2 Sheets—Sheet 1.

W. H. DOANE & J. R. THOMAS.

CARVING-MACHINE.

No. 178,422. Patented June 6, 1876.

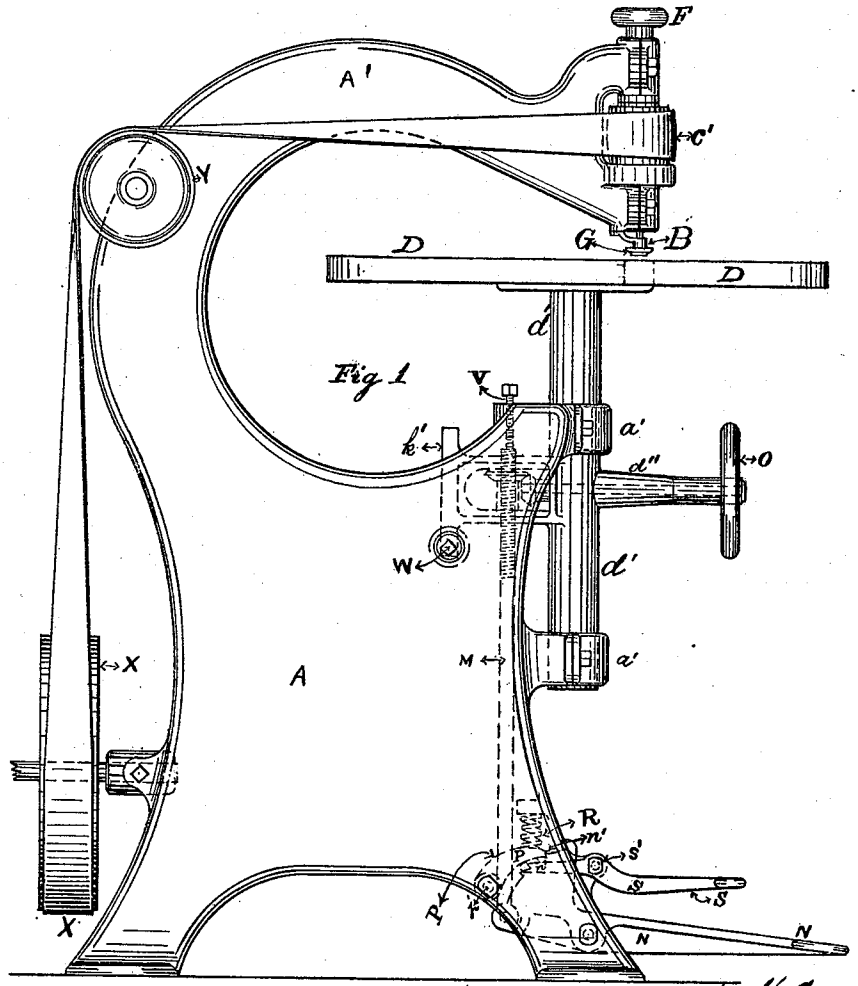


Fig. 1

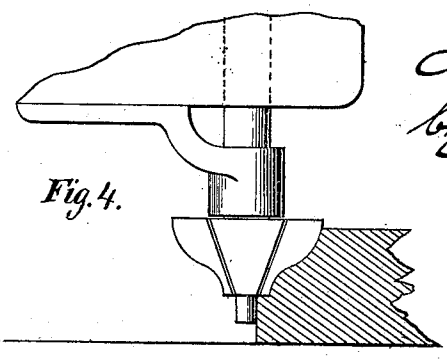


Fig. 4.

WITNESSES

Irving Spencer

Jos. B. Noyes

W. H. Doane

John R. Thomas

INVENTORS

by A. E. J. Bils

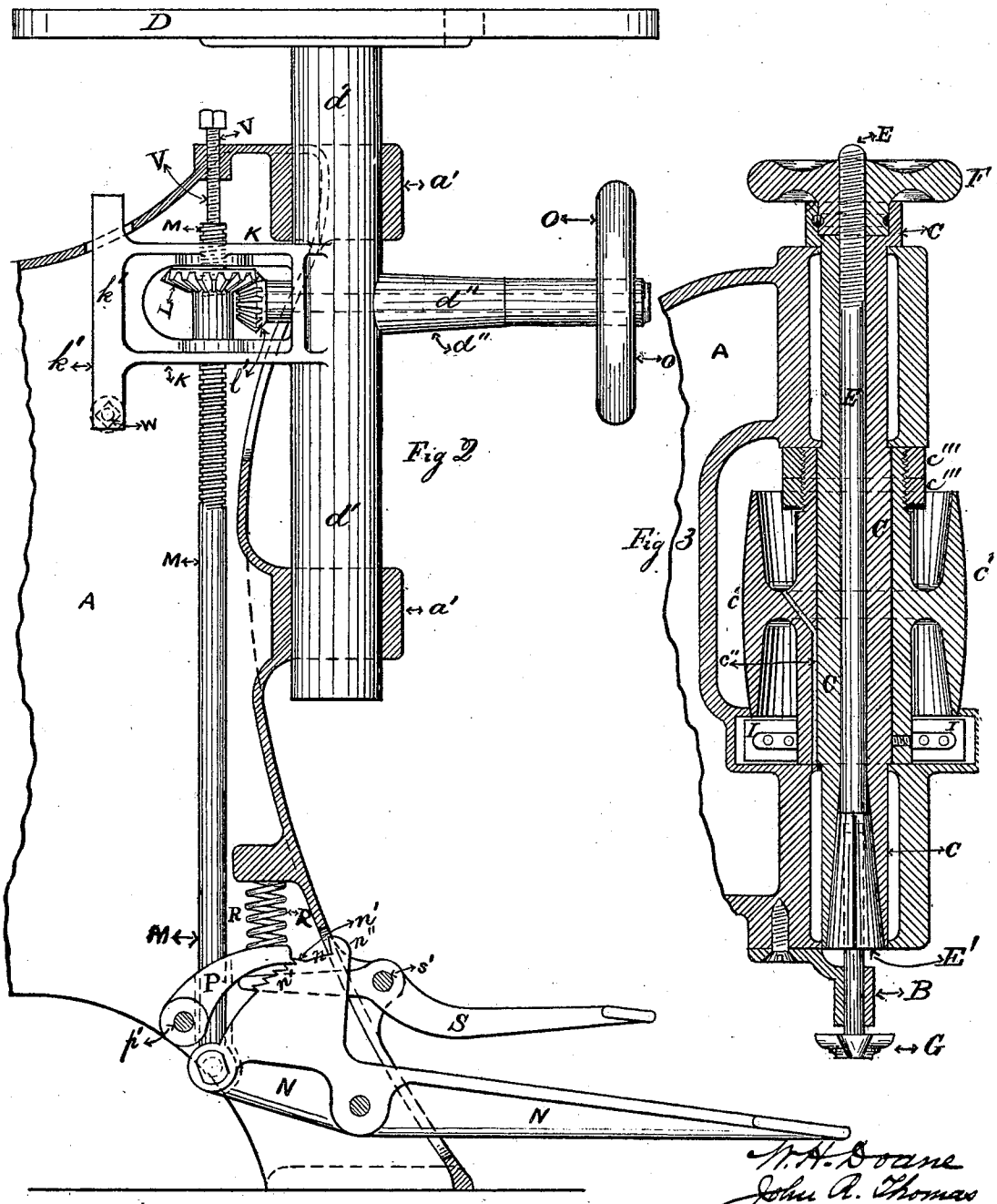
Atty

2 Sheets—Sheet 2.

W. H. DOANE & J. R. THOMAS.

CARVING-MACHINE.

No. 178,422. Patented June 6, 1876.



WITNESSES

Devny Spencer

Jos. B. Noyes

INVENTORS

W. H. Doane

John R. Thomas

by R. B. J. Eils

Atty

UNITED STATES PATENT OFFICE.

WILLIAM H. DOANE AND JOHN R. THOMAS, OF CINCINNATI, OHIO, ASSIGNORS TO J. A. FAY & CO., OF SAME PLACE.

IMPROVEMENT IN CARVING-MACHINES.

Specification forming part of Letters Patent No. **178,422**, dated June 6, 1876; application filed March 11, 1876.

To all whom it may concern:

Be it known that we, WILLIAM H. DOANE and JOHN R. THOMAS, both of Cincinnati, in the county of Hamilton, and State of Ohio, have invented certain Improvements in Carving-Machines, of which the following is a specification:

This invention relates to machines for forming receding or projecting molded carvings on the surface of wood, as well as for molding the edges both of solid and perforated wood-work, such as forming projecting or receding panels on musical instruments, articles of furniture, doors, &c.

Our machine is more especially designed for working the improvement in the art of carving wood by machinery, for which United States Letters Patent No. 174,212 were granted to William H. Doane, February 29, A. D. 1876.

Our improvement consists in certain hereinafter fully described means for adjusting the work-supporting table, and of certain other details of construction, all specifically pointed out by separate claims.

In the annexed drawings, Figure 1 represents a side elevation of our improved carving and molding machine. Fig. 2 represents, on a larger scale, a sectional side elevation of the adjusting mechanism of the work-supporting table. Fig. 3 represents, also, on a larger scale, a section in a plane of the axis of the cutter-spindle. Fig. 4 illustrates an arrangement of parts used for edge-molding.

The same letters of reference are used in all the figures in the designation of identical parts.

The stand or frame A of the machine is constructed with an arched arm or goose-neck, A′, which terminates in a head, with suitable boxes or bearings for the support of the vertical cutter-spindle C which overhangs the work-supporting table or platen D. The stand A has also a pair of boxes, *a′ a′*, at the front, which serve as lateral supports for the stock *d′* of work-table D, and as guides for the said stock when the table is vertically adjusted.

The cutter-spindle C is a hollow shaft, the aperture in which is made tapering at the lower end, as shown in Fig. 3, for the purpose of enabling it to contract the tapering and split socket end E′ of the stem E, which is, in this instance, provided as a means for securing the shank of the cutter G to the spindle C. The stem E passes up through the hollow spindle, and has a screw-thread at its upper end fitted to a female thread in the hub of the hand-wheel F, which is connected to, but turns loosely on, the upper end of the spindle C, so that by turning the hand-wheel thereon the stem will be moved endwise, causing its tapering socket end to either clamp or release the shank of the cutter, as the case may be.

Other well-known means may be adopted for securing the cutter to the spindle, but it is desirable that the means be of such character that they will hold equally well whether the cutter and spindle be rotated in one direction or the other. The driving-pulley *c′* is keyed or secured to the cutter-spindle between its bearings, being provided with oil-hole *c″* to conduct oil to the lower bearing. The hub of the pulley is snugly fitted between the bearings to prevent end play of the spindle, and the upper end of the pulley-hub carries a pair of nuts, *c‴ c‴*, for the purpose of taking up lost motion resulting from end wear. The lower end of the pulley-hub is in this instance provided with wings I, forming a fan for creating a blast to blow away the chips and shavings from the cutter and the work under operation. The pattern-guide or directrix B consists of a cylindrical sleeve which encircles and supports the shank of the cutter G in close proximity thereto, a laterally-projecting arm being formed on or fixed to its upper end as a means for rigidly securing it to the head of goose-neck A′. The guide or directrix serves, therefore, also as a bearing supporting the cutter in close proximity to the work, so as to prevent its vibration and to insure a perfectly smooth even cut. The stock *d′* of the work-table D is provided with a laterally-projecting tubular hub, *d″*, for the support of the horizontal shaft *d‴*, which carries at its inner end, projecting through the body of the stock *d′*, a bevel-wheel, *l′*, and at its outer end a hand-wheel, O. The bevel-wheel *l′* meshes into the bevel-wheel L, the elongated hub of

which is fitted between the horizontal bars of a bracket, K, formed on the stock *d'*. The hub of wheel L has an interior female screw-thread, which engages the screw-threaded end of the vertical rod M, the lower end of which is pivoted to the short arm of a foot-lever, N, fulcrumed on the stand near the base. It will be understood that the work-table can be raised or lowered by turning the hand-wheel O in one direction or the other, which will cause the tapped bevel-wheel L to travel up or down on rod M. A vertical bar, *k'*, of bracket K, travels between set-screws W, tapped in the sides of the stand A, to prevent the work-table from turning when it is adjusted by operating hand-wheel O. The rod M, which actually supports the work-table and adjuncts, can be moved up or down by foot-lever N, its upward motion being determined by the set-screw V, tapped in the stand A, directly over the upper end of rod M, while its downward motion is limited by a pawl-and-ratchet arrangement, as follows: The short arm of foot-lever N has a segmental projection, on the edge of which a series of ratchet-teeth, *n'*, are formed with a blank space, *n*, between the last tooth and a projecting lug, *n''*, on the upper corner.

A pawl, P, pivoted to the stand at *p'*, is arranged in line with the toothed segment of the foot-lever N, and pressed toward the same by a spring, R, so as to normally engage the teeth or lug thereof. A second foot-lever, S, shorter than the one first mentioned, is pivoted to the frame or stand A at *s'*, its pedal being right by the side, or directly above, foot-lever N, so that the operator can depress foot-lever S with the toe of his foot, while his heel controls foot-lever N. The short arm of foot-lever S extends under pawl P, and is adapted to lift the same sufficiently to disengage it from the teeth *n'*; but not so high as to allow the lug *n''* to pass under it. The pulley *c'* on the cutter-spindle is driven by a belt from the pulley X on the driving-shaft, the belt passing over idler-pulleys Y on opposite sides of the goose-neck, one of such idler-pulleys being seen in Fig. 1. The counter-shaft of the machine will be provided with a fast pulley and two loose pulleys, which, by means of any well-known arrangement of straight and cross belting and belt-shifters, will turn the driving-shaft of the machine in one direction or the other, and impart a rapid rotary motion to the cutting-tool, either to the right or to the left, as may be required by the grain of the wood operated upon.

In carving wood according to the plan stated in the aforesaid Letters Patent, the open pattern or templet is attached to the surface of the wood to be operated upon by distance pins or pieces, previous to passing it under the cutting-tool. The work-table is then lowered so far—by making use of both adjustments, if necessary—that the wood with the templet upon it can be pushed under the cutter. Foot-lever N is then operated to raise the table, so as to get the templet just above the cutting-tool, when its interior edge, determining the general contour of the molding or carving, may be brought into contact with the cylindrical guide or directrix B. The depth of the cut having been previously determined by a proper adjustment of set-screw V, and the screw-gearing, the table is gradually forced up by treadle N, causing the cutter to gradually enter the wood to the full depth of the cut, until the farther upward movement is checked by rod M bringing up against set-screw V. The pawl P engaging the ratchet-teeth *n'* will maintain the table at this point. The wood is then moved by hand over the table in such a manner that the molded or pattern-edge of the templet preserves contact with the guide or directrix B, the cutting-tool tracing in the surface of the wood a molding, the outline of which will be a perfect duplicate of the pattern-edge.

The table can at all times be quickly adjusted by hand-wheel O, to regulate the depth of the cut, and effect an even depth of cut in a piece or pieces of wood varying in thickness, without requiring an adjustment of set-screw V. After the carving of a piece of wood has been completed, the table is lowered by operating the treadles S and N successively, so as to drop the surface of the wood below the cutter. The wood is then moved so as to allow the templet to pass down clear of the cutter, when the table can be dropped to its lowest position preparatory to removing the finished work, and the application of new work. It is designed to so adjust the table by means of the screw-gearing, that the cutter shall just clear the surface of the piece of wood under operation, when the pawl P engages the last upper tooth *n'*, so that it will only be necessary to lift the pawl, and let it drop onto blank space *n*, to permit the descent of the table to its lowest point, which is reached, so far as the foot-lever arrangement is concerned, when the pawl brings up against lug *n''* of the segment of foot-lever N. The blank space *n* gives the operator the opportunity of using his foot solely for the control of foot-lever N in the final lowering of the table.

Our improvements are adapted for machines in which the cutter projects from below through the table, in which case the directrix will be under the cutter, the templet being arranged the same as previously described, so that the cutter will clear itself of chips and shavings.

In a machine where the cutter is placed in the table, the goose-neck will not be required, but the head may be driven by suitable belting arrangement below the table, and either the table or the cutter-spindle, as may be preferred, may be made adjustable for the purposes stated.

When it is desired to cut moldings on the edge of scroll-sawed or other work, a cutting-tool may be used having a concentric projection formed on its face, as shown in Fig. 4, to act as a directrix in the manner illustrated.

In operating with such a tool, the stuff to be carved or molded on its edges is moved or fed past the cutter with the lower portion of its edge in contact with the directrix. The same fixed pattern-guide or directrix may be used for all sizes of cutters.

It will be observed that the axial line of the cutter-spindle is some distance in advance of the stock *d'* of the work-table, so that the cutting-tool can be withdrawn from the spindle through an aperture in the work-table on one side of the stock of the same.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The combination, substantially as specified, of the work-table, foot-lever N, rod M, adjustably connected with the stock of said table, and set-screw V.

2. The combination, substantially as specified, of the foot-lever N, the screw-threaded lifting-rod M, the set-screw V, and the gearing L *l'*, with the stock of the work-table.

3. The combination, substantially as specified, with lifting-rod M, of foot-lever N, having a ratchet-toothed segment, pawl P, and foot-lever S.

4. The foot-lever N, constructed with a segment, having a series of ratchet-teeth, *n'*, blank space *n*, and lug *n''* on its edge, substantially as and for the purposes specified.

WM. H. DOANE.
JOHN R. THOMAS.

Witnesses:
DANL. L. LYON,
IRVING SPENCER.