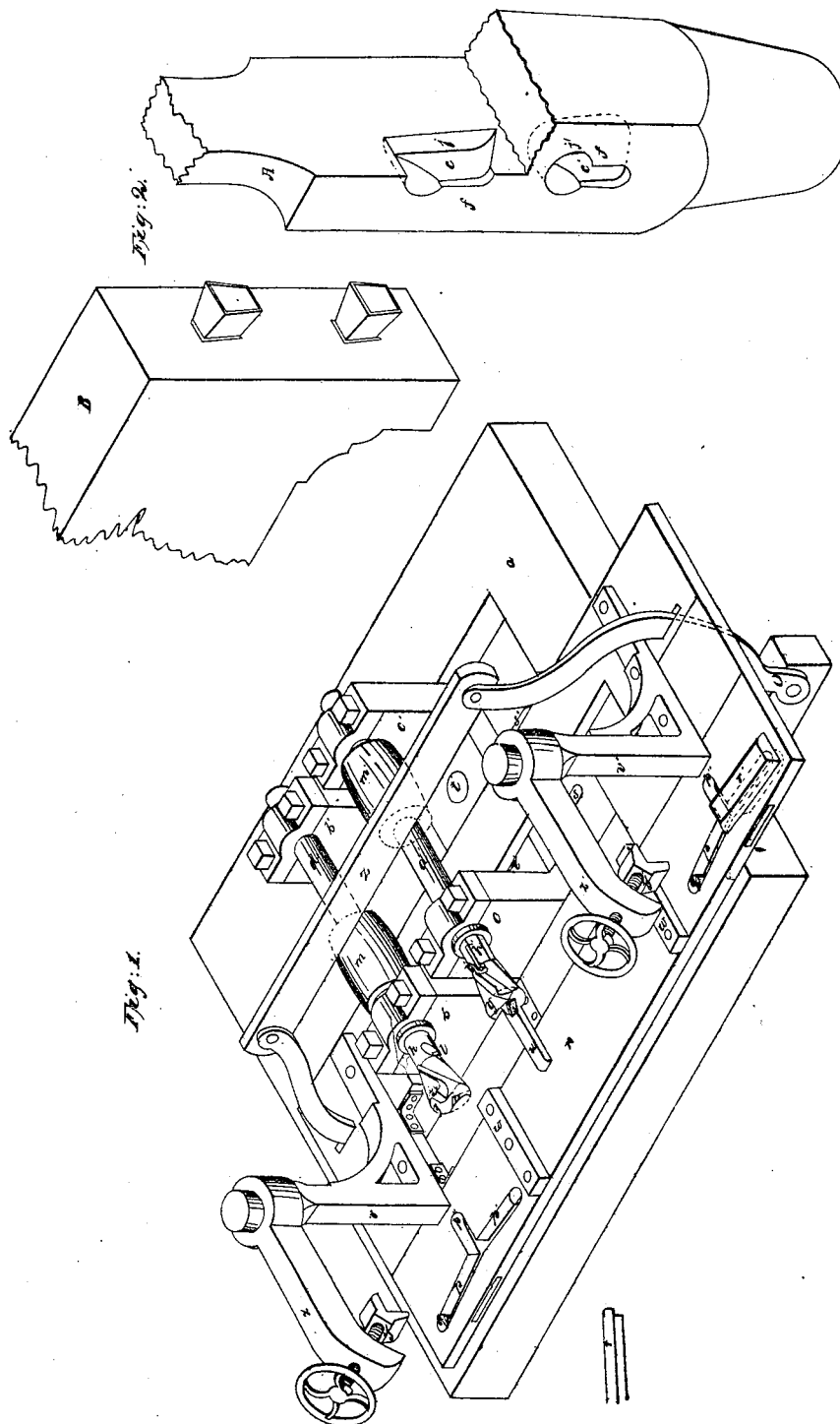


H. J. BETJEMAN.  
MACHINE FOR BORING DOVETAILED MORTISES.  
No. 7,807. Patented Dec. 3, 1850.



# UNITED STATES PATENT OFFICE.

H. I. BETJEMANN, OF CINCINNATI, OHIO.

## MACHINE FOR BORING DOVETAILED MORTISES.

Specification of Letters Patent No. 7,807, dated December 3, 1850.

*To all whom it may concern:*

Be it known that I, HENRY J. BETJEMANN, of Cincinnati, Hamilton county, Ohio, have invented new and useful Improvements in Machinery for the Manufacture of Joints for Attaching the Rails to the Posts of Bedsteads.

The object of my invention is to construct a joint for bedsteads which without the faults of the screw, is equally capable of closely hugging the post, as the strain is placed upon it. It also admits more readily of the use of a slot foundation, is durable and little subject to injury and very expeditiously put together or taken asunder. These advantageous results I accomplish by means of the following machinery for manufacture of the mortises which are to receive the tenons of the rail.

In the annexed drawings Figure 1 is a general perspective view of the machine one of the stops being detached. Fig. 2 represents the adjacent parts of a post and rail jointed on the proposed plan, A being the post and B the rail.

(a) is a bench or table of wood.

b b' are a pair of stationary and c c' a pair of shifting headstocks or standards, affording journal bearings for shafts d d' which are armed at their foreends by rotating cutters of form adapted to excavate the compound receding mortises (e e') with parallel external apertures or entrances (f f'). Each cutter head consists of a truncated cone (g g') whose sides equal in longitudinal extension the depth desired for the flaring tenon and agree in their obliquity with its flare. This conic frustum is at its apex united by a cylindrical neck (h h') to the shaft. The end of the cutter is furnished with a bit (i i') nearly radial which scoops out the bottom (j j') of the mortise, and its sides with a bit (k k') placed somewhat spirally which carves out the bevel sides (e e') of the mortise, and lastly the neck is armed with a small bit (l l') which goes to shape the parallel edges of the mortise entrance. These cutter heads are rotated by hands passing around pulleys (m m') upon the shafts (d d'). (n) is a shifting frame operable by a vibrating handle (z) whose lower ends are pivoted at (o) to the stationary portion. The latitudinal motion imparted to the frame by the handle becomes (by guides hereafter described) modified to a path of motion di-

verging sufficiently toward the cutters to nick the binding faces of the mortises (which faces are formed by the conical sides of the cutter heads) gradually deeper within the post so as to cause the tenons (when the post and rail are put together) to be drawn slightly but powerfully within the posts as they are pressed down along the mortises. The tenons are formed with a double obliquity both horizontal and vertical in exact conformance with the binding faces of the mortise.

The rotating cutter head in forming the mortise enters the post sufficiently to place the conical portion entirely within the post before the longitudinal motion is given to it so as to bring the neck or cylindrical portion into action, and thus give a square sink to the entrance of the aperture, and the cutting edge of the neck bit, moving in the same cylindrical path, throughout its entire length preserves the parallelism of the margins of the mortise entrance while the internal mortise varies in form and position throughout its length. This squareness and parallelism of the entrance margins preserves the post from rending by lateral strain, and throws the pressure mainly outward, so as to bind the rail and post together. The peculiar obliquity of motion of the shifting frame (n) is derived from slots (p p' p p') in the frame, into each of which a pin (q q') projects up from the bench. A forward motion toward the cutters being impressed upon the frame or carriage, the latter is by the longitudinal portion (p'') of the slot guided in a path at right angles to the face of the post and by this means leads the cutter heads directly into the posts until the flaring portion is entirely imburied therein. A latitudinal motion of the frame, then causes it to move under the control of one of the oblique grooves, so as at the same time that the mortise is continued longitudinally of the post, it is also made slightly to recede and thus to remove the bearing faces of the mortises farther from the face of the post as the cutter descends therein, while the neck of the cutter being of the same size throughout, makes an external aperture that is of unvarying width throughout its entire length below the part where the tenon enters.

A stop (r r') placed in the right hand oblique groove limits the play of the pin to

the left hand ones and vice versa so that by thus closing one or other groove either a right or a left hand mortise may be obtained. One of the head stocks has straight lateral adjustability given to it; the apertures (*s s'*) for the clamping bolts (*t t'*) being extended laterally for that purpose.

(*u*) is a tongue firmly affixed to the bench, and which overlapping the frame immediately in front of headstocks or standards, opposes any jarring or jumping upward of the frame.

(*w*) are slots upon the frame and serve to elevate the part out of the way of the tongue.

(*v*) are standards which serve both for a rest for the face of the post, and the arms (*x*) being swung around in front and the notched clamps (*y*) being screwed down against the rear upper corner of the post, the latter is thereby held fast to its proper position for the action of the cutter heads.

The operation of my machine is as follows—To cut the receding mortise holes in the post it is secured to the carriage (*n*) by clamps (*y y'*) and the carriage being caused to advance brings the post in contact with the revolving cutters, which sink a hole of a cylindrical form, to the depth required for that part of the mortise, the carriage is then advanced in a line at an angle say of 80° with its former direction not quite equivalent to right angle, which would carry the cutter lengthwise of the post, and the mortise would then be a simple dovetail, and the tenon would enter and then traverse the dovetail without bringing the shoulder of the rail closer to the post at the end of its range than it was at the beginning. The angle of its course being say about 80° with its former direction; as it progresses nearly lengthwise of the post it sinks deeper, and thus as the tenon is entered and then by a blow or pressure caused to traverse the mortise it is drawn forcibly home until the shoulder of the rail closely hugs the face of the post, making a bug tight joint. The pins (*q q'*) are attached to the bench on which the carriage slides and there projecting through slots of the requisite length and direction in the carriage govern its motions as described. The slots in the carriage branch off right and left with their former course so as to cut to the right or left as re-

quired; the stops (*r r'*) are placed in the slot which it is not desired that the guide pin should traverse, so as to facilitate the manipulation of the machine which is so much more readily performed in this way than by a method which requires the measure of distance by the eye; the retraction of the bit is performed by the reverse motion and the integrity of the mortise is preserved by the guides and stops preventing any action other than simple retraction of the bit by the way it entered. It will be seen that the length of cut, the direction and the degree of recession are regulated by the slots in the carriage and by the guides and stops. The tenons may be formed by two conical cutter heads of the flare and interval apart corresponding to the tenon.

One, two or three tenons may be made but I prefer two as giving stability without unnecessary complication of parts.

Having thus fully described the nature of my invention what I claim therein as new and desire to secure by Letters Patent is—

1. The rotating cutters (*g h i k l*) formed and arranged substantially as described, with conical heads and cylindrical necks, in combination with a rest or movable table, for the reception and attachment of the bed post, the said table while being advanced toward the cutters being conducted by suitable guides (*p p' p''*) as described—either upon the moving table or the stationary bench, in a course which is at first at right angles to the face of the post, and thence, as soon as the cylindrical cutter (*l*) has begun to act, in a longitudinal course receding sufficiently from the face of the post to form a mortise which shall bind the dovetailed tenons of the rail as they are pressed down in their sockets.

2. I claim, in combination with the aforesaid guides, the stops (*r*) substantially as here arranged and applied—or the equivalents whereby the table is limited in its course to the particular range of cutting action required for the time being.

In testimony whereof, I have hereunto set my hand before two subscribing witnesses.

HENRY J. BETJEMANN.

Witnesses:

E. H. PUGH,

EDWARD H. KNIGHT.