(No Model.)

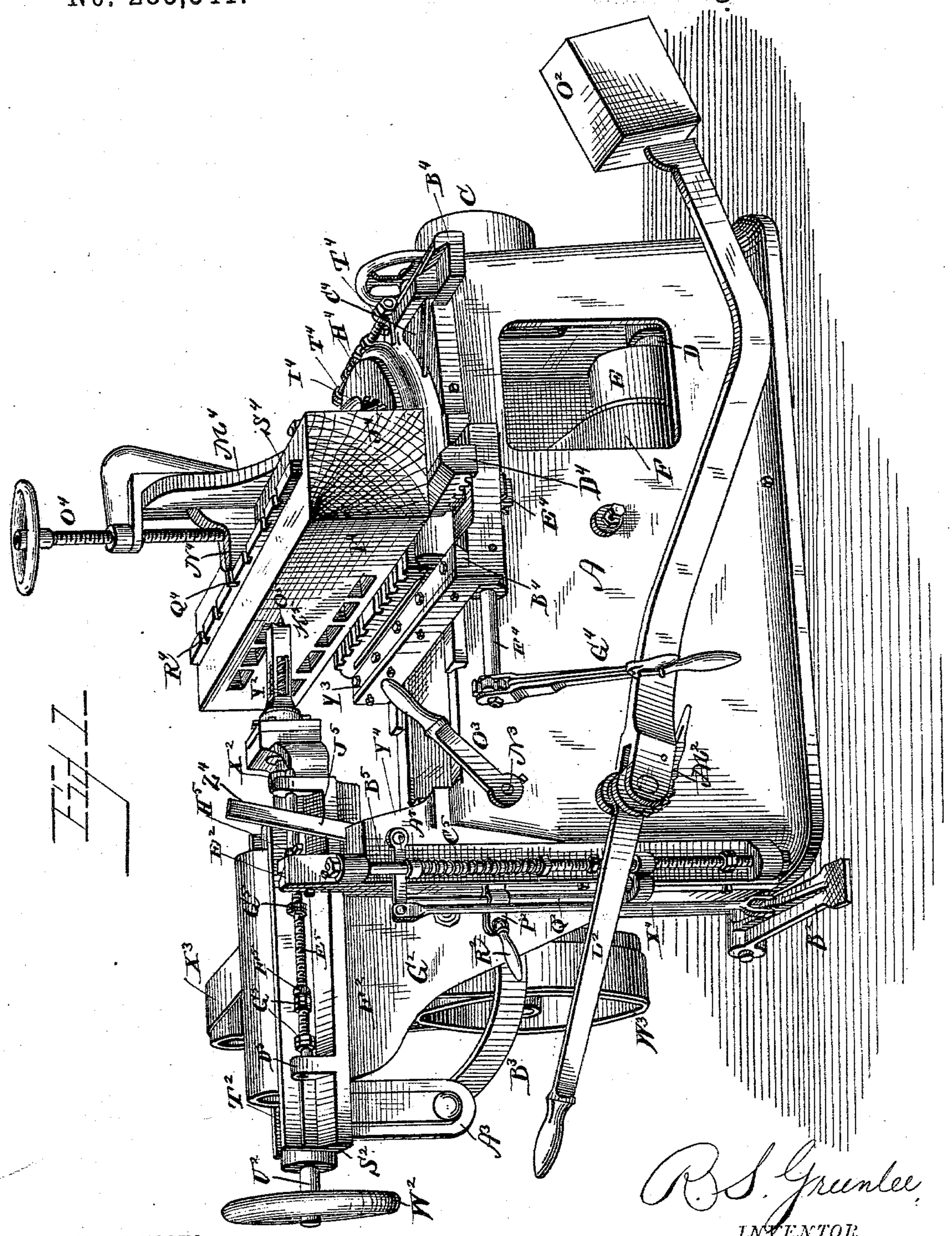
4 Sheets—Sheet 1.

R. S. GREENLEE.

MORTISING MACHINE.

No. 283,341. Patented Aug. 14, 1883.

FIG. 1.



WITNESSES

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(No Model.) 4 Sheets—Sheet 2.

R. S. GREENLEE.

MORTISING MACHINE.

No. 283,341. Patented Aug. 14, 1883.

Fig. 2.

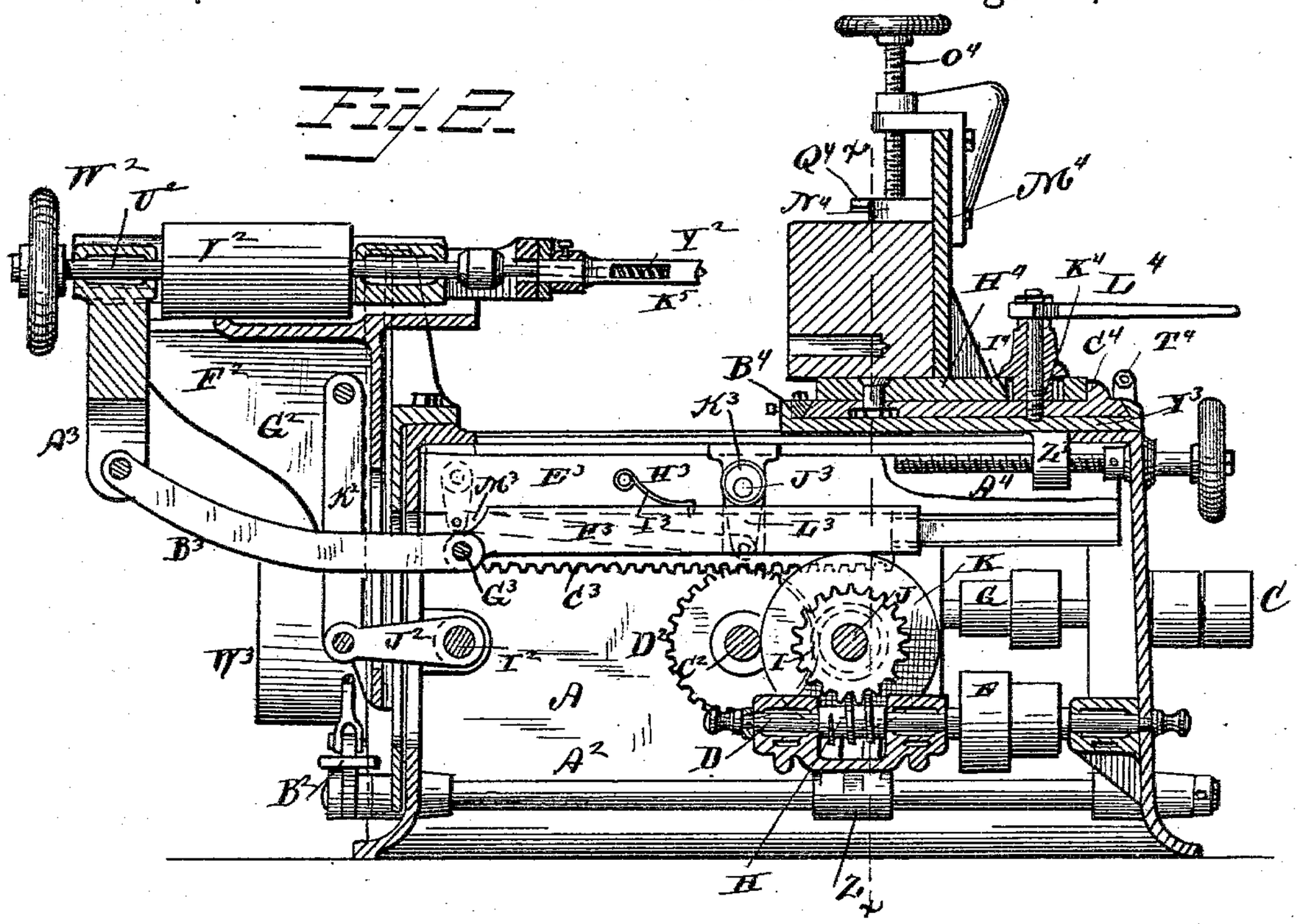
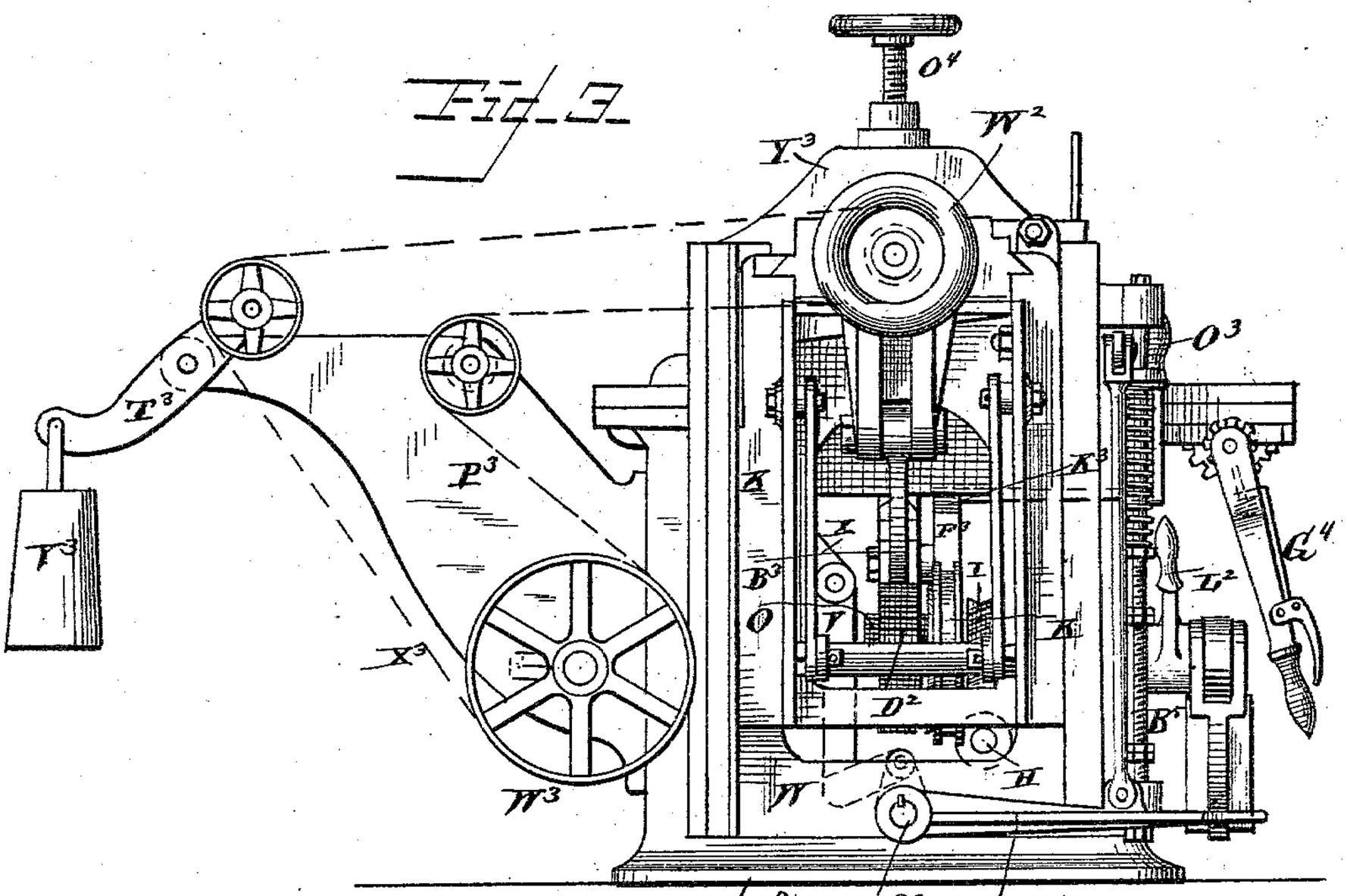


Fig. 3.



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4 Sheets—Sheet 3.

R. S. GREENLEE.

MORTISING MACHINE.

No. 283,341. Patented Aug. 14, 1883.

Fig. 4.

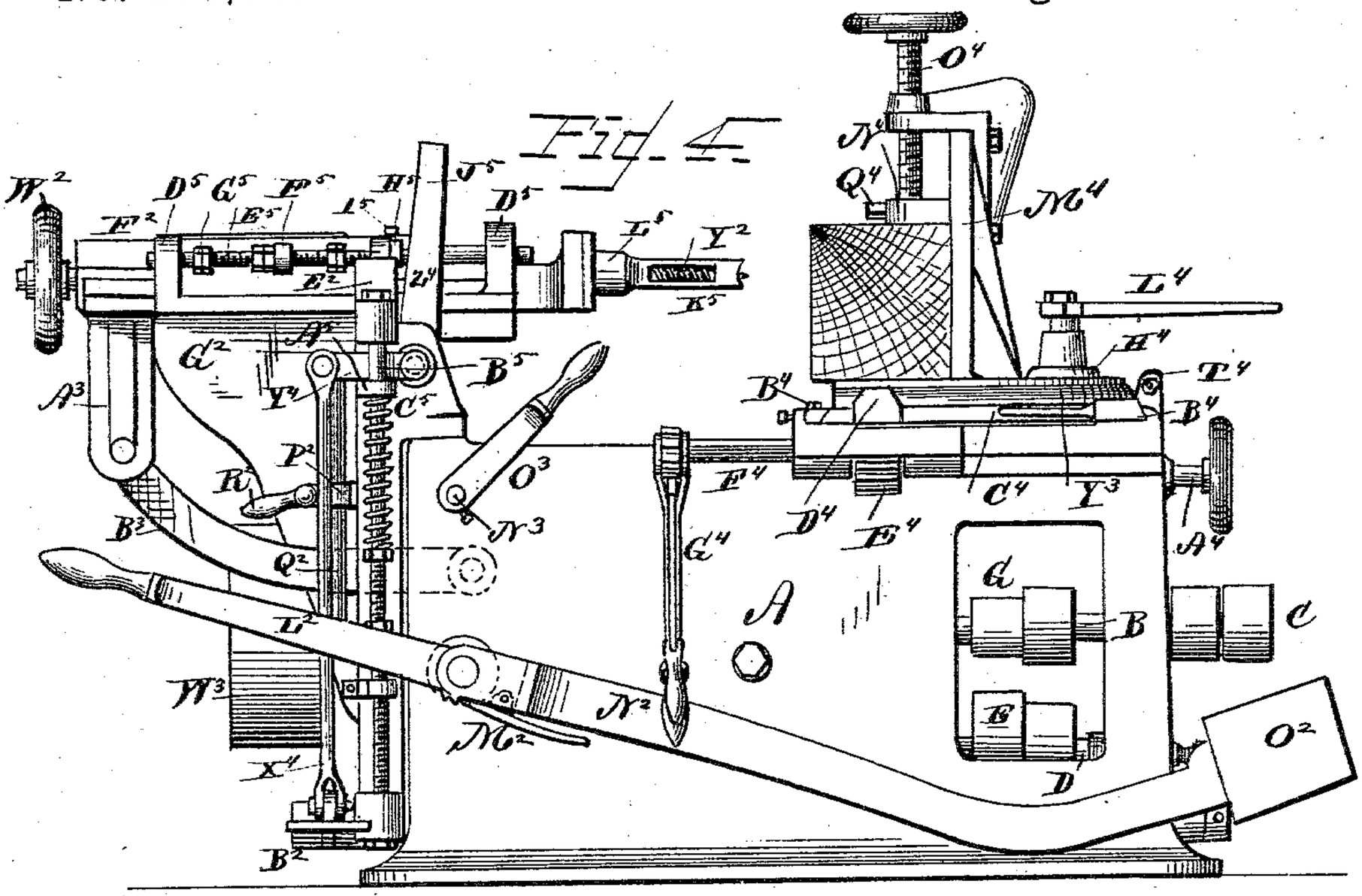
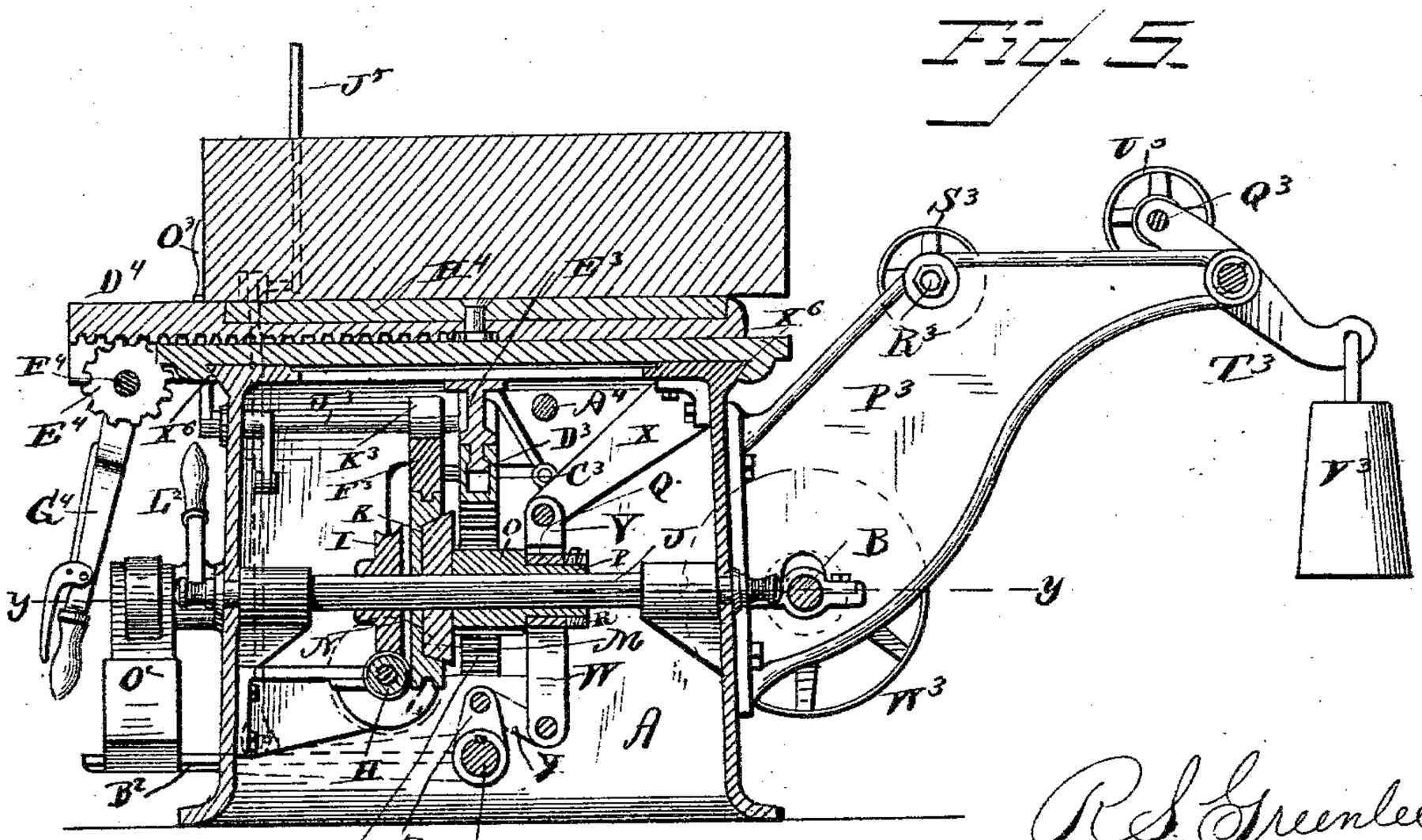


Fig. 5.



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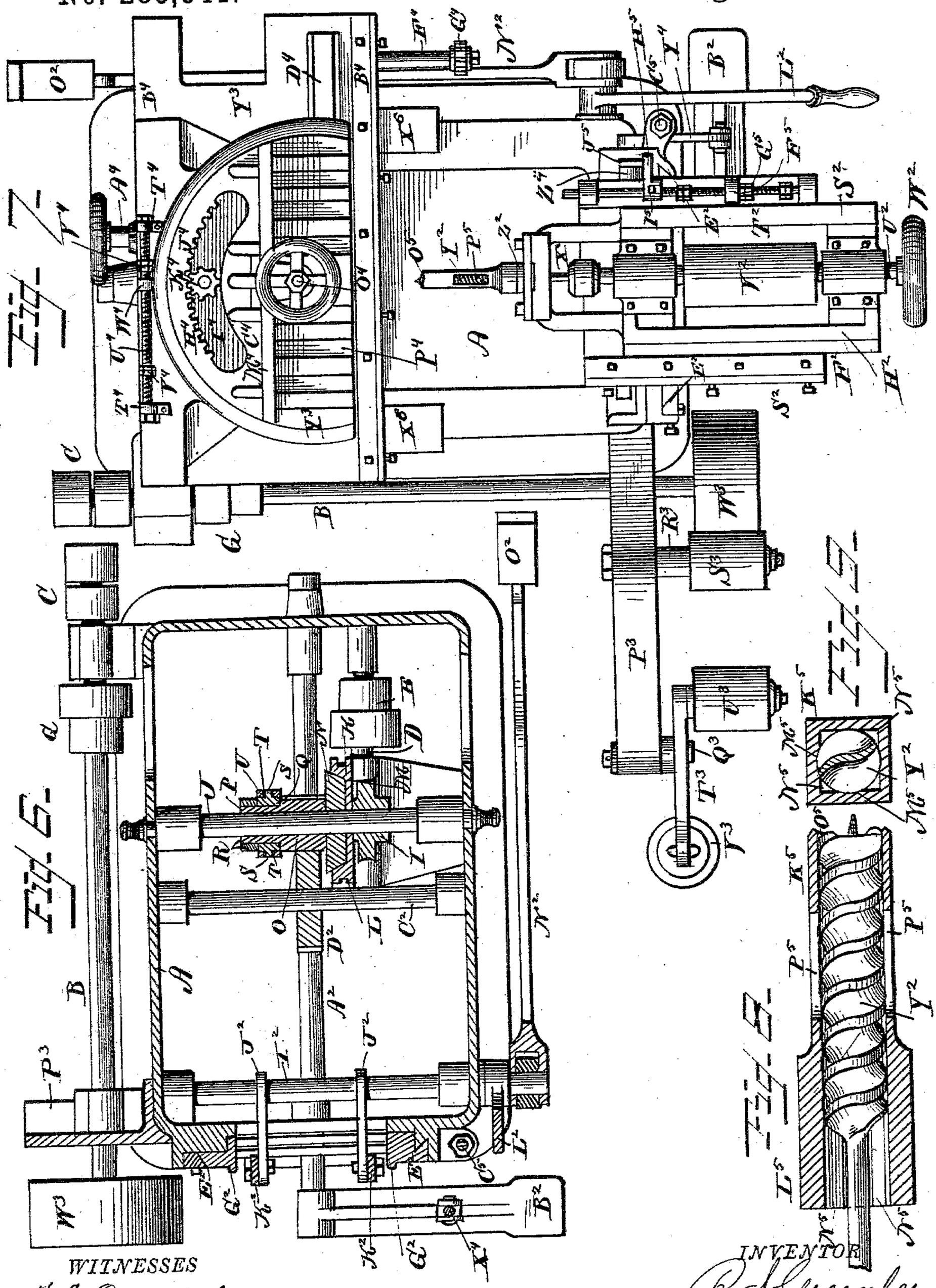
4 Sheets—Sheet 4.

R. S. GREENLEE.

MORTISING MACHINE.

No. 283,341. Patented Aug. 14, 1883.



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UNITED STATES PATENT OFFICE.

RALPH S. GREENLEE, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO ROBERT L. GREENLEE, OF SAME PLACE.

MORTISING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 283,341, dated August 14, 1883.

Application filed March 30, 1883. (No model.)

To all whom it may concern:

Be it known that I, RALPH S. GREENLEE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Mortising-Machine, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to mortising-machines; and it consists in certain improvements in the construction of the same, which will be hereinafter fully described, and particularly pointed out in the claims.

In the drawings hereto annexed, Figure 1 is a perspective view of my improved mortising-machine. Fig. 2 is a longitudinal vertical sectional view of the same. Fig. 3 is a front view. Fig. 4 is a side view. Fig. 5 is a vertical transverse sectional view on the line *x x* in Fig. 2. Fig. 6 is a horizontal section on line *y y*, Fig. 5. Fig. 7 is a top or plan view of the machine. Fig. 8 is a longitudinal sectional view of the hollow chisel, and Fig. 9 is a transverse section of the same.

The same letters refer to the same parts in all the figures.

A in the drawings represents the frame of the machine, which may be of any suitable construction.

B is the main shaft, which is located longitudinally at the side of the frame, which is provided with suitable bearings for the said shaft. The rear end of the shaft B has the driving-pulleys C, for receiving motion from any suitable source.

D is a short shaft journaled in suitable boxes or bearings longitudinally in the frame, and provided with a cone-pulley, E, connected by a belt, F, with a cone-pulley, G, upon the main shaft, from which motion at any desired rate of speed may thus be imparted to the said shaft D. The latter is provided with a worm, H, engaging a worm-wheel, I, upon a transverse shaft, J, located above the shaft D, and to which a rotary motion is thus communicated.

Upon the shaft J, adjoining the worm-wheel I, is placed a friction-wheel, K, having a grooved rim, L, and provided in its outer side with a conical recess, M.

N is a male friction wheel or disk located upon the shaft J, adjoining the wheel K, and adapted to enter the recess M in the latter with a sufficient degree of pressure to cause the said male friction-wheel, which is placed loosely on the shaft, to revolve.

Upon the outer side of the friction-disk N is placed or secured a pinion, O, having a neck, P, on which is placed a loose collar, Q, held in place by a band, R, secured upon the end of the said neck by means of a set-screw. The collar Q is provided with laterally-projecting studs S S, working in openings or slots T T in the sides of a band, U, encircling the said collar, and provided with upwardly and downwardly projecting arms V W. The upper arm, V, is pivoted to a bracket, X, extending downwardly from one side of the frame. The lower arm, W, is connected by a pivoted rod or link, Y, with an arm, Z, extending from a shaft, A^2, running longitudinally through the frame, and provided at its front end with a treadle, B^2, by means of which it may be conveniently manipulated. It will be seen that by operating the said treadle the disk N may be forced into contact with the friction-wheel K, and the pinion O thus be caused to revolve.

C^2 is a transverse shaft located in front of the shaft J, and carrying a gear-wheel, D^2, engaging the pinion O, from which it receives a rotary motion.

The front end of the frame A is provided with guides or bearings E^2, for a vertically-sliding frame, F^2, consisting, mainly, of the sides G^2 G^2 and top H^2.

I^2 is a shaft journaled transversely in the front part of the frame A, and provided with arms J^2 J^2, connected by pivoted links K^2 with the inner sides of the side pieces, G^2, of the frame F^2. The outer end of the shaft I^2 has a hand-lever, L^2, by means of which it may be turned, so as to raise or lower the frame F^2.

Pivoted upon the shaft I^2, and connected adjustably to the same by a pawl and ratchet, M^2, is an arm or lever, N^2, carrying at its outer end a balance-weight, O^2, which counterbalances the weight of the frame F^2, which may thus be easily raised or lowered to the desired position.

Secured to the frame F^2 is a clamp, P^2, en-

circling a rod, Q^2, which is secured vertically to the frame A and upon which the said clamp may be tightened by means of a screw, R^2, thereby holding and retaining the frame F^2 securely in any position to which it may be adjusted.

Guides or bearings S^2 are provided on the upper side of the frame F^2 for a longitudinally-sliding frame, T^2, having bearings for a longitudinal shaft, U^2, which carries a drum, V^2, to which motion is conveyed by means of a belt or band, as will be hereinafter more fully described. The front end of the shaft U^2 has a balance-wheel, W^2, and its rear end is provided with a chuck, X^2, serving to hold the drill or bit Y^2, which projects through an opening or collar, Z^2, at the front end of the frame T^2. The frame T^2 is provided at its rear end with a downwardly-projecting bracket, A^3, to the lower end of which a link, B^3, is pivotally connected.

C^3 is a rack-bar provided with a dovetail groove, D^3, by which it is fitted to slide longitudinally upon a track or guide, E^3, secured under the top of the frame A, as shown. The rack C^3 is arranged to engage the gear-wheel D^2, and the front end of the said rack-bar is connected pivotally with the link B^3, and by said link with the frame T^2.

F^3 is a friction-bar pivoted upon the pin G^3, which connects the rack-bar C^3 with the link B^3, extending rearwardly through the frame A, and adapted to engage the rim of the friction-wheel K. The track or guide E^3 is provided with a laterally-projecting pin, H^3, supporting a spring, I^3, which is connected to the friction-bar F^3, and serves to keep the latter from contact with the friction-wheel K.

J^3 is a transverse shaft having an eccentric, K^3, which, by turning the said shaft, may be made to press the friction-bar F^3 down in contact with the wheel K. The shaft J^3 has an arm, L^3, connected by a link or rod, M^3, with a crank-shaft, N^3, having at one end an operating-lever, O^3, by means of which it may be conveniently manipulated.

The frame A is provided with a laterally-projecting bracket, P^3, having bearings for the front end of the main shaft B, and for two smaller shafts or studs, Q^3 R^3, on one of which is mounted a pulley, S^3, while upon the other one is pivoted a lever, T^3, carrying at one end a pulley, U^3, and at its other end a weight, V^3. The front end of the main shaft has a pulley, W^3. A belt, X^3, passes from pulley W^3 over the tightening-pulley U^3, drum V^2 upon the shaft U^2 of the longitudinally-sliding frame T^2, over the guide-pulley S^3, and back to the pulley W^3, thus conveying motion from the latter to the drum V^2 and the shaft carrying the bit.

The rear end of the main frame A is provided on its upper side with guides or bearings X^6 for a longitudinally sliding and adjustable frame, Y^3, having a downwardly-projecting bracket, Z^3, in which works an adjusting-screw, A^4, which is journaled in the rear part of the main frame. The frame Y^3 is provided with guides or bearings B^4 for a transversely-sliding frame, C^4, on the under side of which is secured a rack, D^4, engaging a pinion, E^4, upon a shaft, F^4, journaled longitudinally in the frame Y^3, at one side of the latter, as shown. The shaft F^4 has a ratchet-lever, G^4, by means of which it may be manipulated so as to adjust the frame C^4 transversely upon the frame Y^3. The frame C^4 is provided on its upper side with bearings for a horizontal segmental base, H^4, which is mounted on a vertical pivot upon the said frame. The base H^4 has a segmental slot, I^4, equipped with a rack, J^4, engaging a pinion, K^4, journaled on the frame C^4, and operated by a suitable handle, L^4, for the purpose of adjusting the base H^4. The latter is provided with an upright, M^4, having a vertically-sliding follower, N^4, operated by a clamping-screw, O^4, for the purpose of holding the material to be mortised securely in position upon the base during operation. The base is grooved longitudinally, as at P^4, to prevent chips from lodging under the block to be mortised, and holding the latter out of line.

Pivoted to the follower N^4, and projecting in front of the latter, is a pawl, Q^4, adapted to engage notches R^4 in a gage-bar, S^4, which is in practice secured on top of the material to be mortised, the notches R^4 being formed at the places where it is desired to make the mortises.

To regulate the length of the mortises the rear end of the frame Y^3 is provided with brackets T^4, in which is fixed a gage-rod, U^4, which is screw-threaded, and provided with nuts V^4, or stops of any description, which may be adjusted so as to limit and regulate the movement of the transversely-adjustable frame C^4, which is provided with a perforated bracket, W^4, sliding over the gage-rod U^4 between the nuts V^4.

The treadle B^2, by means of which the operating mechanism of the machine is thrown into and out of gear, is connected by a pivoted rod, X^4, with the horizontal arm Y^4 of a bell-crank lever, Z^4, pivoted to the frame A. The arm Y^4 rests, and is supported on a slide or follower, A^5, mounted upon a vertical rod, B^5, and held in a raised position by a spring, C^5, coiled upon the said rod. The vertically-sliding frame F^2 is provided at its upper end with bearings D^5 for a longitudinally-sliding screw-threaded rod, E^5, which also passes through a lug, F^5, projecting from the sides of the sliding frame or carriage T^2. Nuts G^5 are adjustable upon the rod E^5, which is also provided near its front end with a stud, H^5, adjustable by means of a set-screw, I^5. When the carriage T^2 moves in a forward direction, the lug F^5 will strike the forward nuts G^5, thus moving the rod E^5 forwardly. When the carriage moves in a rearward direction, the rear nuts G^5 are engaged by the lug F^5, and

the rod E^5 is moved rearwardly until the stud H^5 strikes the vertical arm J^5 of the bell-crank lever Z^4, which is thus operated to raise the treadle B^2.

K^5 is the mortising-chisel, which is made square or nearly square in cross-section and of the required size and proportions. It is provided with a shank, L^5, by which it is connected, in any suitable manner, to the collar Z^2 at the front end of the carriage T^2. The chisel K^5 is hollow, its bore being of the shape indicated in Fig. 9 of the drawings, by reference to which it will be seen that it has four segmental sides, M^5, joined or connected by intermediate angular spaces, N^5. By this construction I have succeeded in producing a hollow chisel in which the chips will not clog. The cutting-edges O^5 of the chisel are made slightly concave, and they are so constructed as to throw the chips into the chisel and to the revolving bit, which carries them back and out through slots P^5 in the sides of the chisel.

In operation the material to be mortised is clamped securely upon the base H^4 by means of the follower N^4 and screw O^4. The said base is then turned so as to present the material at any desired angle. The gage-bar S^4 is to be clamped or otherwise secured upon the plank or other material to be mortised in such a manner that its notches R^4 will be engaged by the pawl Q^4 at points registering with the places where it is desired to make mortises. The nuts or stops V^4 are then to be adjusted upon the gage-rod U^4 in such a manner as to determine the length of the mortises. Power is then applied to the main shaft, which, through the intermediate mechanism herein described, serves to impart a rotary motion to the shaft U^2, carrying the drill-bit. The operator then places his foot upon the treadle B^2, thereby forcing the disk N into contact with the friction-wheel K, whereby a rotary motion is imparted to the said disk N, pinion O, and through the latter to the spur-wheel D^2. The latter, engaging the rack-bar C^3, forces the latter in a rearward direction, thus moving the carriage T^2, to which the said rack-bar is connected, rearwardly, and causing the chisel and bit to enter the plank, where a mortise of the size and shape of the chisel is thus formed. The length of the stroke of the carriage T^2, and hence the depth of the mortise, is regulated by the stud H^5, which is adjustable, as described, and which, by engaging the bell-crank lever Z^4, serves to raise the treadle B^2 against the pressure of the foot of the operator, thus disengaging the disk N from the friction-wheel K and stopping the rearward motion of the rack-bar C^3. The operator then, by means of the lever O^3, eccentric K^3, and intermediate mechanism, forces the friction-bar F^3 into contact with the rim of the friction-wheel K, which revolves in the opposite direction to the spur-wheel D^2, and thus serves, through the friction-bar F^3, to move the carriage T^2 in a forward direction and into position for a repetition of the operation.

When long mortises are to be made, the frame C^4 is gradually moved intermediately between the passes of the carriage T^2, within the limits permitted by the nuts or stops V^4, which have, as stated, been previously properly adjusted upon the gage-rod U^4. This is done by means of the ratchet-lever G^4 and intermediate mechanism.

By properly adjusting the frames F^2 and Y^3 the machine may be adapted to material of various kinds and dimensions.

By the vertically-adjustable frame the cutting mechanism may be raised and lowered, so as to make double mortises in a plank without moving or changing the position of the latter upon a supporting-base. This is an important feature of the invention, and saves much labor, especially when heavy lumber is to be mortised.

I claim as my invention and desire to secure by Letters Patent of the United States—

1. In a mortising-machine, the combination of the main frame or table, a frame longitudinally adjustable upon the rear end of the same, and a frame adjustable transversely upon the latter and carrying a horizontal pivoted base provided with mechanism for clamping and holding the material to be mortised, with a frame vertically adjustable at the front end of the main frame, cutting apparatus movable longitudinally upon the said vertically-adjustable frame, and suitable operating mechanism, as set forth.

2. In a mortising-machine, a horizontal pivoted base mounted so as to be longitudinally and transversely adjustable upon the main frame, and having mechanism for clamping and holding the material to be mortised, in combination with a vertically-adjustable frame, the tool-carriage movable longitudinally upon the latter, mechanism for regulating the throw of said carriage, and suitable operating mechanism, as set forth.

3. The combination of the main frame, a shaft journaled transversely in the same and having forwardly-extending arms, a vertically-sliding frame connected by pivoted links with the said arms, a hand-lever upon the end of the said shaft, a weighted balance-lever connected adjustably to the said shaft by pawl and ratchet, and means for retaining the vertically-movable frame securely in any position to which it may be adjusted, as set forth.

4. The combination of the main frame, a vertically-adjustable frame upon the front end of the same, the tool-carriage mounted upon the said vertically-adjustable frame, and having a downwardly-projecting bracket, a rack-bar sliding longitudinally in the main frame, a spur-wheel engaging said rack, a link connecting the latter with the tool-carriage, and suitable operating mechanism, as set forth.

5. The combination, with the tool-carriage mounted to slide longitudinally upon a vertically-adjustable frame, of a rack-bar and a friction-bar sliding longitudinally in the main frame, a link connecting the said rack-bar and

friction-bar with the tool-carriage, and mechanism for moving the said rack-bar and friction-bar in opposite directions, as set forth.

6. The combination of the main frame, the tool-carriage mounted to slide longitudinally upon a vertically-adjustable frame, a friction-wheel mounted upon a transverse shaft in the main frame, a pinion mounted loosely upon the same shaft and adapted to receive its motion from the said friction-wheel, a spur-wheel arranged in front of and meshing with the said pinion, a longitudinally-sliding rack-bar engaging the said spur-wheel, a longitudinally-movable friction-bar adapted to engage the rim of the friction-wheel, a link connecting the said rack-bar and friction-bar with the tool-carriage, and mechanism for controlling the motion of the spur-wheel by which the rack-bar is operated, as set forth.

7. The combination of the tool-carriage mounted to slide longitudinally upon a vertically-adjustable frame, mechanism for moving the said tool-carriage in a rearward direction, a friction-bar connected by a pivoted link with the said carriage, a friction-wheel mounted upon a transverse shaft in the main frame and revolving in a forward direction, a spring arranged to hold the said friction-bar from contact with a friction-wheel, an eccentric adapted to bear upon the said friction-bar and hold it in contact with the said friction-wheel, and an operating-lever, as set forth.

8. The combination of the tool-carriage mounted to slide longitudinally upon a vertically-adjustable frame, a rack-bar arranged to slide longitudinally in the main frame and connected with the said tool-carriage by a pivoted link, a spur-wheel mounted upon a transverse shaft and engaging the said rack-bar, a pinion mounted upon a transverse shaft in rear of and meshing with the said spur-wheel, and having a male friction-disk secured to one side, a female friction-wheel secured upon the said shaft, worm-gear arranged to revolve the said shaft, and mechanism for throwing the male friction-wheel, carrying the pinion, into and out of gear with the female fixed friction-disk, as set forth.

9. In a mortising-machine, the combination with a longitudinally-sliding tool-carriage mounted upon a vertically-adjustable frame, and provided with a friction-bar extending longitudinally through the frame, and connected to the tool-carriage by a pivoted link, of the main shaft, a shaft driven by the same and carrying a worm, a transverse shaft having a worm-wheel engaging the said worm, a friction-wheel mounted upon the said shaft, adapted to engage the friction-bar of the tool-carriage, and having a conical recess in one side, a pinion mounted loosely upon the said shaft, and having a male friction-disk adapted to engage the recess in the female friction-wheel, a collar journaled loosely upon the neck of the pinion, and having laterally-projecting studs, a band mounted upon the said studs and having arms pivoted, respectively, to a bracket, and by an intermediate link to arms projecting from a longitudinal shaft, and an operating-treadle at the front end of the said shaft, all arranged and operating substantially as set forth.

10. The combination of the tool-carriage mounted to slide longitudinally upon a vertically-adjustable frame, a rod mounted to slide longitudinally adjoining the said carriage and passing through a lug extending laterally from the latter, stops adjustable upon the said rod and adapted to be engaged by the said lug, a stud adjustable upon the said rod, near its front end, a bell-crank lever pivoted to the vertically-adjustable frame, a treadle controlling the means for throwing into and out of gear the mechanism by which the tool-carriage is moved rearwardly, a spring to hold the said treadle automatically in a raised position, and a rod connecting the said treadle with one arm of the bell-crank lever, which latter is adapted to be moved by the stud upon the longitudinally-sliding rod against the pressure of the foot of the operator upon the treadle, as set forth.

11. The combination of the main frame, the vertically-adjustable frame, the tool-carriage mounted to slide longitudinally upon the latter, the hollow chisel secured at the end of the carriage, the longitudinal shaft journaled in the latter, and carrying a bit, a balance-wheel, and a drum, the main shaft having a band-wheel, a guide-pulley, and a belt-tightener mounted in a bracket projecting laterally from the main frame, and a belt connecting the main shaft with the bit-shaft and passing over the guide-pulley and the belt-tightener, as set forth.

12. In a mortising-machine, the combination, with the horizontal pivoted base adjustable transversely and longitudinally upon the main frame in rear of the cutting mechanism, and having a standard or upright, of a follower sliding vertically in front of said upright, and adapted to secure the material to be mortised upon the base, means for operating the said follower, a pawl pivoted to and extending in front of the latter, and a notched gage-bar adapted to be secured to the material to be mortised, as set forth.

13. In a mortising-machine, the herein-described mechanism for regulating the length of the mortises to be cut, the same consisting of a rod secured transversely to the rear end of a frame or carriage which is longitudinally adjustable upon the main frame of the machine, stops adjustable upon the said rod, a frame movable transversely upon the longitudinally-sliding frame, and having a pivoted base adapted to support the material to be mortised, and a collar upon the rear end of the transversely-sliding frame encircling the transverse rod between the stops, whereby the movement of said transversely-sliding frame is limited, as set forth.

14. In a mortising-machine, the combination and arrangement, as herein described, of

the main frame, a frame sliding longitudinally upon the rear end of the same, and having a transversely-adjustable frame carrying a horizontal pivoted base, provided with means for holding the material to be mortised during operation, a gage for limiting the movement of the transversely-adjustable frame, a pawl or stop pivoted to and extending in front of the clamping-follower, a frame adjustable vertically at the front end of the main frame, a tool-carriage mounted to slide longitudinally upon the said vertically-adjustable frame, mechanism for operating a shaft journaled longitudinally in the tool-carriage, mechanism for moving the latter forwardly and rearwardly, and means for controlling such motion, as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

RALPH S. GREENLEE.

Witnesses:
EDWARD G. SIGGERS,
J. R. LITTELL.