(No Model.) 2 Sheets—Sheet 1.

L. H. BERRY & L. O. ORTON.

MACHINE FOR MORTISING WOOD.

No. 453,539. Patented June 2, 1891.

Fig. 1.

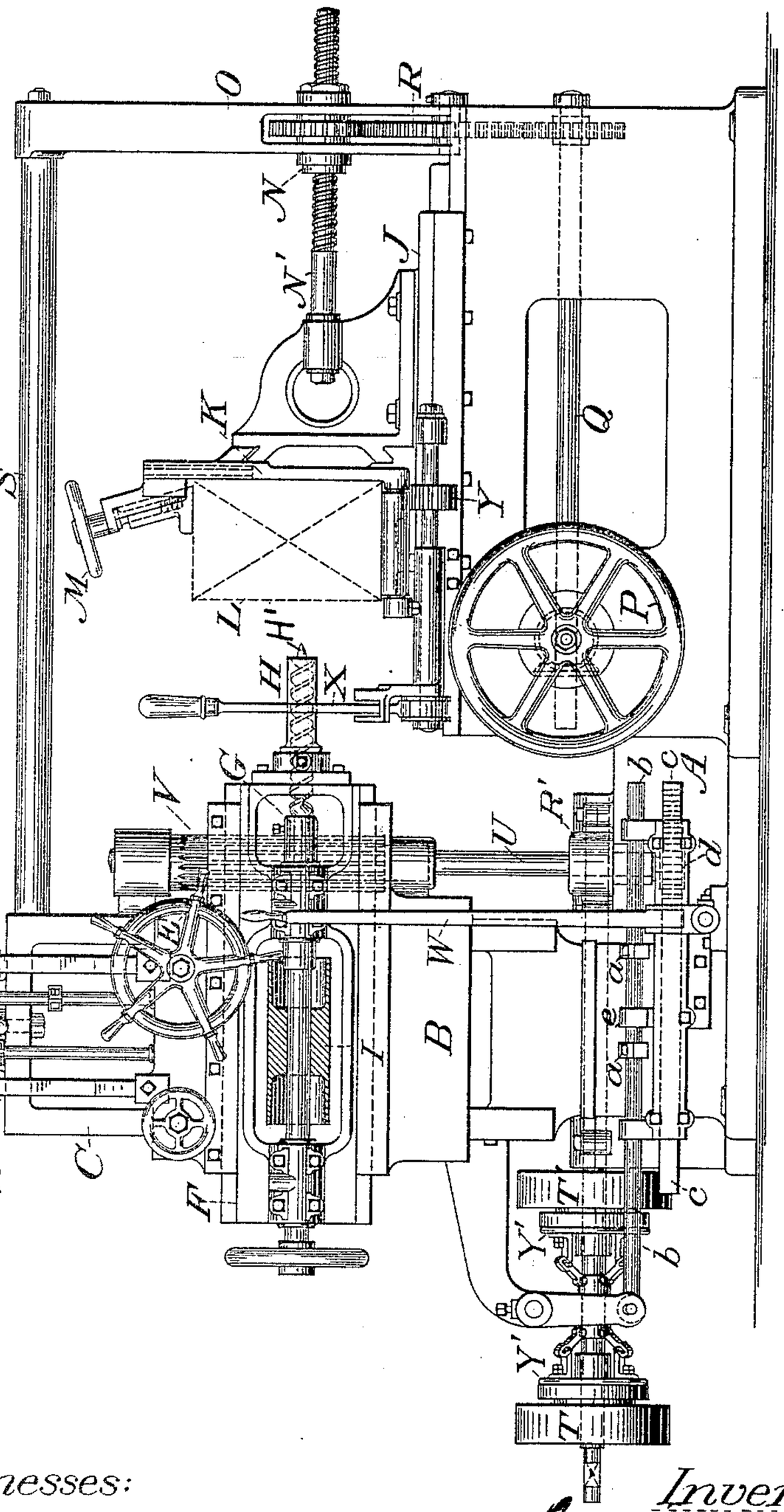

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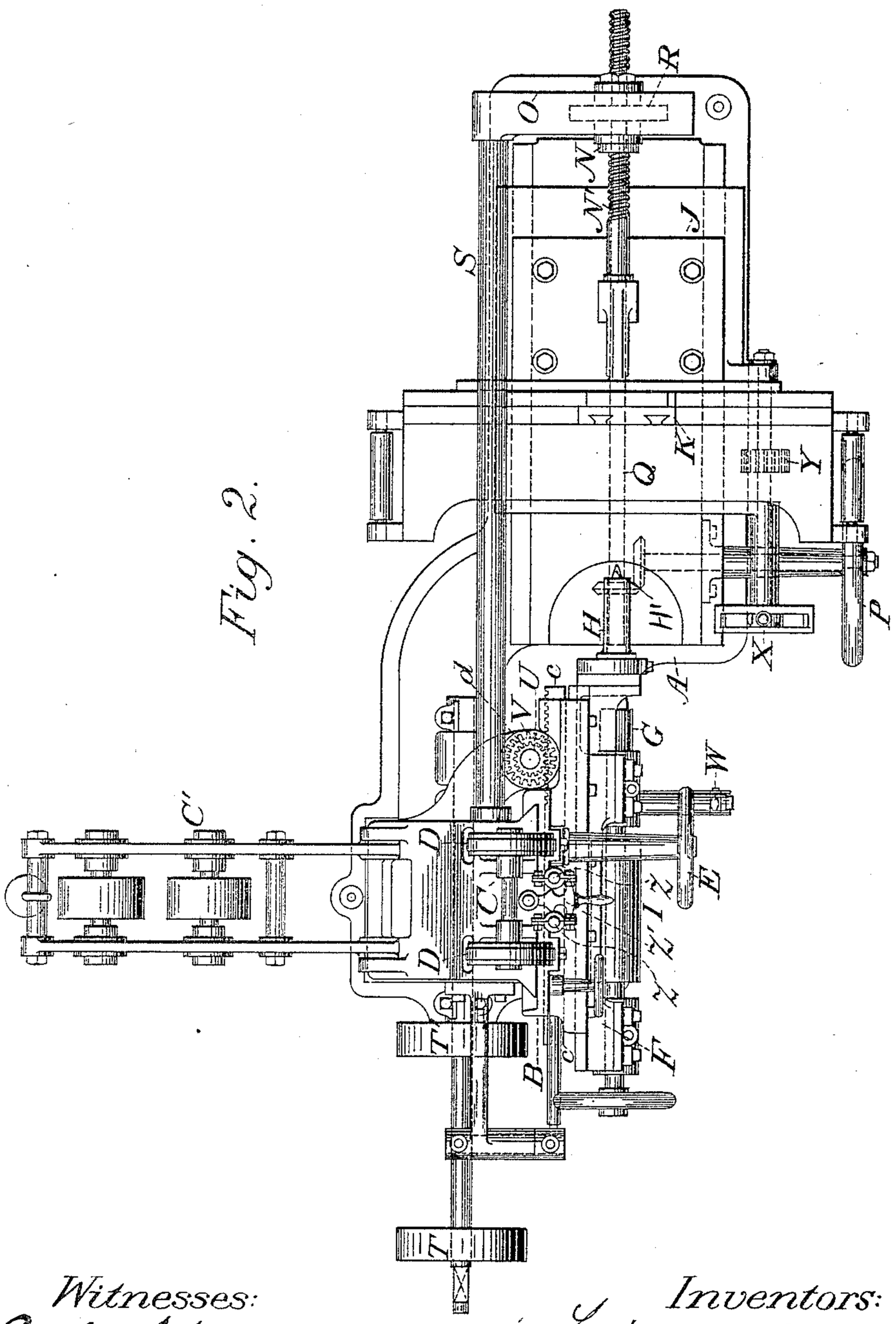
Fig. 2.



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UNITED STATES PATENT OFFICE.

LUCIEN H. BERRY AND LYMAN O. ORTON, OF PHILADELPHIA, PENNSYLVANIA.

MACHINE FOR MORTISING WOOD.

SPECIFICATION forming part of Letters Patent No. 453,539, dated June 2, 1891.

Application filed April 16, 1890. Serial No. 348,241. (No model.)

To all whom it may concern:

Be it known that we, LUCIEN HENRY BERRY and LYMAN OSGOOD ORTON, of the city and county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Machines for Mortising Wood; and we hereby declare the following to be a clear and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to mortising wood, and to that class of machines wherein a rotary implement removes a circular core and the corners or angles are cut away by a direct-acting tubular chisel or cutter, the chips being removed through the bore of the latter by the helical form of the central rotary implement or auger.

The invention consists in various improvements in the mechanism for supporting and operating such mortising implements and for presenting the wood to be acted upon, as hereinafter explained, described, and shown in the drawings, in which—

Figure 1 is a front elevation of one of our improved mortising-machines. Fig. 2 is a plan of the same with some of the details omitted.

Similar letters of reference on both figures indicate corresponding parts.

A is the main frame, on which are mounted all the various details of the machine.

B is a compound saddle or carriage arranged to slide up and down on the standard C by means of the hand-wheel E, which operates in any suitable manner. A preferable way of operating the said saddle B is to provide the shafts of the hand-wheel E with a pinion that engages a rack on the said saddle, said pinion and rack being located behind the saddle out of sight. This is an immaterial feature, however, and may be changed in any desired manner, so that any suitable devices may be employed for the purpose of effecting the vertical movement of the saddle B.

F is a second saddle or carriage sliding horizontally on B, supporting the rotary spindle G, and also the fixed suitably-shaped chisel or cutter H, within which is the revolving auger or implement H′. (Shown by dotted lines, Fig. 1.) At the other end of the main frame A is mounted the timber-supporting carriage J, also a compound one having a longitudinal movement on the main frame A, and also a cross movement by means of the second carriage K, to which the timber L is fastened by means of the screw-clamp M. Behind the carriage J is a strong screw N′, forming a firm abutment against the thrust of the chisel H. This screw is placed at such position in a horizontal plane as will conform most nearly to an average position vertically of the spindle G and chisel H, so that the thrust of the saddle or carriage F may fall as nearly as possible in the line of the screw N′. This screw also serves to adjust the carriage J forward or back as the dimensions of the timber L and the depth of the mortises may require. This adjustment is performed by a revolving nut N in the standard O, this nut being turned by means of the hand-wheel P, shaft Q, and spur-wheels R. The standards C and O are connected by a strong tie-rod S, so that no deflection can take place from the strain of forcing the chisel H into the timber L. The reciprocating movement of the carriage F and the chisel H and auger H′ is performed by power, the actuating mechanism consisting of the clutch-pulleys T T′, connected by worm-gearing at R′ with the vertical shaft U and the long tooth-pinion V, the latter being made long enough so that a rack on the back of the saddle F will engage the pinion at all positions as the saddle B is adjusted up or down on standard C. The pulleys T and T′ are driven in opposite directions by means of suitable belts applied thereto, which belts are not shown in the drawings, and said pulleys are adapted to be engaged by means of the clutches Y′ and Y′, located alongside of said pulleys, said clutches being operated by means of the horizontal rod *b*, which is pivoted to a pivoted frame arranged between the clutches, so that one or the other of them may be shifted as may be required.

W denotes a vertical hand-lever, which is connected directly to the rod *b* by means of a second short lever, the said lever W being used for the purpose of imparting to the rod *b*, and consequently to the clutches Y′ and Y′, a certain movement in stopping and starting so as to produce a reciprocating movement

forward or backward of the carriage F and the cutting devices. On the rod *b* are two collar-stops *a a*, which are adjustable upon the rod and are adapted to be fixed in position at any desired point. Adjacent to the rod *b* is a sliding bar *c*, which is provided near one end with a series of teeth or notches, so that it will serve as a rack-bar, said teeth being engaged by a horizontal pinion *d*, secured on the vertical shaft U, which shaft, we have already seen, carries the long toothed pinion V. The pinion *d* is larger in diameter than the pinion V. On the slide-bar *c* is a fixed lug *e*, which is arranged to strike or come into contact with one or the other of the stops *a a*, which, we have seen, are carried by the rod *b*, said contact of lug *e* with stop *a* taking place when the bar *c* slides. As the two pinions V and *d* are both on the same shaft, it will be evident that as the shaft U revolves a coincident movement of the carriage F and the rod *b* will take place; but since the pinion *d* is larger in diameter than the pinion V this movement of pinion *d* will be more rapid than that of the carriage F, thereby causing a sudden stop when the cutting-tools have reached the required depth in the wood L, or on the back-stroke when they are withdrawn.

The purpose of the lever W is to start the clutches Y′ Y′ either way. As the bar *c* slides in consequence of the engagement of pinion *d* therewith, the lug *e* will move until it strikes one of the stops *a*, which will cause a movement of the rod *b* and a loosening or stopping of one of the clutches Y′ or Y′. Then the lever W will come into use because the operator will grasp it in his hand, and by moving it cause the rod *b* to be moved on in the same direction until the other clutch Y′ is engaged, and in consequence the movement of the slide *c* is reversed, sliding now in an opposite direction until the lug *e*, which is connected thereto, strikes against the other collar *a*, thereby shifting the rod *b* and disengaging the other clutch Y′. In other words, it will be evident that the lever W will engage both of the clutches Y′ and Y′ and that the bar *c* will operate to disengage both of them.

The main spindle G is driven by the pulley I, the belt coming from the back through the standard C, passing first around the idle-pulleys C′, which change the band from a vertical to a horizontal direction and maintain uniform tension as the carriage B is moved up or down on the standard C. The idle-pulleys C′ are supported in a swinging or pivoted frame having at its outer end a depending weight, as illustrated in the drawings, and this construction serves to keep the tension of the belt uniform. The longitudinal adjustment of the timber L is performed by the lever X, the pinion Y, and a tooth-rack on the bottom of K. This adjustment can be regulated by lines or marks on the timber L, or, for uniform work, can be regulated by stops, as the nature of the work may demand.

The saddle B is counterweighted by the flexible bands D D, passing over the pulleys at the top and attached to weights sliding inside the standard C. The vertical adjustment of B and the lateral position of mortises in the timber L are determined by a system of stops Z^2 on the rods Z, engaging the pawl Z′, as may be seen in the plan, Fig. 2. These stops Z^2 are formed as collars, which are adjustable up or down on the rods Z, (see Fig. 1,) and they are fastened at any desired point to which they may be adjusted by means of suitable set-screws or screw-threads, so that when the pawl Z′ is swung either to the right or the left, as the case may be, it will lie in the path of movement vertically of the said stops Z^2, and accordingly the upward or downward movement of the saddle will be governed, each of the rods Z answering for one position or lateral adjustment of the carriage B and the chisel H and the width of the mortise or its position laterally in the timber L. These rods Z Z are fixed rigidly in the saddle B. Each of the rods is preferably provided with two of the stops Z^2; but it will be evident that the number of the rods Z, as well as of the stops Z^2, may be changed to meet the requirements of the work to be done and may be increased or diminished accordingly, and also there may be several of the pawls Z′ if they are needed. The pawl Z′ is pivoted suitably upon the standard C, so that it may swing horizontally between the vertical rods Z Z, and thus lie in a position to be struck by the stops on the one or the other of these rods, as the case may be. (See Fig. 1.) Suppose the pawl Z′ to be turned to the right, as shown in this figure. Then the stops Z^2 on the right-hand rod Z will strike the pawl Z′ on the upward and downward movements of the saddle B, and thus two positions will be given for the chisel H—a position when the saddle is up and another when it is down. This, however, will not be enough for all uses. Therefore a second rod Z is used, having thereon the two other stops which I have already referred to. Therefore when the pawl Z′ is swung or turned the other way—that is, to the left—then the stop-collars on the left rod Z will give two more positions for the chisel H—a position when the saddle B is up at the upper position and another when it is down at the lower position, the two positions afforded by this arrangement of stops Z^2 on the right rod Z being different from those afforded by the other rod and its stops, the several stops being all properly adjusted to permit of these different movements.

We are aware that the system of mortising by means of a fixed and rotary tool combined is not new, but has been applied in various ways. We do not therefore claim that as our invention; but

What we do claim, and desire to secure by Letters Patent, is—

1. In a wood-mortising machine, the combination of the carriage F, its cutting imple-

ment, the upright shaft U, having thereon a long toothed pinion V, engaging a rack on the carriage F, and a lower pinion *d*, larger in diameter than pinion V, said pinion *d* engaging a toothed bar *c*, having thereon a lug which operates in conjunction with stops on a sliding rod connected to a clutch mechanism for the drive-pulleys, together with the means for adjusting the carriage F up and down, said long pinion V being so arranged that it will remain in mesh as the carriage B, which carries the carriage F, is adjusted up or down as the lateral position of the mortises may require, substantially as described.

2. In a wood-mortising machine, the combination of the carriage F, the cutting implement, vertically-movable saddle B, the rods Z Z, carried by said saddle, the adjustable stop Z^2, located on said rod Z Z, and the pawl Z′, said parts being arranged for determining the vertical adjustment and regulating the position of mortises in the timber L, substantially as described.

3. In a wood-mortising machine, the combination of the friction-clutches Y′ Y′, the pulleys T and T′, adjacent thereto, the stop-rods Z, carried by a vertically-movable saddle, the adjustable collars or stops Z^2 on said rods, the pawl Z′, operating in conjunction with said stops, the sliding rod *b*, connected to the friction-clutches, chisel H, and auger H′, with which the sliding bar has a movement coincident, the whole combined and operating substantially in the manner and for the purpose herein set forth.

4. In a wood-mortising machine, the combination of the carriage F, horizontally movable and mounted on a vertically-movable carriage B, its cutting devices, the shaft U, having the long toothed pinion V, engaging a rack on the carriage F, and a lower pinion *d*, larger in diameter than the pinion V, the sliding rod *b*, having adjustable collars *a a* thereon, the sliding bar *c*, having thereon a lug *e*, adapted to strike the aforesaid collars *a a*, said bar *c* being toothed for engaging the aforesaid pinion *d*, and the clutch mechanism connected to the ends of the rod *b*, substantially as described.

5. In a wood-mortising machine, the combination of the carriage F, the chisel H, supported thereby, the pulleys T T′, driven in opposite directions by belts, the clutches Y′ Y′, engaging the said pulleys T T′ and operated by the rod *b*, the vertical shaft U, having the long pinion V, engaging a rack on the carriage F, and the lower pinion *d*, larger in diameter than pinion V, together with rod *b* and sliding bar *c*, operated by the pinion *d*.

6. In a wood-mortising machine, the combination of the frame A, standard C, carriage B, vertically movable on said standard, carriage F, horizontally movable on carriage B, rotary spindle G, cutter H, and auger H′, supported by carriage F, the timber-supporting carriage J, the screw N′ for adjusting carriage J, the standard O, revolving nut N, hand-wheel P, shaft Q, and spur-wheels R for accomplishing the adjustment of the said carriage J, substantially as described.

7. In a wood-mortising machine, the combination, with the standard C, of the saddle B, counterweighted by the flexible bands D D, passing over pulleys at the top and attached to weights sliding inside the standard C, the stop-rods Z, fixed rigidly in the saddle B, the stops Z^2, adjustable on said rods Z Z, the pivoted pawl Z′ between the said stop-rods, and the cutting implement carried by the saddle, all arranged substantially as described, so that the lateral position of the mortises to be cut in the timber by the cutting implement may be regulated by the vertical adjustment of the saddle, substantially as specified.

8. In a wood-mortising machine, the combination of the main frame A, the standard C, saddle B, sliding up and down thereon, the second saddle F, sliding horizontally on the saddle B and supporting the rotary spindle G, and fixed chisel H, the vertical shaft U, carrying a long toothed pinion V, which engages a rack on the carriage F, and also carrying a pinion *d*, larger in diameter than the pinion V, the driving-pulleys T and T′, clutches Y′ and Y′ adjacent thereto, sliding rod *b*, connected to said clutches for operating them and having on it adjustable collars *a a*, sliding bar *c*, having a fixed lug *e*, adapted to come in contact with the collar *a*, said bar *c* being toothed and engaged by a pinion *d*, and the hand-lever W, connected to the rod *b* and operative to shift the same, substantially as described.

9. In a wood-mortising machine, the combination of the two standards C and O, the tie-rod S, connecting the standards above the timber L and thus preventing deflecting strains on the frame from the thrust of the chisel, the vertically-sliding saddle B on the standard C, the horizontally-sliding saddle F on the saddle B, the rotary spindle G, carried by the carriage F, together with chisel H and auger H′, the timber-supporting carriage, screw N′ for adjusting said carriage, the vertical shaft U, having a long toothed pinion V thereon engaging a rack on the carriage F and having a pinion *d*, larger in diameter than pinion V, said pinion V engaging the toothed bar *c*, which has thereon a fixed lug *e*, operating in connection with collars *a a* on the sliding rod *b*, together with the clutches Y′ Y′, to which the rod *b* is connected, substantially as described.

In testimony whereof we hereunto affix our signatures in the presence of two witnesses.

LUCIEN H. BERRY.
L. O. ORTON.

Witnesses:
HERBERT H. KNIGHT,
J. L. HUTCHINSON.