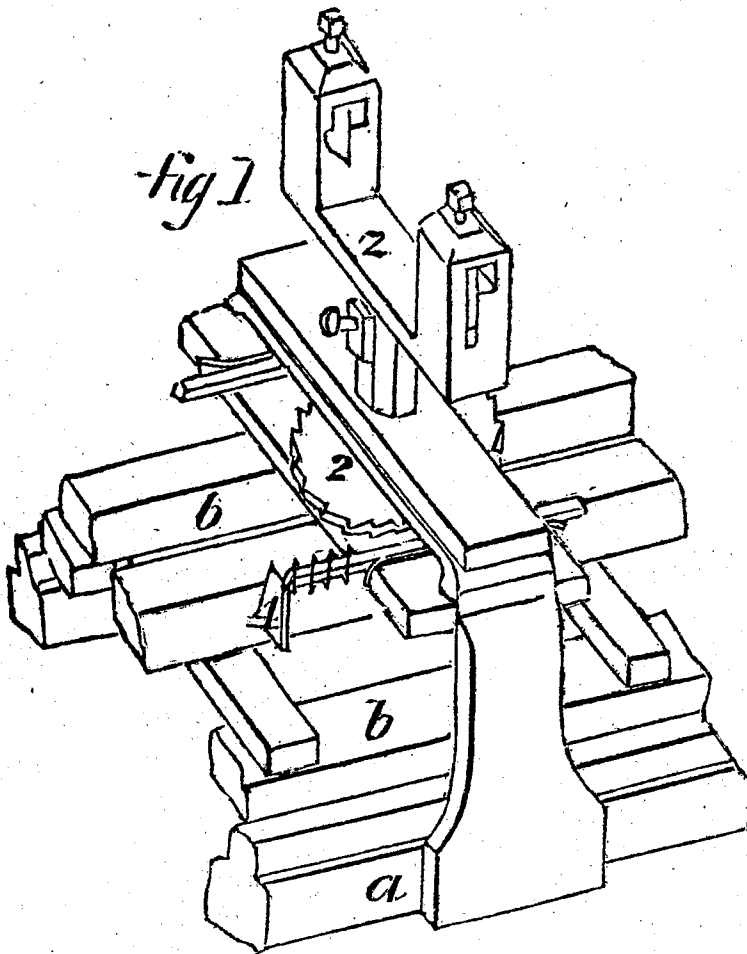


J. C. HINTZ.
MACHINE FOR TURNING SPIRAL FORMS.

No. 18,588.

PATENTED NOV. 10, 1857.



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UNITED STATES PATENT OFFICE,

JOHN C. HINTZ, OF CINCINNATI, OHIO.

IMPROVED MACHINE FOR TURNING SPIRAL FORMS.

Specification forming part of Letters Patent No. 18,588, dated November 10, 1857.

To all whom it may concern:

Be it known that I, JOHN C. HINTZ, of Cincinnati, Hamilton county, Ohio, have invented a new and useful Machine for Turning Spiral Forms; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the annexed drawings, making part of this specification.

My invention has for its object a means of producing spiral or other oblique carving on wood without "roughing" or "turning" the grain, and is principally designed for the forming of spiral flutings and moldings upon posts and other parts of household furniture.

In the accompanying drawings, Figure 1 is a perspective view of the apparatus with the cutting-bits and their accessories elevated. Fig. 2 is a perspective view of a portion of the machine, exhibiting details hereinafter explained.

A rectangular frame, L, is supported in a horizontal position on the tops of four posts, A A A' A', two of which, A A, for convenience of reference, are called the "front" posts, and the other two, A' A', the "rear" posts. One end of the frame L is hinged, *l*, to tops of the front posts, A A. The other end of the frame L simply rests upon a transom, A'', which unites the tops of the posts A' A'. Journalled athwart the frame L, near its free end, is the driving-shaft B, mounted with suitable pulleys, C D D'. Depending vertically from this shaft B is a second rectangular frame, L', whose lower end is susceptible of a compound motion derived from the elevation or depression of the frame L at its free end and its own capacity of vibration on the shaft B. These two frames collectively I style "the swinging and gravitating frame," L L'.

O is a brace, (removable at will,) which, being at one end hinged to one of the rear posts, A', and at the other end to the swinging frame L', restricts the latter to an up-and-down motion.

p is a bracket, which projects forward from the other rear post, A'. This bracket, in the present illustration, has its upper edge horizontal, but a concave or other form is employed in some cases. This bracket is adjustable vertically on the post, and when used is elevated until its upper edge presses a small roller, *q*, projecting from the frame L', thus supporting the said frame with its suit of cut-

ting-bits and their accessories for purposes hereinafter explained. A horizontal rail, L'', unites the lower extremities of the frame L' and bears on its front a number of bearings, V'', which hold the journals of a rotating cutter of the following construction:

k'' k''' are two shafts supported by the bearings V'' aforesaid accurately in line with each other. To the inner or adjacent ends of these shafts are fixed two similar stocks or heads, K K', (each attached to and revolving with its respective shaft.) To each head K K' is attached a set of bits, *k k'*, one set having its cutting-edges adapted to form the right half of the desired flute or molding, and the other the left half thereof, the two sets being pointed in opposite directions of rotation and having their adjacent edges coincident, or nearly so, with a common plane of rotation. The two heads thus equipped are so belted, E E', from the driving-shaft as when in motion to revolve in opposite directions, so that one set cuts forward in the forming furrow or molding, and the other set cuts backward, immediately opposite to it, at the same time, both thereby cutting toward the grain of the wood and leaving a smooth surface. The two sets or halves thus combined, so as in their collective capacity to cut smoothly an entire groove or molding oblique with the grain of the wood, I style "the duplex cutter."

The arrangement of cutters in the present illustration is such as is adapted for forming a right spiral. For a left spiral the pointing and direction of the bits and the belting of the shafts *k'' k'''* are all reversed. The entire swinging frame L', with its duplex cutter and accessories, is capable of being elevated or depressed bodily by means of rack and pinion *m n*.

a a' is a customary lathe-bed, which at or about its mid-length is pivoted, *u*, to the floor, at a point perpendicularly beneath the center of the cutter-head *k k'*, so as to permit the adjustment of the bed in a horizontal plane to any desired angle to the right or left of parallelism with the shaft of the cutter-head.

v is a scale mapped on the floor to enable the accurate adjustment of the bed.

b c d e f g h i j r r' constitute, respectively, the carriage, head and tail stocks, gearing, and spindles of a customary screw cutting-lathe, being such as to cause any given point

on the stuff to describe a spiral path winding to the right or left according to whether the rack i or j is brought into service, the "pitch" of the spiral depending on the relative sizes of gearing employed.

w is a rest, adjustable in height by means of wedge movement w' or other means, and provided with jaws $x x'$, adjustable toward and from each other, so as to embrace or grasp the stick to be operated on, the whole when adjusted being secured in position by a bolt, w'' .

y is a gage or mouth piece attached (with vertical adjustability) to the rail L'' of the frame L' , and which, resting on the surface of the stuff, serves to control the depth of cut of the bits, and to insure a uniform shaving throughout the length of a taper-stick or of one having any other varying longitudinal contour, the frame L' rising and falling with the surface of the stuff. The swinging and gravitating frame and its appendages are so counterbalanced by weight and pulley F , or otherwise, as to lighten the pressure of the gage y to about forty or fifty pounds. For paring off the slight comb or seam left by the rotary bits, I employ a pair of crank-wheels, $s s'$, which, by means of pitman t , impart, when desired, a more rapid motion to the carriage, the gearing $e f g$, &c., communicating a rotary motion to the spindle r of corresponding relative speed. The bits employed in connection with this motion are a pair of finely-sharpened blades, $z z'$, which may be automatically fed to the work by the following plan of construction: The bifurcated bit-stock Z has a prismatic stem, 1 , screw-threaded, $1'$, at its lower end, so as to work in the screw-threaded eye of a ratchet-wheel, 2 , and thereby to slightly depress the rest Z at every motion of the carriage, this intermittent motion of the ratchet being imparted by the spring-pawls $4 4'$ impinging against tappets 3 (one shown) on the carriage.

The operation is as follows: Suppose, for example, it is desired to produce a spiral fluting on a taper bed-post. A piece of timber that has been turned to the desired taper form in the usual way is centered or fixed between the spindles $r r'$ and the rest $w w' w'' x x'$, so adapted to it as to afford it support underneath and on each side without impeding its rotation. The gage y is then so adjusted as to allow the bits $k k'$ to cut into the timber to a suitable depth. A pinion, h , having been attached, of suitable size to impart the desired pitch of spiral, and the carriage b adjusted to an equivalent angle with the plane of rotation of the bits, the latter are now set in motion and the frame $L L'$ lowered by means of the rack and pinion $m n$ until the gage y rests on the stuff. The gearing $e f$, &c., being then set in motion, imparts simultaneously a rotary motion to the spindle r and a longitudinal motion to the carriage b , resulting in the cutting a spiral groove around the post. The gage y resting on the stuff causes the cutting-

bits accurately to follow its taper, and if it be desired to leave a portion of the post without spiral, for carving or other purpose, this is accomplished by raising the frame $L L'$ by means of the rack and pinion $m n$ and lowering it again at the right moment. The bed $a a'$ being so adjusted that the bits rotate in a plane precisely coincident with the direction of the groove at the point where they cut it, and the bits rotating in opposite directions, as indicated by red arrows, a very accurate and highly-finished fluting is accomplished, requiring little subsequent manipulation. When it is desired to produce a "left" spiral, the heads $K K'$ are belted to run in the opposite direction to those which they followed before and a left set of bits inserted, those described being convertible by being basiled on the reverse side of the blade. If, then, the same pitch of spiral is desired, it is simply necessary to shift the rack i out of gear and the rack j in gear, and to shift the lathe over an equal distance on the other side of zero on the scale V . The several motions then proceed as before. By cutting spiral grooves in both directions rhomboidal figures are produced of beautiful effect. The spiral groove being cut, the frame $L L'$ is elevated, the pitman t attached, and the bits $z z'$ suitably adjusted to shave off the seam left by the bits $K k K' k'$. The rotary cutter may be adapted to cut a spiral or oblique groove on a prismatic post as follows: The brace o is detached and the frame $L L'$ lowered until the roller q rests on the bracket p , the latter having been previously so adjusted as to impart the desired depth of cut. The bits $k k'$ being then rotated and at the same time moved to and fro in the horizontal path to which they are confined or guided by the bracket p , the spindle r is held stationary by any customary device. A fluting on one side being thus made, the pinion h is brought into gear and the stuff is simultaneously advanced and rotated until the next side or facet is uppermost, when a second fluting, in continuation of the last, is made by the means already described, and so on until completion. A flat facet of any desired length may be produced by sliding the carriage to and fro while the bit is operated as last described.

This machine may be advantageously employed in forming a superior quality of bench and other large wooden screws.

I do not claim the oppositely-rotating cutters as new in themselves; but

I claim as new and of my invention herein—

1. In combination with the adjustable screw cutting-lathe the described construction and arrangement of the gravitating frame L , and concentrically and oppositely rotating cutters $K K'$, whereby the latter are made to cut in unison and always over a point in the axis of the piece, in the manner and for the purposes set forth.

2. The pair of finishing-bits $z z'$, operated automatically by means of the screw-stem $1'$,

ratchet-wheel 2, tappets 3, and spring-pawls 4, as described.

3. In combination with the adjustable screw cutting-lathe, rotary cutters, and gravitating frame, as aforesaid, the described construction and arrangement of the roller *q* and bracket *p*, whereby (the brace *o* being disconnected) the said cutters may be vibrated in a (substantially) horizontal plane at any desired

angle to the stuff for the production of spiral or oblique flutings on prismatic posts, as explained.

In testimony of which invention I hereunto set my hand.

JOHN C. HINTZ.

Attest:

GEO. H. KNIGHT,
JAS. H. GRIDLEY.