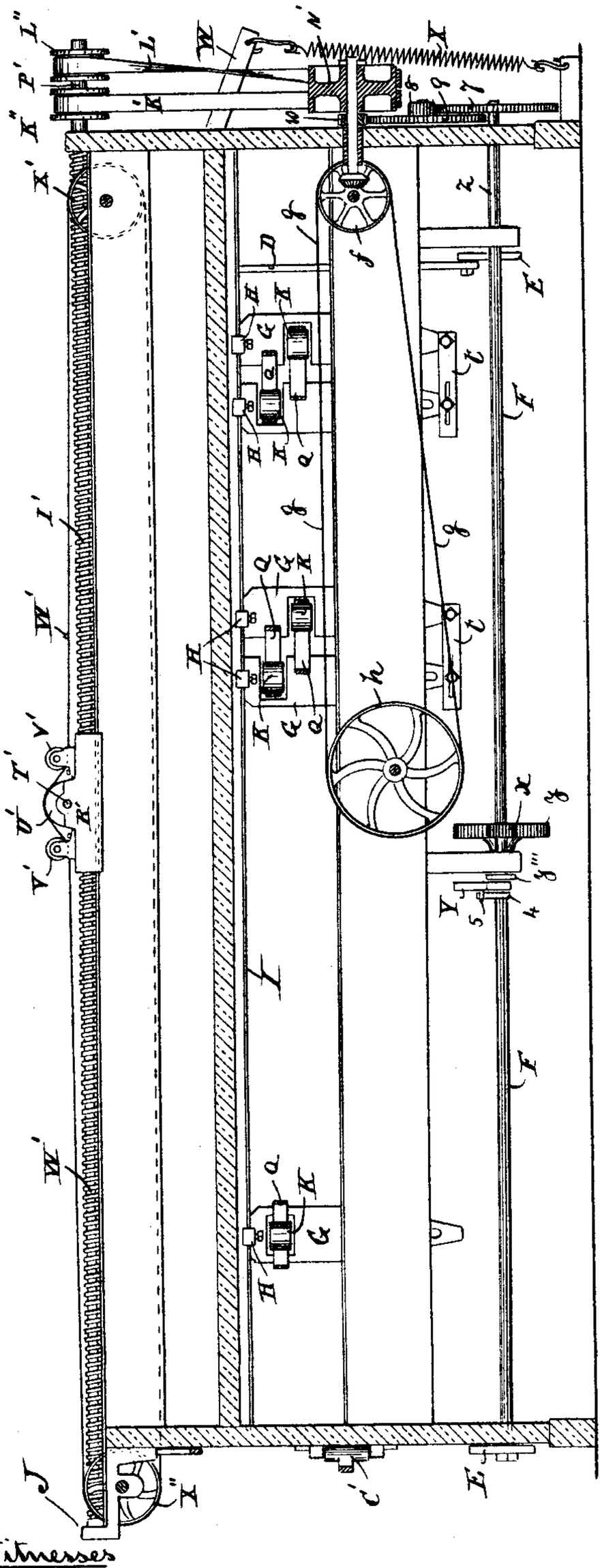
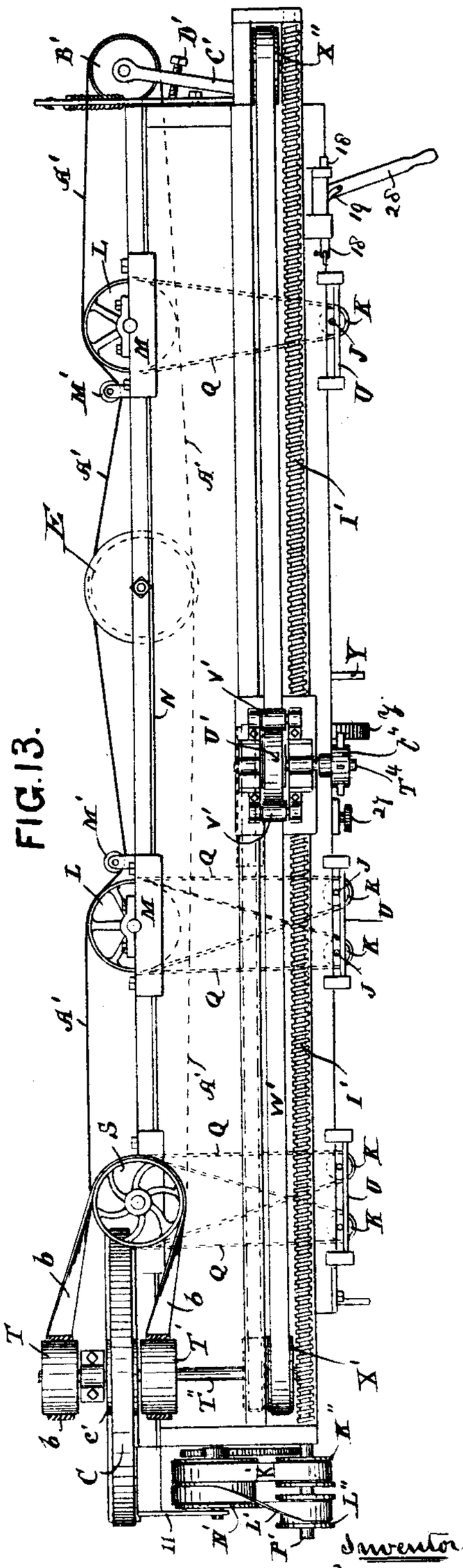


FIG. 13.



Witnesses
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UNITED STATES PATENT OFFICE.

SAMUEL F. TIBBETTS, OF BIDDEFORD, MAINE.

WOOD-WORKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 388,320, dated August 21, 1888.

Application filed June 5, 1886. Serial No. 204,281. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL F. TIBBETTS, a citizen of the United States, residing at Biddeford, in the county of York and State of Maine, have invented certain new and useful Improvements in Wood-Working Machines, of which the following is a specification.

My invention relates to an improvement in wood-working machines whereby I am enabled to perform the several functions of jointing, mortising, and grooving in one and the same machine.

My invention is designed more especially for the manufacture of doors. The door-stiles as they are sawed from the lumber in a rough state of the proper width for working are secured in the machine upon a table which is caused to move downward, so that the cutters will work from the under side of the wood, the cutter, though rotating, having no vertical movement, but a reciprocating movement, and is capable of mortising the wood to the extent of from one to five inches, or more.

In order to keep the cutter-spindle steady as it passes through the wood, I place it within a metal casing which is pivoted near its upper end to a block which can be adjusted to adapt it to door-stiles of any desired size. The lower part of the said casing is secured to a small bar which is connected to a bar extending nearly the whole length of the machine, and which has a horizontal reciprocating motion, thereby imparting a corresponding reciprocating movement to the cutters.

The jointing and grooving are effected by a device which is caused to traverse the top of the machine backward and forward by means of a screw extending throughout the length of the machine and passing through a nut attached to the device.

Referring to the accompanying drawings, Figure 1 represents a front elevation of a machine embodying my invention. Fig. 2 is a rear elevation of the same. Fig. 3 is a view of one end, showing the driving-gear. Fig. 4 is a view of the other end of the machine. Fig. 5 is a vertical transverse section taken on line *x x* of Fig. 1. Fig. 6 is a horizontal section of one end of the machine, showing the driving-gear. Fig. 7 is a view showing the mechanism for throwing in and out of gear the shaft that lowers the table. Figs. 8, 9, and 10 are respectively side view, end view, and horizontal section of the clamping device. Fig. 11 is an enlarged view of a pair of the tool-holders; and Fig. 12 is a vertical section through one of the same, showing how it is supported to the frame and also its connection with the levers and other parts. Fig. 13 is a plan or top view of a machine embodying my invention. Fig. 14 is a longitudinal vertical section looking from the rear of the machine.

A represents a frame of wood or other suitable material, upon the front side of which is fitted a table, B, for supporting the material to be operated upon. This table or support is preferably of angle-iron, and is free to slide up and down in suitable guides, C—one in the center and one at each end of the table—and is raised and lowered by means of bars or pitmen D D, secured to each end, the lower ends of which bars are connected to arms or cranks E E, mounted upon a shaft, F, to which latter an intermittent motion is imparted, as hereinafter set forth.

G G are tool-holders, Figs. 1 and 11, each supported in front of the machine by a stud on a block or slide, H, that is free to be pushed backward and forward on a plate, I, Figs. 5 and 12, secured to the frame A, and when in the desired position is held in place by a set-screw, *a*. A horizontal oscillating motion is imparted to the tool-holder in the following manner: Motion being communicated from the belt *b* to the pulleys T T′ on shaft T″, that also carries a pulley, *c′*, transmits a rotary motion by belt *c* to drum *d* on a transverse shaft, *e*, upon which is also mounted a drum, *f*, which, by means of belt *g*, transmits motion to the drum *h*, mounted upon a short shaft, *i*, Fig. 2, on the outer end of which is mounted a disk, *j*, Fig. 1.

To the disk *j* is connected one end of a pitman, *k*, the other end of which is secured to a horizontal bar, *l*, that is held to the frame of the machine by brackets *m*, Figs. 5 and 12, upon which the bar *l* is free to slide, and upon which are mounted sliding blocks *n*, held in the desired position on the bar by set-screws *p*. To each of these blocks *n* is secured one end of the levers *q*, the other end being secured to one end of the tool-holder G by means

of a screw and nut, *r*, Fig. 12, so formed that they can be adjusted up or down in a groove, *s*, in the lower end of the tool-holder G, so as to regulate the amount of throw to be given to the tool-holder to cut the mortise the required length. When the mortises are to be very long, or two mortises are to be cut close together, the tool-holders are then arranged in pairs, and motion is communicated directly from the bar *l* by bar *q* to one of the tool-holders, and transmitted to the other by means of a short bar, *t*, bolted at one end to one of the tool-holders and provided with a slot at the other end, so that the space between the tool-holders can be adjusted as desired, and then clamped to the bar *t* by the clamping device *u*. This clamp is shown in Fig. 12, and consists of a screw with a square head, 1, and a nut, 2, between which the bar *t* is clamped, and a screw, 3, that passes through the end of the tool-holder and into the screw 1. The spindle of the cutting-tool J passes down through the tool-holder G, and the end is recessed so as to fit over a pin in the center of a pulley, K, so that as the pulley revolves the spindle and tool will revolve with it.

Motion is communicated to the pulleys K by belts Q from drums L at the back of the machine, which are mounted in frames M, that at their upper ends are formed with a lip that passes over a bar, N, secured to the back of the frame A, and their lower ends fit in a groove formed in a plate, P, Fig. 2, also secured to the rear of the frame A, so that the frames M M can be adjusted to bring the drums L opposite to the tool-holders G, Fig. 5, and when in the desired positions are secured by set-screws *v*. The shaft of the drum L^4 is extended up and has mounted thereon a drum, S, that is driven by the main belt *b*, that passes around said drum and under the fast and loose pulleys T T′ to the source from which the power is derived.

A′ is a belt that passes around the drum L^4 and over the drums L and around a tightening pulley B′, mounted in a swinging bracket C′, hinged to the front part of the frame A. When it is desired to tighten the belt A′, the screw D′ is turned so as to push the pulley B′ farther from the frame A. On each of the frames M are mounted rollers M′, under which the belt A′ passes, so as to keep it in close contact with the drums L L.

E′ is a pulley to keep the belt A′ from sagging down, and F′ F′ are tightening-pulleys mounted on slides G′, that work on a bar H′, and are held in position by set-screws. These pulleys are for tightening the belts Q Q should they become loose. The cutters J J having but a short distance to travel—viz., the length of the mortise for the door-stiles—and the tool-holders G being fulcrumed just above the pulleys K—that is, on a stud on the block H (see Figs. 5 and 12)—the pulleys only travel about one-third the distance of the cutters J, not sufficient to cause the belt Q to become slack; but should said belts stretch, the tightening-pulleys F′ can be adjusted accordingly.

The upper ends of the tool-holders G work in guides U, Figs. 1 and 12, secured to the flange of the angle-iron table or support B, so that the tool-holder has always a steady support at the face of the material being operated upon, thereby preventing vibration and insuring a true cut. The guides U are held on the table B by means of set-screws, so that they can be adjusted according to the required position of the tool-holders. The tool-holders are further guided, and so caused to work true, by means of a plate, V, secured to the front part of the frame, and against which the tool-holders rest, the belts Q Q having a tendency to draw them against the said plate.

It will be seen that the tools are caused to cut upward into the material being operated upon. Consequently the chips will fall out of the mortise as fast as they are cut, thereby leaving the tool clear. Any required depth of mortise can be cut by adjusting the play of the table B, which is supported at each end by levers W, fulcrumed on the frame at *w* and provided at their outer ends with springs X X, the lower ends of which are secured to the frame A, so that when in its normal position the table will be raised.

When it is desired to lower the table, the foot is placed upon the lever Y, Fig. 5, fulcrumed on a shaft, Z, which, when depressed, will, by reason of the edge of the groove *y′* coming in contact with a pin, *y″*, on a bar, *y‴*, mounted at one end upon the shaft F and at the other end provided with a slot through which the shaft Z is passed, draw the pinion *x* into gear with a cog-wheel, *y*, mounted on a shaft, F, and cause the same to be rotated, which, through the arms or cranks E and bars D, causes the table to be drawn down, until an eccentric, 4, mounted on shaft F, strikes a pin, 5, on lever Y and raises it, thereby allowing the shaft Z to be drawn back by the spring 6, Fig. 7, so as to throw the pinion *x* and wheel *y* out of gear with each other, thereby releasing the table, which is then raised by the spring X drawing on the levers W, a spring, D″, Fig. 4, also assisting to bring the bars D to their normal position.

On the end of the shaft Z, outside the frame, is mounted a cog-wheel, 7, Figs. 1, 3, and 6, in gear with a pinion, 8, secured to a cog-wheel, 9, supported on a stud on the frame A. The cog-wheel 9 is in gear with a pinion, 10, mounted on a shaft, 11, Fig. 6, on the inner end of which is secured a bevel-wheel, 12, that gears with a bevel-wheel, 13, on shaft *e*, which is driven as before described. It will be seen that through this train of gears the shaft Z is always rotating when the machine is at work, but has a very slow motion, and the shaft F rotates only when the shaft Z is drawn forward, so as to throw the wheels *x y* into gear with each other.

I′ is a screw-shaft that extends the whole

length of the machine, and it is mounted at each end in suitable bearings, J J'. On one end of the shaft I' are mounted two pulleys, K'' L'', both being loose, and which are driven by belts K' L' from a drum, N', on shaft 11. One of the belts, L', is crossed so that one of the pulleys will be driven in one direction, while the other will rotate in the opposite direction. P' is a feather or pin on the shaft I', and when it is desired to revolve the shaft one way or the other the corresponding pulley is pushed over the feather P' and the required motion is thereby given to the shaft I'.

R' is a carriage that slides upon a plate, S', and is provided on its under side with a nut through which the screw I' passes, so that as the screw is rotated one way or the other the carriage will be caused to travel along the top of the machine.

The carriage R' is provided with a spindle, T^4, that carries the cutting-tool t^4 (see Fig. 13) for jointing and grooving the material. The spindle also carries a pulley, U', and on each side of the pulley U' is mounted a roller, V'.

W' is a belt that passes around a pulley, X', on shaft T'' at one end of the machine and around a pulley, X'', mounted on a spindle carried by a bracket, J, at the other end of the machine, and the belt passes under the two rollers V' V' and over the pulley U', thereby transmitting motion to the rotary cutter as the carriage R' is moved from one end of the machine to the other.

To clamp the material in position on the table B, I provide at one end a toothed plate, 14, and at the other end the clamping device shown in Figs. 8, 9, and 10, and it consists of a rectangular piece, 15, into which is fitted a hollow block, 16, the space 17 between these two being of the exact size of the angle-iron forming the table B. 18 is a slide to which is secured an arm, 19, the outer end of which is secured to a lever, 28, (shown in Fig. 1, and also in dotted lines in Fig. 10,) the lever being fulcrumed to the rear of block 16 at the point 20, so that when the lever is pressed forward the slide 18 will be carried with it and cause the teeth of a plate, 21, carried by said slide, to enter the material at one end, while the teeth on the plate 14 will enter the material at the other end. When clamped sufficiently tight, the slide is held in position by means of set-screws 23 23. This clamping device fits loosely on the angle iron table B, which latter passes through the space 17 between the rectangular piece 15 and hollow block 16, so that the clamp can be pushed to any part of the table, according to the length of the material to be held, and when the clamp is in the desired position it is secured to both flanges of the angle-iron table B by means of set-screws 24.

25 is a gage secured to the piece 15, and is used for a back bearing for the material operated upon. Each of the toothed plates 14 and 21 is provided with a projection at its base, through which a screw, 26, passes, upon which the material to be operated upon rests. The material is held in the center of the table by means of a clamp, 27, of ordinary construction.

The operation is as follows: The material to be operated upon is taken in the rough—that is, as it comes from the saw-mill—and clamped onto the table B. The throw of the cranks E having been adjusted according to the width of the plank, the machine is then started and a horizontal oscillating motion is imparted to the tool-carriers G, while at the same time a rotary motion is imparted to the cutters J, all in the manner before described. The operator then places his foot on the lever Y, which brings the pinion *x* and wheel *y* into gear with each other and causes the shaft F to rotate, and through arms E and bars D brings the table B down very slowly, and the cutters J enter and pass through the material, by which time the eccentric 4 strikes the pin 5 and raises the lever Y, when the spring 6 draws the pinion *x* out of gear with the wheel *y*, and then the springs X draw down the ends of levers W, and thereby raise the table to its normal position. The carriage R', carrying the rotating cutter for jointing and grooving, is then caused to travel along the screw by moving one or the other of the pulleys K'' L'' onto the pin or feather P', according to which end the carriage may be, and a rotary motion being imparted to the cutter by the belt W', so that as the cutter travels along it joints and grooves the material from end to end. The material is then taken out and another piece inserted, when the operation is repeated.

What I claim as my invention is—

1. The cutting-tool J, to which a rotary motion is imparted, in combination with the tool-holder G, supported by a block, H, adjustable on plate I in front of the machine, an oscillating motion being imparted to the tool-holder G, substantially as shown and described.

2. The tool-holders G, carrying rotating cutting-tools J, in combination with bars *q*, sliding blocks *n*, sliding bar *l*, bar *k*, and disk *j*, mounted upon shaft *i*, that also carries drum *h*, driven by belt *g*, for imparting a horizontal oscillating motion to the tool-holders, substantially as shown and described.

3. The oscillating tool-holders G, supported by blocks H, adjustable on plate I in front of the machine and carrying rotating cutting-tools J, in combination with the pulleys K, belts Q, drums L, mounted in frames M, belt A', tightening-pulley B', and pulley S, for imparting a rotary motion to the cutting-tools J, substantially as shown and described.

4. The angle-iron table B, working in guides C, in combination with bar D, arms E, mounted upon shaft F, to which an intermittent rotary motion is imparted for lowering the table, and levers W and springs X, for returning the table to its normal position, substantially as shown and described.

5. The pinion *x*, mounted on shaft Z, to

which a rotary motion is imparted, in combination with the lever Y, provided with recess y', and pin 5, bar y''', provided with a pin, y'', and eccentric 4 on shaft F, and spring 6, for throwing the pinion x into and out of gear with the wheel y on shaft F, substantially as shown and described.

6. The clamping device consisting of a rectangular piece, 15, hollow block 16, with a space, 17, between, to fit onto the angle-iron table B, and a slide, 18, provided with an arm, 19, for attachment to a lever fulcrumed at 20, the front end of the slide being provided with a toothed plate 21, substantially as shown and described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SAMUEL F. TIBBETTS.

Witnesses:

J. H. ADAMS,

E. PLANTA.