(No Model.) 2 Sheets—Sheet 1.

F. H. FOSTER, D. J. WHITE & R. HOLMAN.

WOOD TURNING LATHE.

No. 303,994. Patented Aug. 26, 1884.

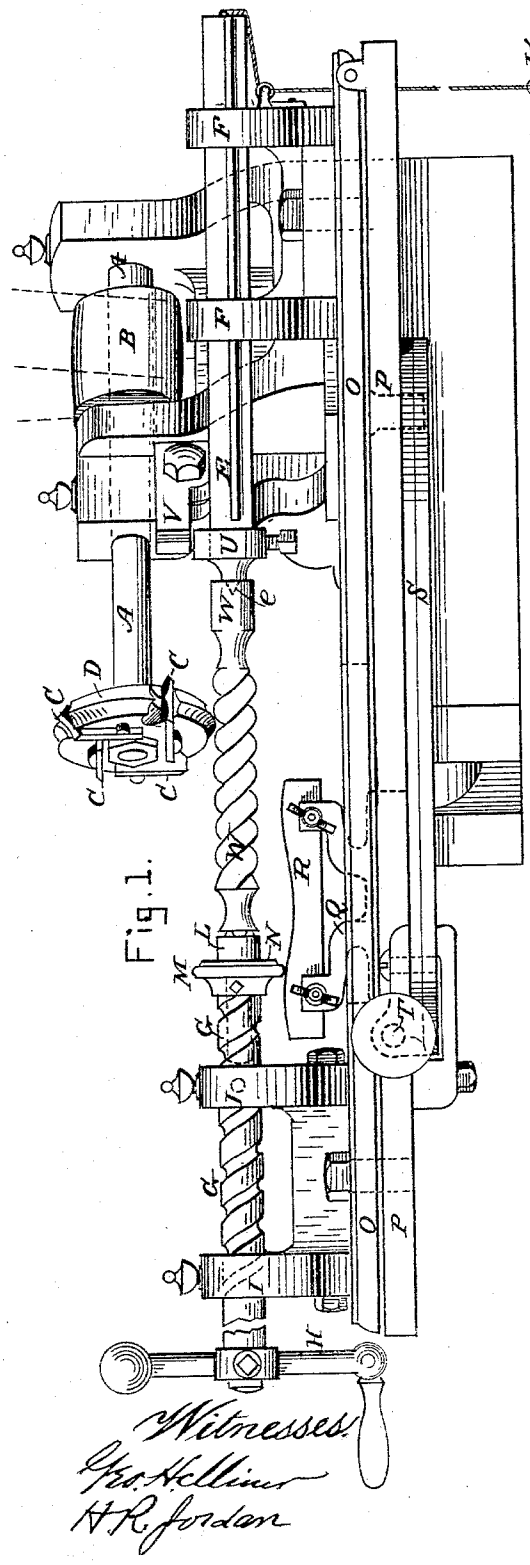


Fig. 1.

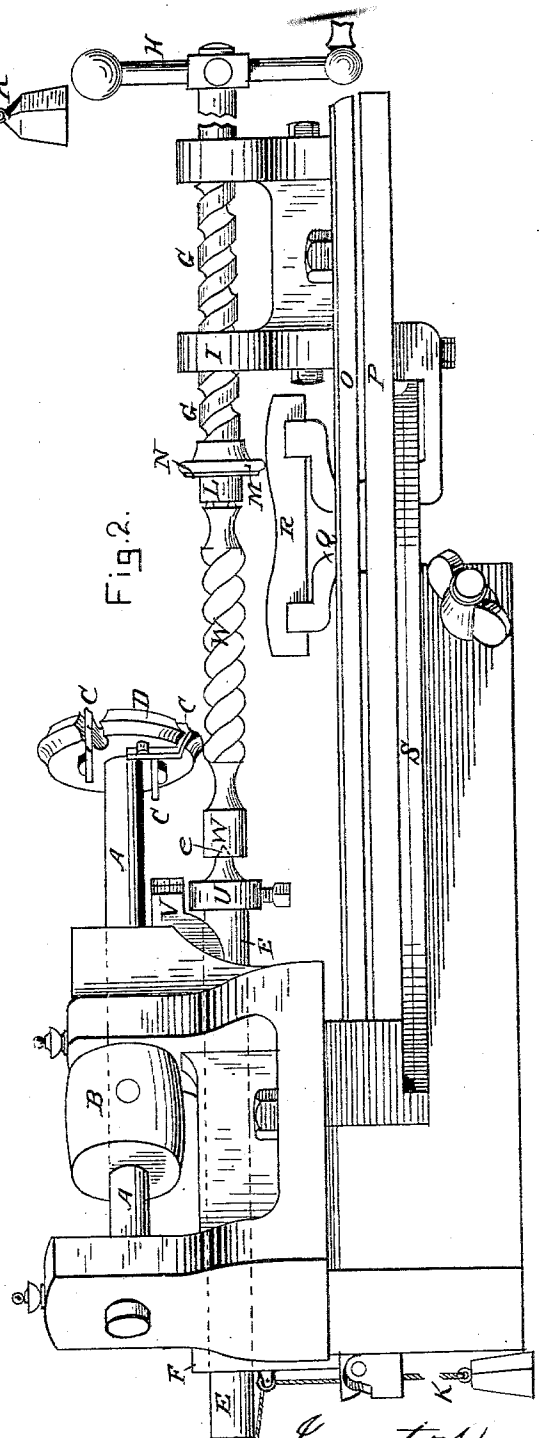


Fig. 2.

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Rufus Holman.
by their attorney R. H. Jordan

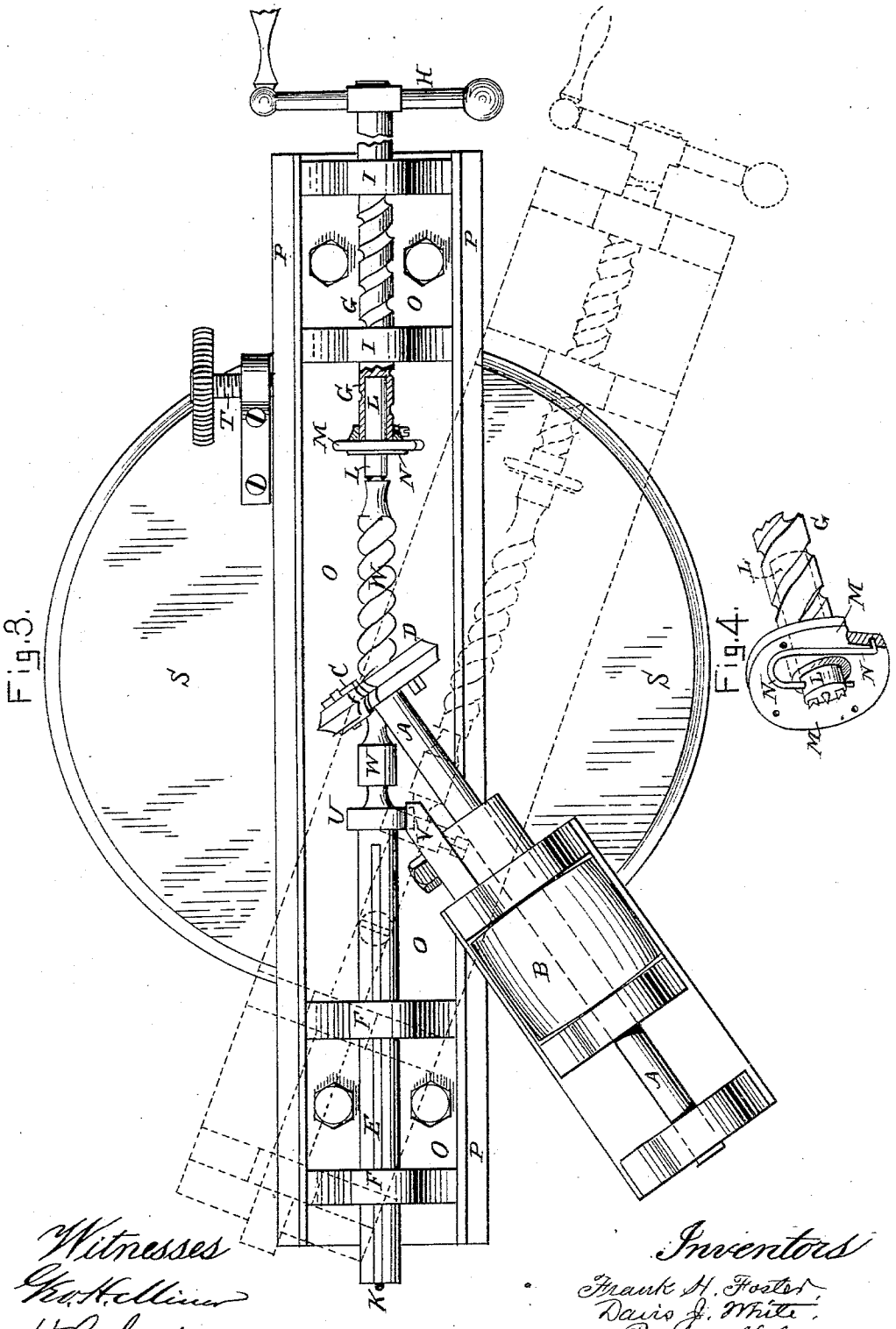
N. PETERS, Photo-Lithographer, Washington, D. C.

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UNITED STATES PATENT OFFICE.

FRANK H. FOSTER AND DAVIS J. WHITE, OF CHELSEA, AND RUFUS HOLMAN, OF BOSTON, MASSACHUSETTS.

WOOD-TURNING LATHE.

SPECIFICATION forming part of Letters Patent No. 303,994, dated August 26, 1884.

Application filed April 28, 1884. (No model.)

To all whom it may concern:

Be it known that we, FRANK H. FOSTER and DAVIS J. WHITE, residing at Chelsea, and RUFUS HOLMAN, residing at Boston, both in the county of Suffolk and State of Massachusetts, and all citizens of the United States, have jointly invented certain new and useful Improvements in Twist-Turning Mechanism; and I do hereby declare that the same are fully described in the following specification, and illustrated in the accompanying drawings.

The object of this invention is to simplify and greatly cheapen twist-turning apparatus for the mechanical formation of spiral grooves or flutes on wood surfaces. The mechanism requires cutters revolving at a high speed, with means for holding the wooden body up to the cutters and at the same time advancing it obliquely to their axes and partially rotating it. Provision is also made for reversing this spiral movement after the wooden body has been turned upon its axis upside down, so as to cut another groove while the body travels again past the cutters. The frame which supports and carries the work to be operated upon is adjustable with relation to the cutters both vertically and horizontally, and a gage or pattern may be employed with stops to limit the movement, if desired.

Our invention consists in the devices and combinations of devices set forth in the appended claims.

In the drawings, Figure 1 and 2 are elevations showing opposite sides of the machine. Fig. 3 is a top plan. Fig. 4 is a detail, which will be explained.

The cutter-shaft A is mounted for rotation in suitable bearings, and is driven at a very high speed by a belt around the pulley B. The cutters C are keyed or otherwise removably secured in a head, D, mounted on said shaft, and project sufficiently from the head to cut freely the work presented to them, which will ordinarily be first reduced to a cylindrical or other form circular in cross-section.

The wooden body to be acted upon by the machine is supported obliquely to the axis of the cutters by means which permit its simultaneous advance and slow rotation, so that the rapidly-moving cutters may cut a smooth spiral path around such body, either on its forward or backward journey. The means for this purpose shown in the drawings constitute the best form in which we have contemplated applying our invention. One end of the work, W, is supported by a shaft or bar, E, having a longitudinal sliding movement in ways or bearings F. The other end receives support and simultaneous rotary and forward movement from a spirally-threaded shaft, G, provided with a hand-wheel or handle, H, and working through bearings I, one of which has a nut, pin, or stud engaging with the thread of the shaft, so that its rotation by the handle H will effect its spiral movement. The work turns with the shaft G in its spiral course, its axis being coincident with that of the shafts E and G. The shaft E need not revolve, but is provided with an axial teat or center, *e*, around which the wood may be turned. A weight, K, with cord and pulley, are applied about as shown to insure return of the shaft E when the screw-shaft G is retracted; or an equivalent spring may be employed. The inner end of the spiral shaft G is made hollow, and an arbor or mandrel, L, fitted therein engages with the work W. The work may be partially revolved with this mandrel, while the shaft G is stationary, so as, for instance, after inverting the work, to cause the cutters to form another spiral groove in it parallel to the first, while the shafts E and G reverse their movement, with the work still held up to the cutters.

Any suitable means of adjusting the arbor L with relation to the shaft G may be employed, such as making it angular and reversible in an angular socket. We have found effective the device best shown in Fig. 4, in which a collar, M, secured on the hollow end of the shaft G, has its vertical inner face perforated at points diametrically opposite to each other, said perforations receiving a stud formed on a spring-bar, N, which passes through the arbor. When the stud is engaged in the perforation, the arbor is fixed to the shaft; but when it is sprung out the arbor having a cylindrical shank may be turned halfway round, or more or less, for the purpose of adjustment, and again secured.

Instead of the work-holding shafts shown and described, a traveling frame may carry

the work before the cutters, and at the same time rotate it correspondingly by suitable gearing.

We mount the work-carrying shafts and their bearings upon a frame, O, hinged at one end to a base, P, so as to have a limited vertical movement, if desired. One object of this vertical movement is to provide for automatically cutting the spirals upon work not of a plain, cylindrical character. For this purpose we erect from the base, beneath the shafts, a bracket or pattern-stand, Q, which rises through an opening in the frame O, and supports a pattern, R, the reverse, in longitudinal outline, of the work to be turned. The collar M bears upon the upper surface of this pattern, and where such surface is cut away the frame O, with the work, settles down by gravity, owing to the hinged connection of the frame and base; and the work being thus carried farther from the cutters, a piece of large diameter will pass before them; or, in other words, the distance from the axis of the work at which the cutters will operate will be governed by the pattern which holds the shafts E and G away from its surface—a distance equal to half the diameter of the collar M.

We also provide for swinging the work laterally away from the cutters and back again, together with its supports or carrier, so that a new piece may be introduced, or a piece partially treated can be turned to another position without contact with the cutters meanwhile, and again operated on during its return movement beneath the cutters. This lateral swinging of the work-supporting frame is best accomplished by pivoting the base P, to which said frame is hinged, upon the bed S, so as to carry the work out of range of the cutters when desired, and return it to its exact position. A stop, T, preferably an adjustable screw, fixes the point to which the bed will move on its return.

It is desirable to hold the sliding shaft E so that it will not move backwardly while introducing a new piece of work, and seizing it endwise by the terminal prongs on the arbor L. A simple device for this purpose is illustrated in Figs. 1 and 3. The shaft E has a collar, U, which comes just in front of a lug, V, on the cutter-frame, when the work-holding frame is swung around, as described, to insert new work. The lug V prevents the shaft and collar from retreating under pressure while in such position, but the parts do not collide when in position for use. The collar U may also limit the longitudinal travel of the shaft E by contact with the standard in which it has its bearing.

Instead of the vertical adjustment of the frame O, heretofore described, or in addition thereto, the frame O, bed P, and base S, may together be raised or lowered by suitable means relatively to the cutters, to provide for wide variations in the diameter of the work; or the work holding and carrying frame may be thus adjustable, omitting the movable bed and base. Such adjustment may be by a rack and pinion working in an obvious manner, and need not be further described.

We claim as our invention—

1. The combination, with a rotary cutter, of the supporting-frame, the longitudinally-sliding bar having a dead-center, *e*, the spirally-threaded shaft G, in bearings to correspond, arranged in line with said bar, and having a chuck for the work, and a handle for advancing the same, substantially as described.

2. The rotary cutters secured in the revolving head, and the screw-shaft advancing and revolving with the work, in combination with the sliding non-rotating bar or shaft arranged to move in line with said screw-shaft, and its retracting spring or weight, substantially as set forth.

3. The sliding bar which supports one end of the work, the fluted shaft and its bearings which support the other end of the work and serve to advance it spirally, a collar on said fluted shaft, and a gage on which said collar bears, whereby a compound movement is given to the work, all the parts being combined and arranged substantially as set forth.

4. The sliding bar having a dead-center, the spirally-fluted shaft in corresponding bearings, and provided with a chuck, and a handle whereby the shaft and bar may be moved along with the work, and a rotary cutter placed obliquely to the line of movement of the bar, and capable of adjustment to different degrees of obliquity, all the parts combined and arranged substantially as set forth.

In testimony whereof we hereto affix our signatures in presence of two witnesses.

FRANK H. FOSTER.
DAVIS J. WHITE.
RUFUS HOLMAN.

Witnesses:
A. H. SPENCER,
C. G. KEYES.