H. B. Smith,

Mortising Machine.

No. 13,663. Patented Oct. 9, 1855.

Fig 4

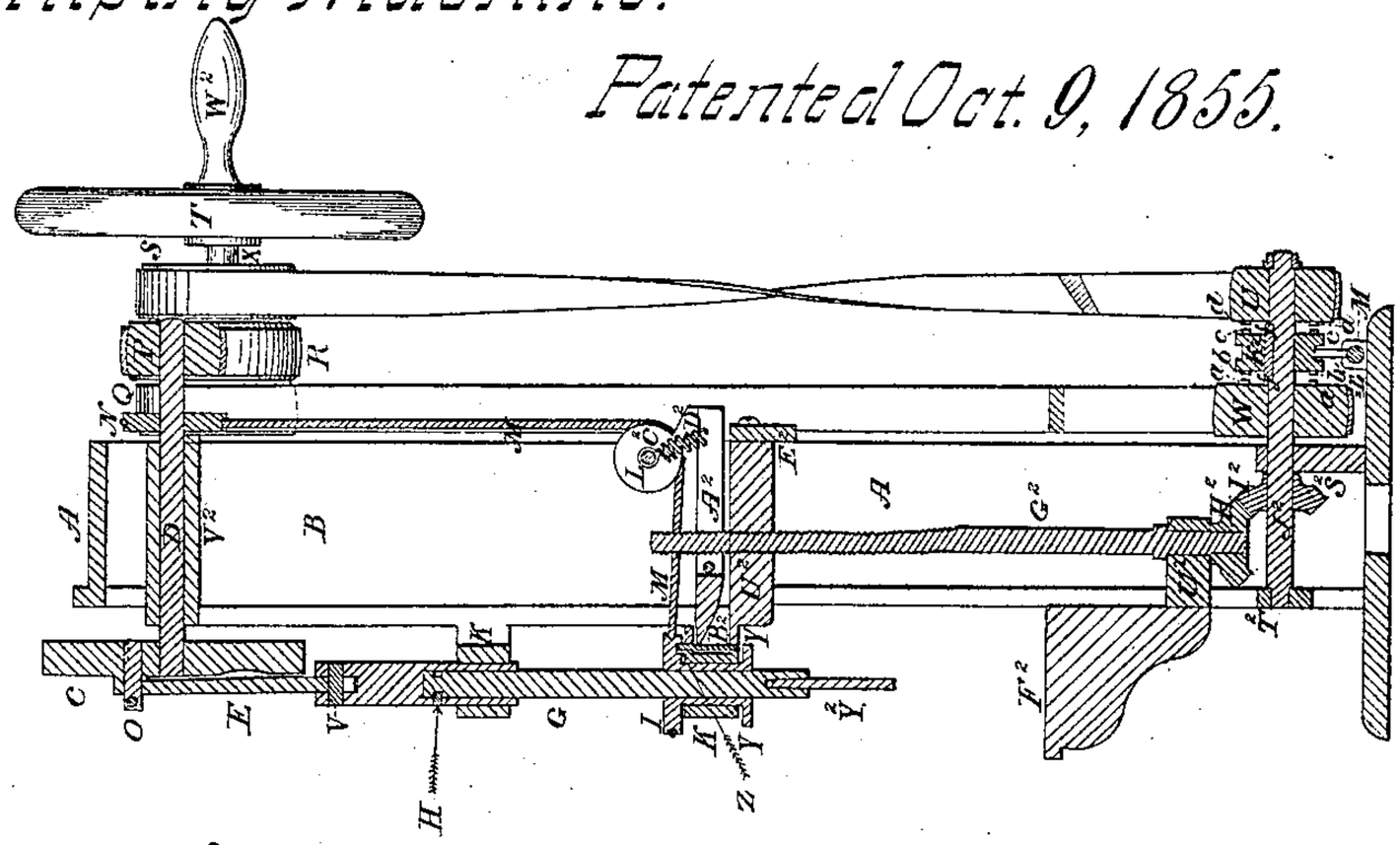


Fig 3

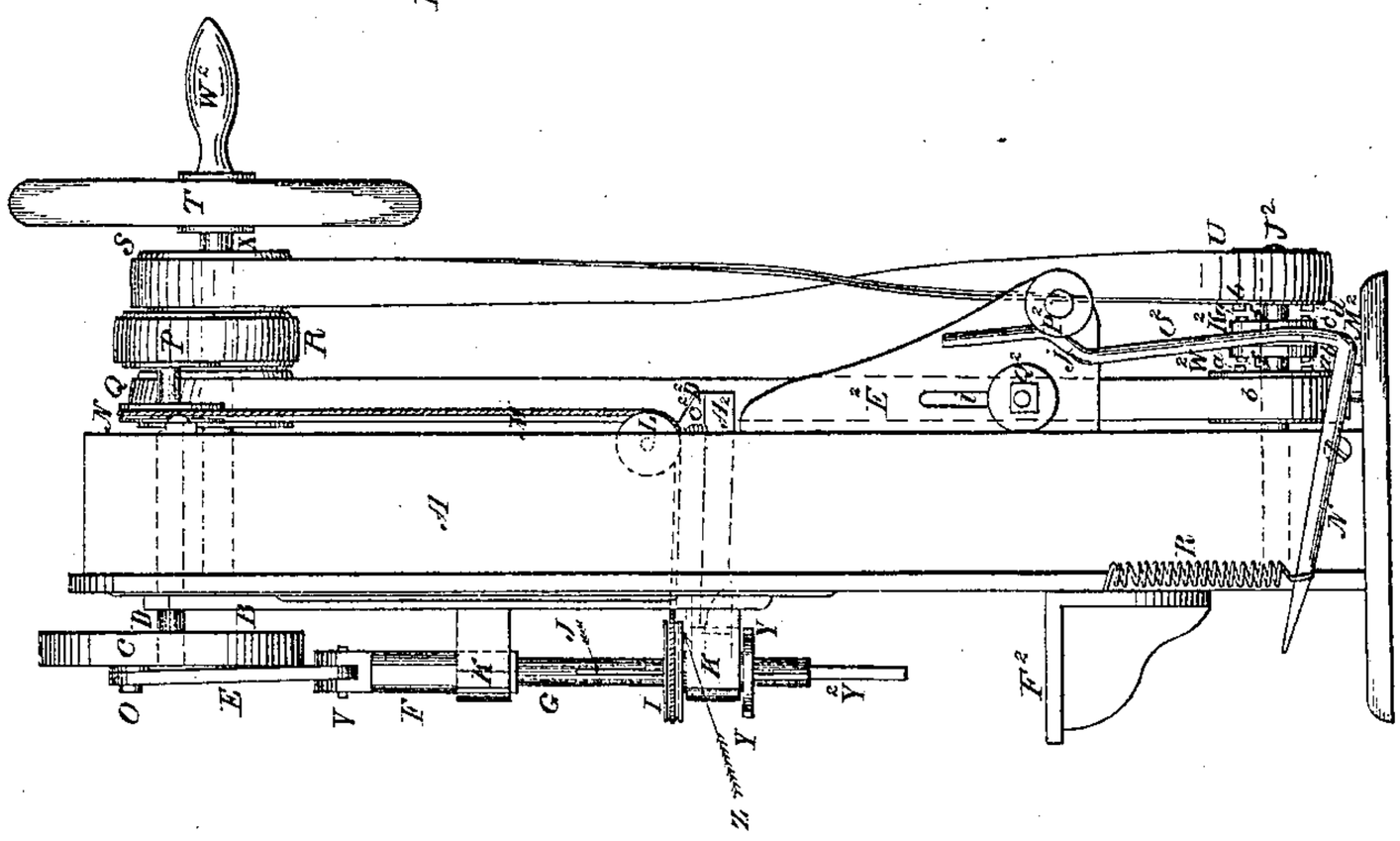


Fig 1

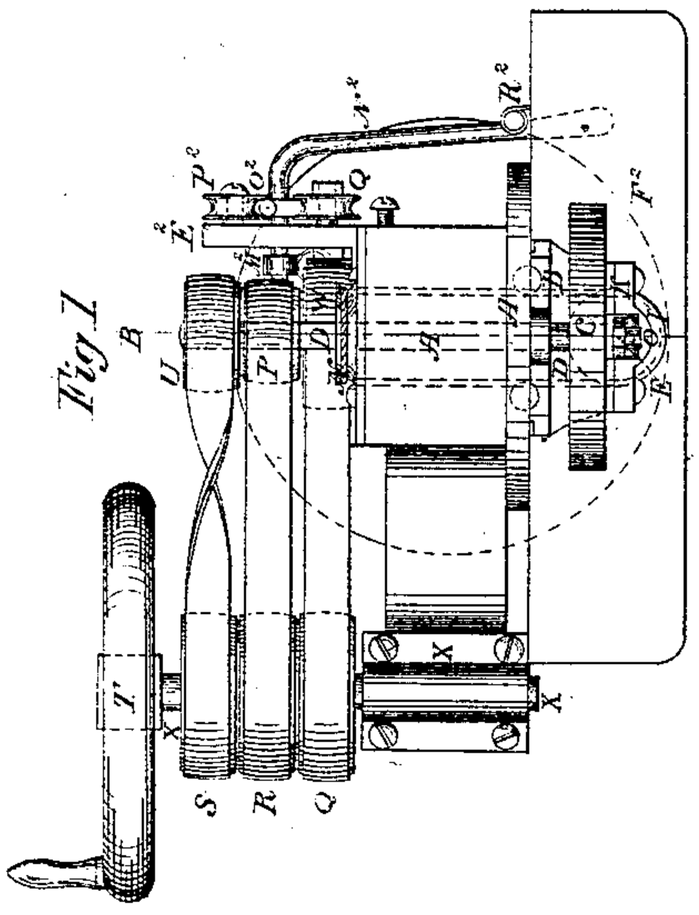
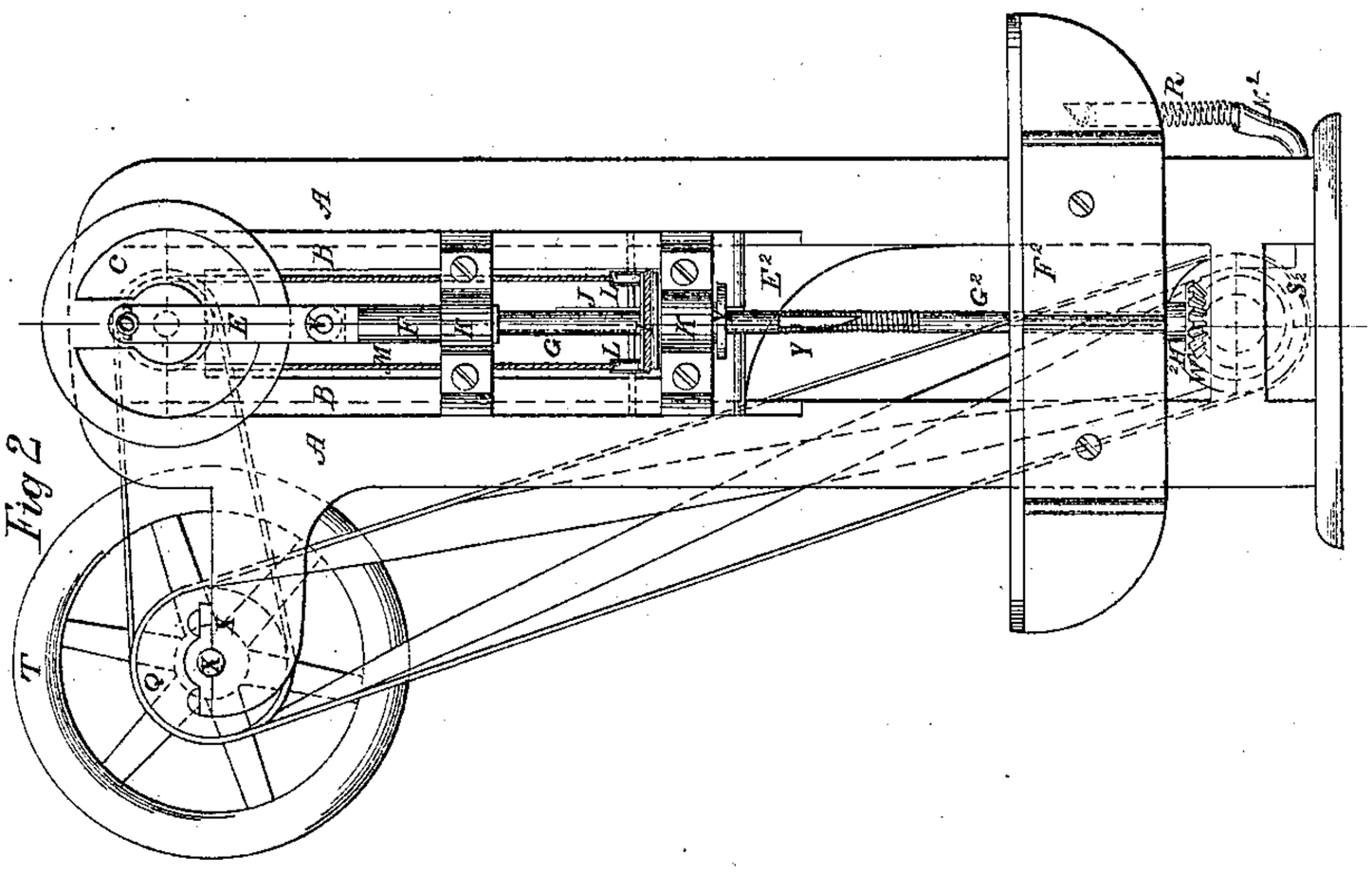


Fig 2



UNITED STATES PATENT OFFICE.

HEZEKIAH B. SMITH, OF LOWELL, MASSACHUSETTS.

MORTISING-MACHINE.

Specification of Letters Patent No. 13,663, dated October 9, 1855.

To all whom it may concern:

Be it known that I, HEZEKIAH B. SMITH, of Lowell, in the county of Middlesex and Commonwealth of Massachusetts, have invented a new and useful Self-Moving, Stopping, and Reversing Power Mortising-Machine; and I hereby declare that the following specification, in connection with the accompanying drawings and references thereon, constitute a lucid, clear, and faithful description of the construction and use of the same.

In referring to the drawings, Figure 1 denotes a plan or top view. Fig. 2, a front side elevation. Fig. 3 an edge view of the same. Fig. 4, is a transverse and vertical section on line A, B, Figs. 1 and 2 showing parts beyond.

Invention.—The nature of my invention consists of the mortising machine hereafter fully described, which is so constructed that large timber can be mortised thereon, and so that the carriage carrying the chisel will be fed or moved downward by power to form the mortise by the movement of my machine until the mortise is formed the required depth. Then the downward movement will cease, and allow the timber to be moved along so that one head of the mortise will be formed. Then by removing the foot from a lever or its equivalent, the carriage is moved upward by power until the cutting edge of the chisel is above the surface of the timber, when the chisel instantly reverses by power and the carriage is again moved down by power, by pressing down the treadle, or lever by the foot so that the chisel will form the mortise the required depth in the timber, which is then moved along until the chisel forms the other head of the mortise, all substantially as hereafter described.

Construction.—To enable persons skilled in the art to which my invention appertains, to construct and carry out the same, I will describe it as follows. I construct a strong frame of iron, seen at A, A, to which is fitted the iron chisel carriage seen at B in such manner that it may slide up and down by power. To the top of the carriage B, I suspend the shaft D, in bearings so as to revolve, and on which is placed the crank or driving wheel C, it being firmly secured to it. To the wheel C, is fastened the wrist O, which carries, and operates the revolving chisel Y^2, by means of the connecting rod E, pin V, socket F, and chisel piston G, the piston G is kept from dropping out of the socket F by means of the pin H, which passes through the socket F into the groove formed in the chisel piston G, as seen at Fig. 4.

On the carriage B I form two stands or bearings seen at K, K, to the upper one the socket F is fitted so as to slide freely up and down by operation of the wheel C, to the lower stand K is fitted the reversing cylinder I, so that it may easily turn therein to reverse the chisel Y^2. To the reversing cylinder I, is fitted the steel plunger G, this plunger has a spline fitted and fastened to it as seen at J, Figs. 2 and 3, this spline is fitted to the reversing cylinder I, so as to easily slide therein as the chisel plunger G is moved up and down. The upper part of the reversing cylinder I is grooved so as to receive a band as seen at M, this band passes around the two friction rolls L, L, and thence up around the pulley N, on the shaft D by which it is operated. On the lower part of the reversing cylinder I is formed the two stops seen at Y, Y, which strike the vertical moving bar B^2, when the chisel is in position to cut either head of the mortise, when it is moved down by the lever A^2 so that the stop Y will come in contact with it. I form two recesses equidistant from each other in the reversing cylinder, seen at Z into which the bar B^2 projects when moved upward to stop the chisel when reversed by the stop B^2, striking against the projections of metal left in the recesses Z, the band M playing loosely around the cylinder I, and pulleys N and L, will slip around the cylinder I when it is held by the bar B^2, and catch Y, or by the projections of metal in the groove Z, when the chisel Y^2 is mortising the wood, but will instantly turn or reverse the chisel piston or plunger G, and chisel Y^2, when the bar B^2 is moved up or down by the lever A^2.

This device hereinbefore specified for simply reversing the chisel is embraced in, and forms part of my original invention of mortising machine patented by me January 10th 1854. Therefore I lay no claim to it here, but briefly describe it, and its connection with the other parts of my machine which constitute the subject of the present application for patent.

I form the lower part of the movable carriage B of sufficient thickness to receive the

screw G^2, by the revolving of which this carriage B is raised or lowered with great power to force the carriage B, down, and the chisel Y^2 into the wood, of sufficient depth, it being impracticable to move up heavy timbers to the chisel which renders it necessary to move down the carriage B, chisel Y^2 and parts operating them.

A stand seen at U^2 Fig. 4, is cast with, or otherwise formed on the frame A constituting the lower bearing for the screw G^2. On the lower end of this screw is fitted and fastened a bevel gear seen at H^2, which gears into and is driven by the corresponding bevel gear I^2 firmly fastened upon the horizontal shaft J^2. The bearings for it are seen at T^2, and S^2. To the out end of the shaft J^2 is fitted the pulleys U, and W, and clutch K^2. This clutch slides on the shaft J^2 and is kept from turning on this shaft, by the spline *f*.

I form two projections on the pulley W as seen at *a*, *a*, which correspond with two similar projections *b*, *b*, from the side of the clutch K^2. I also form two more projections seen at *c*, *c*, from the opposite side of the clutch K^2, and two corresponding ones seen at *d*, *d*, from the side of the pulley U, these constitute the reversible clutching apparatus by which the chisel Y^2 is moved both up and down by power.

I construct a main driving shaft seen at X which is suspended to a portion of the iron frames seen at X^2. To this shaft is secured the balance wheel T, with its crank pin seen at W^2, also the driving pulleys S, R and Q. The driving pulley S is connected to, and drives the pulley U by belt. The pulley Q is likewise connected to, and drives the pulley W by belt. The pulley R connects with and drives the pulley P, and consequently the shaft D, and mortising chisel Y^2. The balance wheel T, occupies the same position which is intended to be occupied by the driving pulley in a large machine.

I construct a metallic lever seen at N^2 which is operated by foot to so connect the clutches so that the carriage B and chisel Y^2 will move downward by power. Said lever turns in the stands M^2. This lever is kept upward by the spring R^2. A portion of the lever N^2, seen at L, is projected upward into the groove *g* in the clutch K^2 which projection operates to ship the clutch K^2 from the pulley U to the pulley W as desired, or to disconnect it from either of them.

I form an arm seen at O^2 which connects with the projection L^2. This arm is operated upon to stop the chisel Y^2 from descending too far downward, and to reverse the movement of the screw G^2, by the pulley Q^2 coming in contact with the bent portion J of the arm O^2 and pressing it off so as to uncouple the clutch K^2 from the pulley W if the foot be, or be not on it, when and after the chisel Y^2 penetrates the wood the desired depth.

After the stopping of the downward movement of the carriage B, and chisel Y^2 by shipping the clutch K^2 from the pulley W, the foot is then removed from the lever N^2 which is then instantly raised up, by the spiral spring R^2, thereby connecting the clutch K^2 with the pulley U, which moves up the carriage B^2, and chisel Y^2 out of the mortise, which upward movement is stopped by the pulley P^2 coming in contact with the bent portion J of the lever O^2 which presses off this lever and unclutches the clutch K^2 from the pulley U, the carriage B, will thus remain up until the lever N^2 is again pressed down by the foot or otherwise as before described, when the chisel Y^2 moves up out of the mortise it is instantly reversed as before described, when it is ready to again be moved down by power, by placing the foot upon the lever N^2 and pressing it down so as to connect the clutch K^2 with the pulley W which will readily be seen.

The pulley Q^2 is made adjustable to give any required depth to the mortise by means of the slot *i*, which is formed in the stand E^2, it is not necessary to have the pulley P^2 adjustable, as the chisel Y^2 and carriage B, are always raised to about the same height when moved upward by power.

The lever A^2, the out end of which is kept up by the spring C^2, strikes the fixed stand D^2 when the carriage B moves upward by which the reversing cylinder I, and chisel Y^2 are allowed to be reversed by the band M, which reversing operation will readily be seen, and understood by inspection of the drawings.

Use.—In using my within described power mortising machine, I first place the timber to be mortised, upon the stationary metallic bed piece F^2, then press the lever N^2 down by the foot, which moves the clutch K^2 so as to clutch with and revolve the pulley W, shaft J^2, bevel gear I^2 which gears into and drives the gear H^2, and screw G^2, on which the gear H^2 is placed, in the right direction to move the carriage B and chisel Y^2, down until the chisel Y^2 penetrates to the proper depth into the timber for the desired mortise.

The gage of the depth of the mortise is effected by first setting or adjusting the friction pulley Q^2 in such position by means of the slot *i* in the stand E^2 that this friction pulley Q^2 will come in contact with the bent portion J of the lever O^2 which will push off this lever, and raise the lever N^2, whether the foot be, or be not on it, and consequently unshipping the clutch K^2 from the pulley W by the arm L^2. Then the timber is moved or slid along by any desired means, until one end or head of the mortise

is formed. Then the foot is removed from the lever N^2 which lever will then be instantly drawn up by the spring R^2, and throw back the lever Q^2 and arm L^2, which will move the clutch K^2 into connection with the pulley U by which means the screw G^2 and intermediate connections are revolved in an opposite direction so as to raise the carriage B, and chisel Y^2 out of the mortise. The upward movement of the chisel Y^2 and carriage B is stopped by the friction pulley P^2 coming in contact with the bent portion J of the lever O^2, and pressing it and the arm L^2 and clutch K^2 forward and consequently unclutching it from the pulley U, after the cutting edge of the chisel Y^2 is above the upper surface of the timber which is being mortised. Then the chisel Y^2 is instantly reversed by the parts embodied in my patent of January 10, 1854 hereinbefore briefly described, so as to form the opposite head of the mortise. Then the carriage B carrying the chisel Y^2 is again moved down as before stated, and so on for any desired number of mortises. Thus it will be seen that the largest mortises desired, can be formed in the hardest timber, by simply pressing down the lever N^2, and thus holding it until one end of the mortise is completed, then removing it therefrom until the carriage B is raised so as to allow the chisel Y^2 to be reversed by power, then by placing the foot upon the lever N^2 and again pressing it down and thus holding it until the mortise is completed.

Having thus described the construction, and use of my invention I will state my claim as follows:

1. I claim moving the chisel carriage B to, and from the wood to be mortised, by power, essentially in the manner and for the purposes set forth.

2. I claim in combination the bent lever O^2, clutches K^2, *a*, *b*, *c*, and *d*, pulley stops P^2 and Q^2, or their mechanical equivalents by which the chisel carriage B will stop its own motion, at, or near any desired point, substantially in the manner and for the purposes set forth.

HEZEKIAH B. SMITH.

Witnesses:
WILLIAM B. MERRILL,
E. W. SCOTT.