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F. MANKEY.

MACHINE FOR CROSSCUTTING WOOD.

No. 356,286. Patented Jan. 18, 1887.

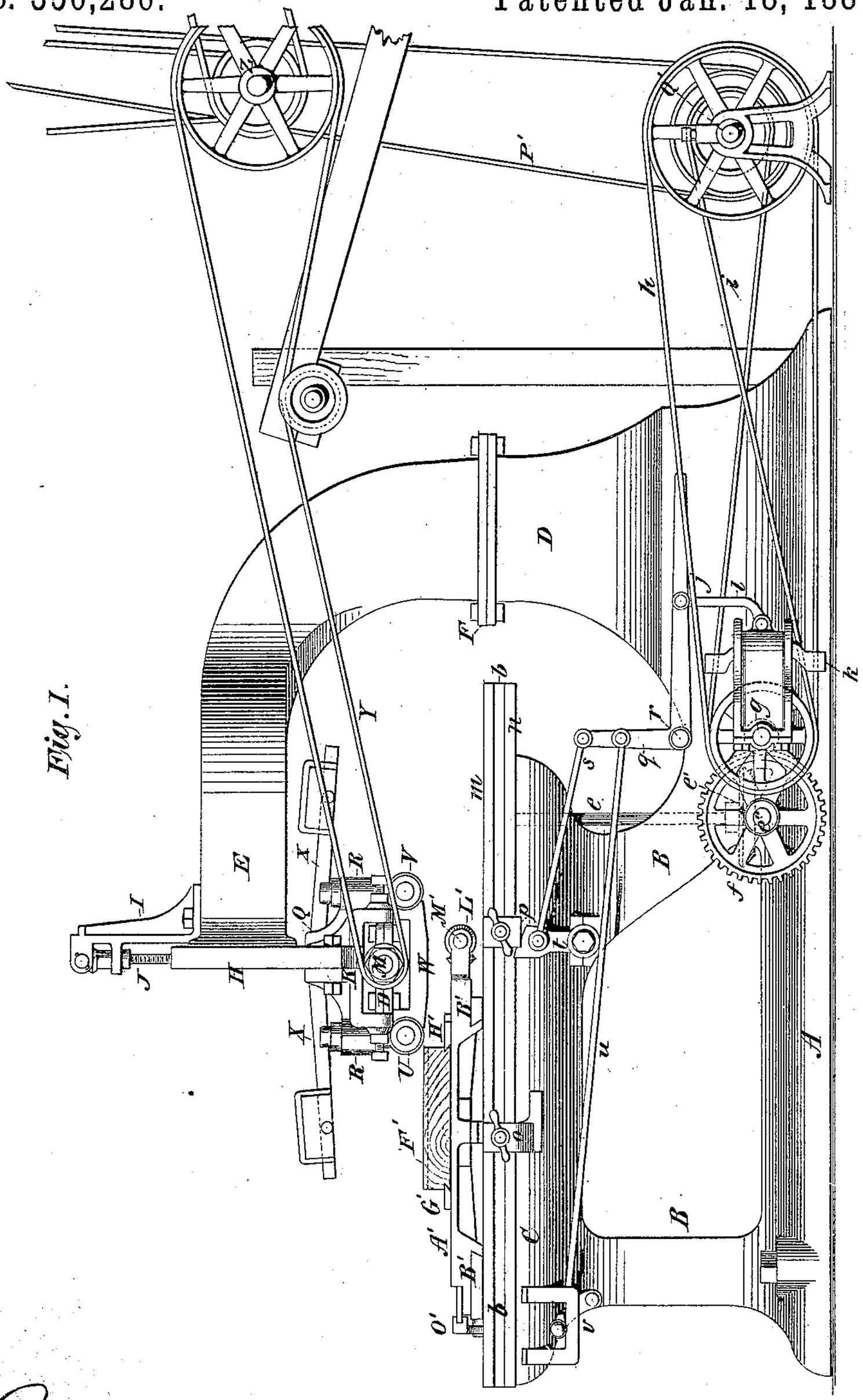

Fig. 1.

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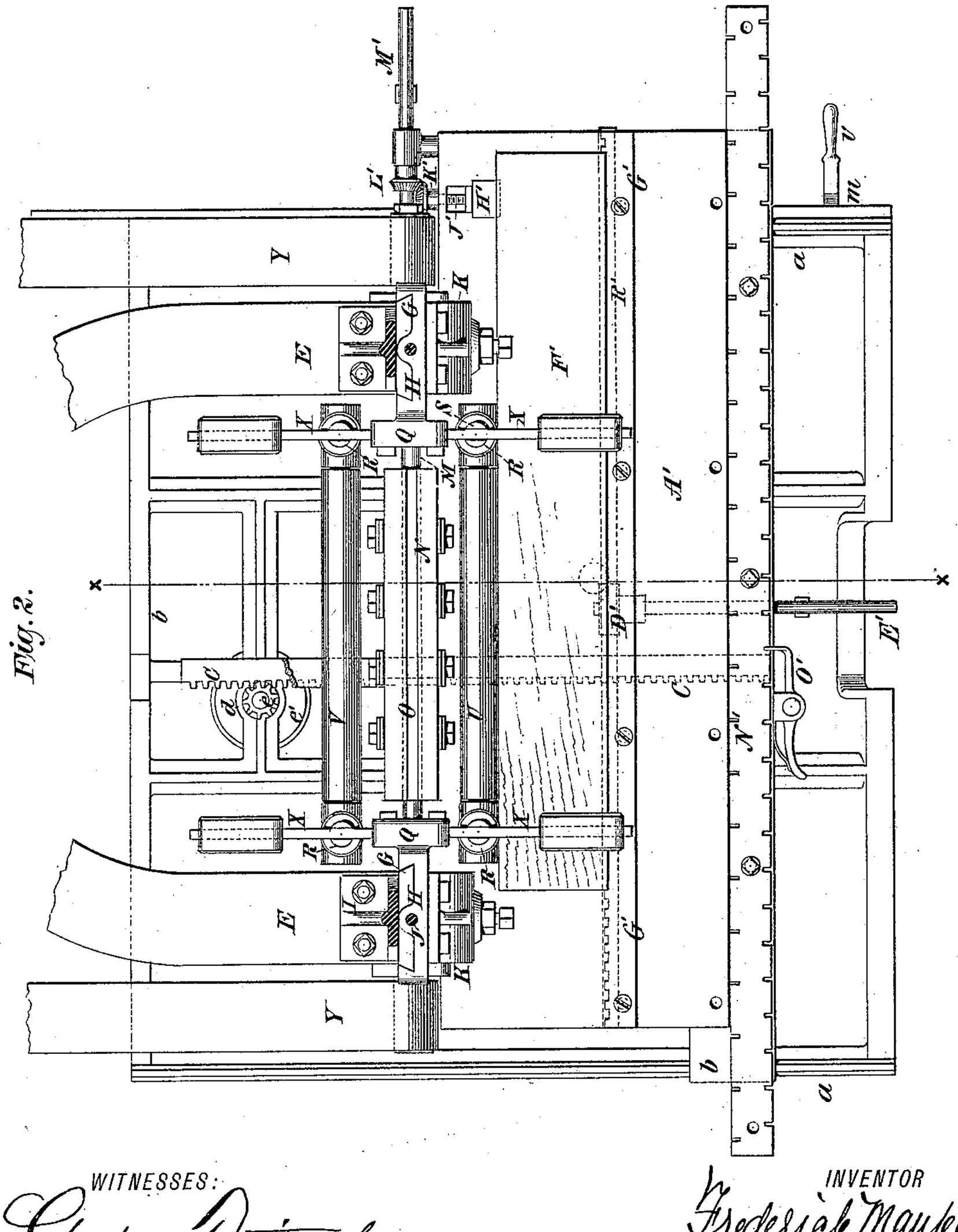

Fig. 2.

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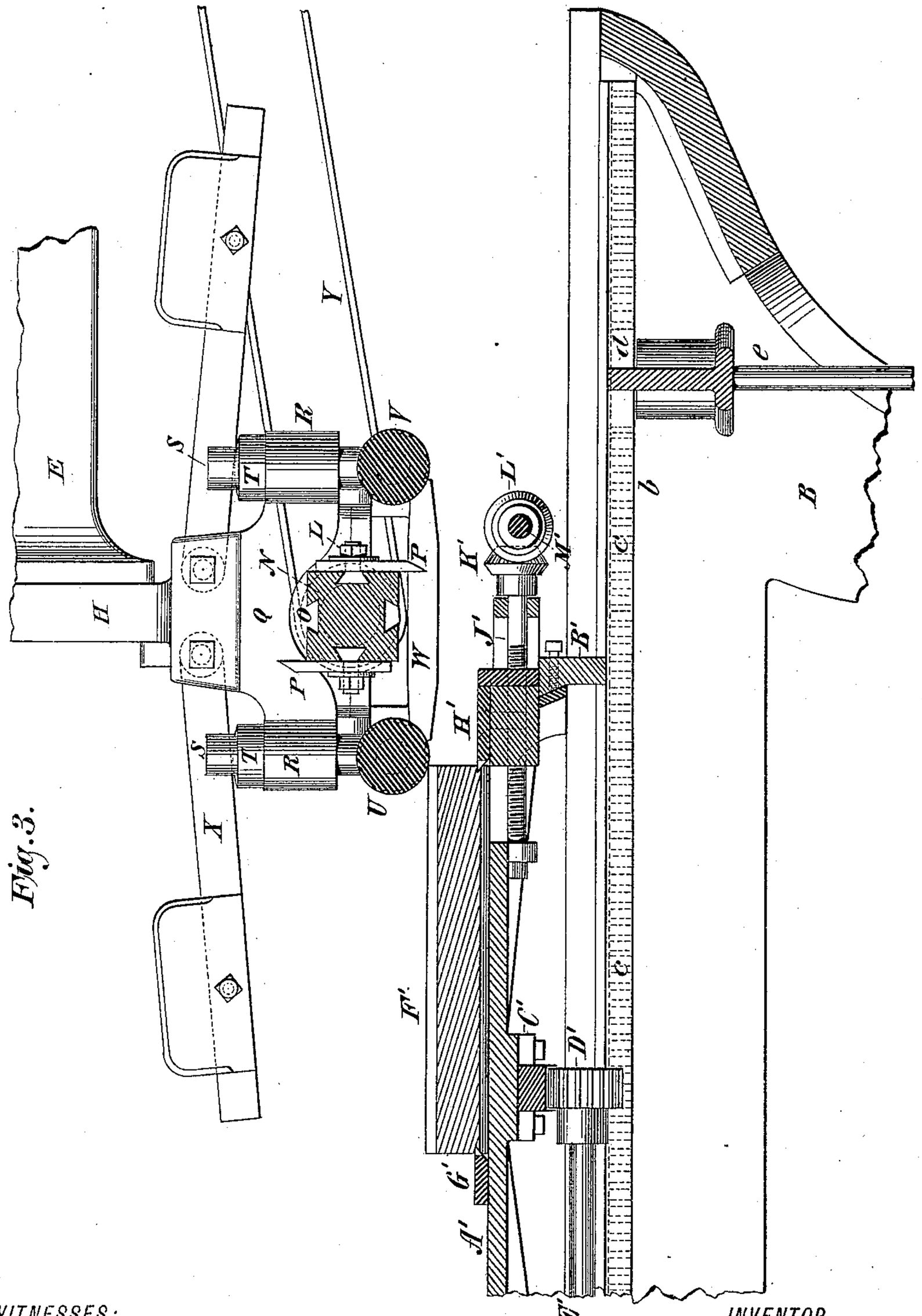

Fig. 3.

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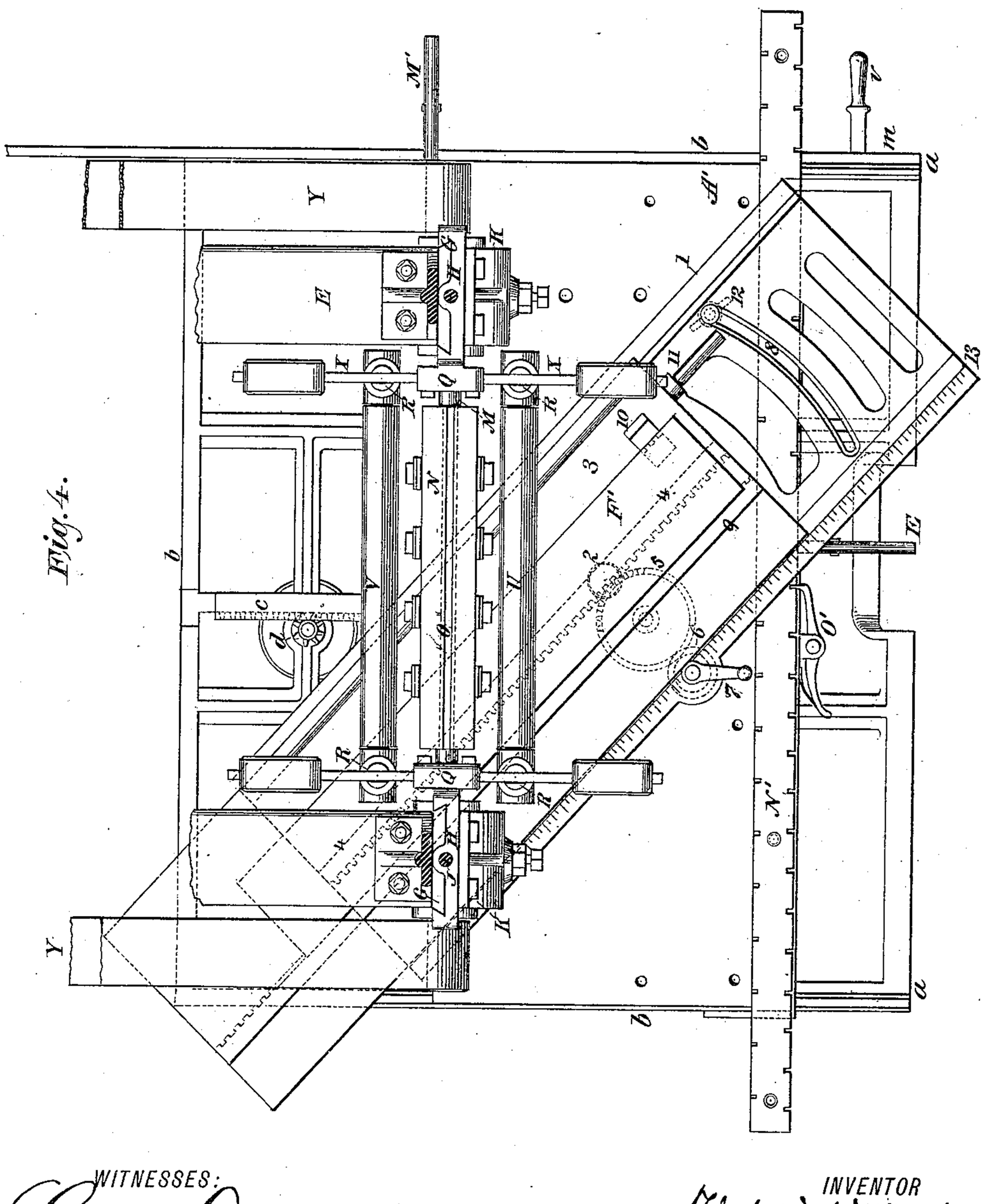

Fig. 4.

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FREDERICK MANKEY, OF WILLIAMSPORT, PENNSYLVANIA.

MACHINE FOR CROSSCUTTING WOOD.

SPECIFICATION forming part of Letters Patent No. 356,286, dated January 18, 1887.

Application filed July 8, 1886. Serial No. 207,391. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK MANKEY, of Williamsport, Lycoming county, Pennsylvania, have invented a new and useful Machine for Crosscutting Wood, of which the following is a specification.

My invention consists in a machine for crosscutting the surface of wood for the purpose of producing on said surface a new configuration, ornamental in character. By "crosscutting" I mean forming channels, grooves, recesses, or indentations in and upon the surface of the wood, transversely or at an angle to the natural direction of the grain of said wood. By the employment of rotary cutters of various forms, and by presenting the work to the same at various angles, I am enabled to produce relief-patterns upon the solid wood. Such patterns have hitherto been made by forming the portions in relief separately and securing them to the surface.

In numerous prior design-patents granted to me I have described and claimed a great variety of designs for trims, moldings, panels, surface ornamentation of walls, &c., produced upon wood in this way; and in certain mechanical patents, also hitherto granted to me, I have described and claimed various processes and modes of operation whereby such articles are made. I have also claimed certain of said articles as new in manufacture.

My present invention is an organized machine for the manufacture of the aforesaid ornamental trims, panels, moldings, surface-ornamentations, &c., by crosscutting; and it consists, more particularly, in the combinations of mechanism, instrumentalities, and parts hereinafter set forth.

In the accompanying drawings, Figure 1 is a side elevation of my crosscutting-machine. Fig. 2 is a plan view of the same. Fig. 3 is a partial section of the same on the line *x x* of Fig. 2. Fig. 4 is a plan view showing the adjustable table for supporting the work during diagonal crosscutting.

Similar letters of reference indicate like parts.

A is a metal casting, forming the base of the machine. From this rise the standards B, which support the bed C, on which the frame which supports the work-table traverses, as hereinafter explained. From the rear of the base extends upward the standard D, which branches into two horizontal arms or supports, E. These arms extend over the bed C and carry the cutting mechanism. I make the base A, standard B, bed C, and standard D, up to the flanged joint F, Fig. 1, in a single casting. The remainder of the standard D, above the joint F, and the arms E form another casting, and therefore the whole frame of the machine consists simply of these two castings bolted together at F.

I do not mean to limit myself necessarily to a frame thus made, because other forms of frame may be employed; but I prefer the foregoing construction, inasmuch as it renders the machine of great strength and solidity, and prevents undue vibration of the same. The importance of this will be realized when it is remembered that the cutting mechanism is run at high speeds, and hence the machine is ordinarily subjected to much jar. On the other hand, in order that the cuts made shall be true, straight, and even, it is desirable to reduce this vibration or jar to a minimum. This, as already stated, I find best accomplished by making the frame of the two heavy castings above described.

The machine embodies two principal mechanisms—namely, the cutting apparatus, which produces the new configuration upon the surface of the work, and the work-table and its adjusting and feeding mechanism, whereby the work is presented as may be desired to the action of the cutters. I will first describe the cutting apparatus and associated appliances.

On the front vertical faces of the supporting-arms E are ways or projections G, Fig. 2, of dovetail shape in horizontal section, which enter corresponding recesses on the rear sides of the sliding plates H. On the upper sides of the arms E are standards I, which support adjusting-screws J, whereby the sliding plates H may be moved vertically upon the ways or projections G. Bolted to the front and rear sides of the plates H are angle-iron supports K. Between these supports are secured the bearings L of the horizontal shaft M. This shaft, between its bearings, supports the cut-

ter-head N, which is provided with longitudinal dovetail grooves O. As shown in Fig. 3, the cutting-blades P are secured on opposite sides of the head N by bolts, nuts, and washers in the usual well-known way.

From the foregoing it will be seen that inasmuch as the bearings of the cutter-shaft M are supported upon the slide-plates H, and as these last may be moved up and down by the screws J, it follows that by means of said screws the cutting device may be raised or lowered, and in this way the depth of the cut upon the work may be regulated.

Referring now more particularly to Fig. 3, also on the lower portion of each plate H is a supporting-piece, Q, which carries two sleeves, R. Through said sleeves pass short rods S. On each rod S above the sleeve R is a fixed collar, T, which rests on the upper side of sleeve R. On the lower ends of the rods S are bearings for the rollers U V. Secured to said bearings and extending between the same on each side of the machine is a shoe or presser plate, W. The rollers U V are placed at each side of the cutter, and their function is to press upon, steady, and hold the work while passing under said cutter. The lower surface of the shoe W also bears upon the work and aids in steadying the same and preventing vibration.

Pivoted to the supporting-piece Q are weighted levers X, which rest in notches in the upper ends of the rods S. When the work passes under the rollers U V and shoes W, the rods S, supporting the bearings of said rollers, are free to rise in their sleeves R, against, however, the downward pressure of the weighted levers X. The object of this arrangement is to allow the shoes and rollers, while constantly pressing down upon the work, to yield slightly to any variations in its surface, so that a uniform pressure thereon will always be maintained. The cutter-shaft is actuated by the belts Y, which pass over pulleys on the ends of said shaft. Said belts pass over idlers, as shown in Fig. 1, and receive motion from a pulley on the counter-shaft Z.

I will next explain the work-table and feeding mechanism.

Upon the bed C are ways *a a*, upon which travels the frame *b* in a direction longitudinally of the machine. In the central portion of the frame is a rack-bar, *c*. (Dotted lines, Fig. 2.) With said rack-bar meshes a pinion, *d*, on the upper end of the vertical shaft *e*, Fig. 1. At the lower part of the shaft *e* is a bevel-pinion, *e'*, (dotted lines, Fig. 1,) which engages with a corresponding gear on the shaft *e''* of the gear-wheel *f*, Fig. 1. Said gear-wheel is rotated by a pinion on the counter-shaft *g*, same figure. On said shaft is a well-known reversing-gear, consisting of two fixed pulleys and an intermediate loose pulley. Over said pulleys pass the open belt *h* and the cross-belt *i*. Connected with said belts are the shifting-arms *j k*, which are controlled by the lever *l*, to throw either the crossed belt or the open belt on the loose pulley at will. The details of this belt-shifter are well known and constitute no part of my invention, and hence they are not here described.

It will readily be understood that when the crossed belt is in action the counter-shaft *g* will turn in one direction, and when the open belt is in action said shaft will turn in the opposite direction, and in this way the movement of the pinion *d* may be reversed and the frame *b* caused to reciprocate forward and backward on its ways. I cause this reversal of motion of the frame *b* to be effected automatically by the following means: The right-hand-side bar, *m*, Fig. 1, of the frame *b* extends over and outside the way *a* on that side of the machine. Said bar, on its exterior surface, has a dovetail recess, *n*, in which, at any desired point, may be secured the stops *o* and *p* by means of the set-screws shown. Pivoted to the belt-shifting lever *l* is a bell-crank lever, *q*, having its fulcrum at *r*, Fig. 1. The vertical arm of said lever is connected by a rod, *s*, to the shouldered plate *t*, which is pivoted to the side of the bed C.

It will be readily seen that when the frame *b* reciprocates, the stop *o* strikes the pivoted plate *t* and moves it in one direction when the frame is at the end of its travel, while when the frame reaches the opposite extremity of its course the stop *p* will meet the plate *t* and move it in the other direction. The consequence, therefore, is that the belt-shifter is thus controlled through the intermediate levers to throw the cross-belt and the open belt alternately on and off the loose pulley, and so to cause the reciprocating movement of the frame *b*. The stops *o* and *p* are both adjustable upon the bar *m*, so that the extent of travel of the frame *b* may thus be easily regulated.

Connected to the vertical arm of the bell-crank lever *q* is a rod, *u*, which is attached to the pivoted handle *v* on the front portion of the bed of the machine. By means of said handle *v* the attendant may control the lever *q*, and hence the belt-shifter, and so change the motion of the frame *b* at will.

I will now refer more particularly to the work-table proper, A', which rests upon the frame *b* between the guides B'. Said table may be moved in its guides transversely upon the frame *b*. This is done by means of the rack-bar C' on the lower side of the table, with which engages the pinion D', supported on the end of the shaft E', which is journaled in the frame *b*. Said shaft extends through to the front side of the machine, as shown in Fig. 2, and may have at its extremity a crank-handle. (Not shown.) By rotating said shaft the operator, through the engagement of the pinion D' and the rack-bar C', can move the table A' laterally the machine and upon the frame *b* at will.

The devices for securing the work, which are shown at F', upon the table consist in the fixed toothed bar G', secured to the upper side of the table, and the sliding blocks H', also having a toothed edge for engaging with the

edge of the material. Said blocks are received and slide in openings in the table, as shown in Fig. 2. Each block is actuated by means of the fixed screw J′, journaled in the table, upon which screw the block moves as a nut, Fig. 3. On the ends of the screw J′ are beveled pinions K′, with which engage the beveled pinions L′ on the shaft M′, which is journaled at the rear edge of the table A′. By means of a crank-handle (not shown) applied to the end of said shaft M′ to rotate said shaft, the sliding blocks H′ may be moved up toward the fixed bar G′, so that the work F′ may thus be firmly grasped between the bar G′ and the blocks H′.

For the purpose of accurately gaging the travel of the work-table laterally the machine, I employ a detachable gage-bar, N′. This is secured in any suitable way—as by nuts and bolts—upon a ledge on the front edge of the table A′. Pivoted to the front edge of one of the guides B′ is a spring-latch, O′, Fig. 2, the engaging end of which is adapted to enter one of the series of notches formed upon the edge of the gage-bar N′. The gage-bar N′, as here shown, has a series of notches on each edge; but it will be observed that the notches on one edge are separated by wider intervals than those on the other edge. I may employ either series of notches at will. The object of the gage-bar B′ and latch O′ is to enable the operator to move the work-table A′ in a direction laterally the machine over regular and uniform distances, and thereby to produce on the work supported on said table correspondingly-spaced cuts.

The operation of my machine will now easily be followed. The plank, board, or block F′ which is to be crosscut upon its upper surface is secured between the fixed bar G′ and the sliding blocks H′ upon the table A′. The cutter-shaft M is then set in motion by the belts Y. From the driving-shaft of said belts Y a belt, P′, extends to the counter-shaft, on which are the pulleys which drive the belts *h* and *i;* hence, as the cutter-shaft revolves, the table A′ is moved beneath the cutter, which crosscuts the surface of the material. Meanwhile the work, while passing under the cutter, is steadied by the rollers U V and shoes W. When the frame *b* has reached the desired limit of its travel, the stop *o* strikes the plate *t* and causes the belts to shift. The frame *b* then travels in the opposite direction, and at the same time the table A′ is moved by the operator in a direction laterally the machine, so that when the motion of frame *b* is once more changed a new surface of the plank or board will be presented to the cutter. This is repeated until the whole length of the board, plank, or block is crosscut.

I will now describe the appliance for holding the work when it is desired to produce the crosscutting diagonally thereupon or at an angle to the natural direction of the grain of the wood other than a right angle. This appliance is shown in Fig. 4. It consists in an elongated frame or support, 1, which is placed upon the work-table and pivoted thereon by means of the central pivot-pin, 2, dotted lines. Upon said frame, and in suitable guideways thereon, is a work-table, 3. On the lower side of said table is a rack-bar, 4, with which engages the pinion 5 on the frame 1. Said pinion is rotated by the pinion 6, also pivoted on said frame and provided with a crank-handle, 7. When the said handle is rotated, the table 3 is moved longitudinally upon the frame 1. The work F′ is held upon the table between a fixed bar, 9, and sliding blocks 10, which blocks are actuated by screws and bevel-gear in communication with the shaft 11 in substantially the same way as the sliding blocks H′ are arranged and operated, as already described.

Inasmuch as the frame 1 is carried by the table A′, which, as already described, is carried by the frame *b*, under the cutter, it follows that the scores or channels formed by the cutter will be made diagonally across the work F′, and that the angle which said scores make to the longitudinal edges of the work F′ will be governed by the angle at which the frame 1 is placed with reference to the line of the cutter-shaft M. As the frame 1 is pivoted at 2, said frame may be adjusted at any angle with reference to the line of the cutter-shaft. For this purpose near the end of frame 1 is formed an arc-shaped slot, 8, through which passes the set-screw 12, which is secured in a suitable opening in the table A′. By loosening this screw the frame 1 may easily be turned by hand to the desired angle, and then clamped in place by said set-screw 12. Along one edge of the frame 1 divisions 13 are laid off, by which means the extent of movement of the table can be observed and regulated.

I claim—

1. The combination of a rotary cutter adapted to crosscut the surface of wood at an angle to the grain thereof, a support and means (such as clamps) for rigidly holding the object to be crosscut thereon, feeding mechanism for moving said support beneath and thereby subjecting said object to the action of said cutter, yielding presser-rollers adapted to bear upon said object in front and in rear of said cutter, and yielding presser-shoes adapted to bear upon said object at each side of said cutter, substantially as described.

2. The combination of the bed C, frame *b*, a means (such as a work-table and clamps) for securing the object to be crosscut upon said frame, a rotary cutter supported above said frame, rack-bar *c*, pinion *d*, shaft *e*, bevel-pinion *e′*, and corresponding pinion on shaft *e″*, shaft *g*, fast and loose pulleys on said shaft *g*, gearing between said shaft *g* and shaft *e″*, belts *h* and *i*, and means for shifting said belts upon said fast and loose pulleys, substantially as described.

3. The combination of the bed C, frame *b*, a means (such as a work-table and clamps) for securing the object to be crosscut upon said frame, a rotary cutter supported above said frame, rack-bar *c*, pinion *d*, shaft *e*, bevel-pin-

ion e', and corresponding pinion on shaft e'', shaft g, fast and loose pulleys on shaft g, gearing between said shaft g and shaft e'', belts h and i, and means for shifting said belts upon said fast and loose pulleys controlled by the lever l, bell-crank lever q, rod s, pivoted plate t, and adjustable stops on the said frame b, substantially as described.

4. The combination of vertically-sliding plates H and supports for the same, means (such as screws J) for vertically adjusting said plates, supports Q, carried by said plates and carrying the vertical sleeves R, rollers U V, having their bearings supported on rods S, collars T on said rods, and weighted levers X, bearing on said rods and pivoted to said supports Q, substantially as described.

5. The combination of vertically-sliding plates H and supports for the same, means (such as screws J) for vertically adjusting said plates, supports Q, carried by said plates and carrying the vertical sleeves R, rollers U V, having their bearings supported on rods S, collars T on said rods, and shoes W, supported by and between the bearings of said rollers U V, substantially as described.

6. The combination of two vertically-adjustable supports, a rotary shaft carried by said supports, a cutter on said shaft between said supports, and two yielding presser-rollers also carried by and between said supports and disposed parallel and respectively on each side of said cutter-shaft, substantially as described.

7. The combination of the vertically-sliding plates H and supports for the same, means (such as screws J) for vertically adjusting said plates, supports K, bearings L, cutter-shaft M, (the said shaft carrying a cutting mechanism,) supports Q, sleeves R, rods S, weighted levers X, rollers U V, and shoes W, substantially as described.

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