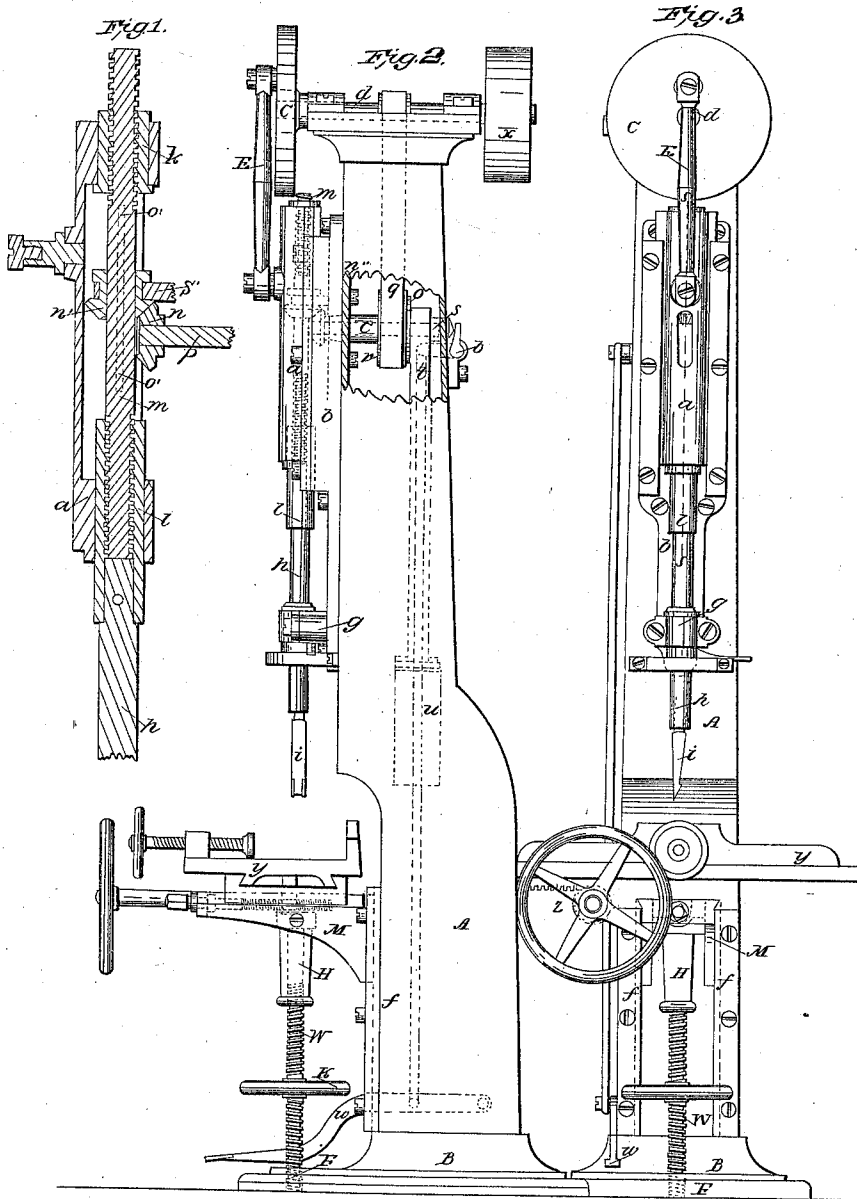


*J. Richards,*  
*Mortising Machine.*

*No. 81,407.*

*Patented Aug. 25, 1868.*



*Witnesses:*  
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# United States Patent Office.

JOHN RICHARDS, OF CINCINNATI, OHIO.

Letters Patent No. 81,407, dated August 25, 1868.

## IMPROVEMENT IN MORTISING-MACHINES.

The Schedule referred to in these Letters Patent and making part of the same.

### TO WHOM IT MAY CONCERN:

Be it known that I, JOHN RICHARDS, of Cincinnati, in the county of Hamilton, and State of Ohio, have made certain Improvements in Power-Mortising Machines; and I hereby declare the following to be a full and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 3 is a front elevation of a machine complete, with my improvements on.

Figure 2 is a side elevation of fig. 3.

Figure 1 is a vertical section through the ram *a*, fig. 3, on line *s s*.

Similar letters of reference, on the different figures, indicate corresponding parts.

The nature of this invention consists—

First, in a reverse-threaded screw, for projecting the chisel-bar down upon the work.

Secondly, in gearing and devices for operating this screw, by means of a frictional clutch, using the force of the driving-power to operate the same; and

In a graduated weight, to return the chisel-bar after the mortise is completed, the graduated resistance of the weight enabling the operator to stop the chisel at any point of its downward stroke.

Also, in a reverse-threaded screw, for adjusting the table to receive work of different depths, and to receive the force of the chisel-bar directly, and communicate it to the foundation on which the machine stands.

In power-mortising machines, as hitherto constructed, the chisel-bar is thrown into motion, or brought down to the wood to be mortised, by the weight of the operator upon a treadle; or the wood, with the table, has been raised in the same manner. In either of these cases, the long movement of the treadle, together with the great weight required, has made the operation laborious to the operator, particularly in machines constructed for a heavy class of work; neither has the chisel-bar had a positive movement, but reacted upon the treadle.

To obviate these objections, and to secure a positive movement of the reciprocating parts and chisel-bar, is the object of the invention illustrated.

To enable others skilled in the art to make and use my invention, I will proceed to describe the mode of constructing and manner of operating the same, with the aid of the drawings.

A is the main column or support, cored out hollow, and mounted on a broad base, B, in the usual manner.

C is the crank-wheel or eccentric, and *d* the driving-shaft. E is a link or connection between the crank-wheel C and the reciprocating ram *a*.

*b* is a frame, bolted to the front of the column A, arranged with guides to receive the ram or carrier *a*, and also an extension, to receive the lower bearing of the chisel-bar *g*.

*h* is the chisel-bar, bored out at the lower end to receive the chisel *i*, the upper end being fitted into the nut *l*.

The right-and-left threaded screw *m* is tapped into and through the nut K, also with a reverse thread into the nut *l*, at the bottom, as shown in fig. 1, and by red lines, fig. 2.

*n'* and *n* are bevel-gears for rotating the screw *m*, and are operated by the shaft *p*. *q* is a belt, passing from the pulley *r* to a driving-pulley on shaft *d*, as shown in fig. 2. *o* is a frictional clutch or plate, moving on a feather in the shaft *p*, with its face in contact, or nearly so, with the side of the pulley *r*, fig. 2. On this flange *o* is formed a hub or extension, *s*, on which is wound the belt *t*, for raising the weight, shown by dotted lines at *u*, fig. 2. *v* is a bell-crank, communicating with the treadle *w*, and is used to force the plate *o* up against the pulley *r*. *x* is the driving-pulley, and *y* the table for supporting the timber to be mortised. The table *y* is not different from the ordinary table used on this class of machines, is moved by rack and pinion and hand-wheel *z*. It has a compound movement with and transverse to the line of the mortise, but the manner of supporting is different from that commonly adopted. The table *y*, with the supporting-bracket M, rests upon a large screw, W, which is placed centrally under the chisel-bar *i*, and the force of the blow is thereby communicated to the foundation at F, relieving the guides *ff* of the force. This screw is threaded, like the screw *m*, with reverse or right-and-left threads, tapped into the nut H, and through the base at F.

The hand-wheel *k* is to elevate or depress the table, by rotating the screw *W*, moving the table a distance equal to twice the pitch of the screw, at each revolution.

In operating the machine, the ram or carrier *a*, with the screw *m* and chisel-bar *h*, has a reciprocating motion equal to the stroke of the eccentric, *C*, the screw *m* moving freely through the bevel-gear *n''*, but prevented from turning by a feather, shown by dotted lines at *o' o'*, fig. 1. The gear *n'* has a fixed bearing, *s'*, formed on the frame *b*, as shown by red lines, fig. 2.

To project the chisel-bar *h* down, and cause the chisel *i* to enter the wood, the operator presses with his foot upon the treadle *w*. This, by means of the bell-crank *v*, fig. 2, forces the plate *o* up against the face of the pulley *r*. This pulley being continually in motion, by means of belt *q* rotates the flange *o*, and with it the shaft *p* and bevel-gears *n' n*, with the screw *m*. This projects the nut *l* and chisel-bar *h* downward a distance equal to double the pitch of the screw, at each revolution, the screw *m* moving down out of the fixed nut *k*, one thread at each turn, and the nut *l* receding from the screw in the same manner.

The nut *l* being fixed to the chisel-bar *h*, prevents it from turning.

The pulley *r* runs loose on shaft *p*, and bears on its reverse face against the hub *o'* on the bracket *n'*, fig. 2.

The shaft *p* and clutch-plate *o*, in rotating, wind up the large weight *W*, by means of the belt *t*. This belt, by winding in the form of a spiral on the hub of *o*, offers a graduated resistance to the rotation of shaft *p*, enabling the operator to stop the movement of the screw *m* at any point.

When the foot of the operator is removed from the treadle *w*, the weight *u* rotates the shaft *p* in a reverse direction, and returns the chisel-bar *h* and screw *m* to the position shown in fig. 1, when the chisel-bar is in its disengaged or highest position.

The graduated resistance of the weight *u*, by the spiral winding of the belt *t*, meets precisely the conditions of reversing the screw *m*, commencing with an increased power, and diminishing as the chisel returns to its upward position. This feature is also an essential element in the use of the driving-power, to throw the chisel into motion or into the work, as without this the action would be positive, and the operator unable to work the chisel down gradually, to suit the conditions of the work, and the kind and depth of the mortises to be formed.

Having thus described the mode of constructing, and the manner of operating my machine, what I regard as new, and desire to secure by Letters Patent, is—

1. The right-and-left threaded screw *m*, and fixed and movable nuts *k* and *l*, when used to operate the chisel-bar of a mortising-machine, as herein set forth and described.
2. The shaft *p* and bevel-gears *n'* and *n*, when used in combination with the ram or carrier *a*, and as a means of rotating the reverse-threaded screw *m*, substantially as specified and shown.
3. The shaft *p* and bevel-gears *n'* and *n*, for rotating the screw *m*, as specified and shown.
4. The belt *q* and pulley *r*, when used in combination with the ram or carrier *a*, and as a means of operating the reverse-threaded screw *m*, for feeding the chisel-bar down, substantially as set forth and shown.
5. The friction-clutch, consisting of the plate *o*, pulley *r*, in combination with the reverse-threaded screw *m* and carrier *a*, for producing a graduated feed of the chisel-bar *h*, for the purposes and in the manner shown.
6. The weight *u* and belt *t*, when arranged to operate as a graduated resistance to the rotation of the screw *m*, and as a means of returning the chisel-bar to its up stroke, arranged and operating as herein described.
7. The screw *W*, when formed with a compound or right-and-left hand thread, and used, as a means of adjusting the table-bracket *M*, arranged and operating as set forth and specified.

JOHN RICHARDS.

Witnesses:

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W. E. LONDON.