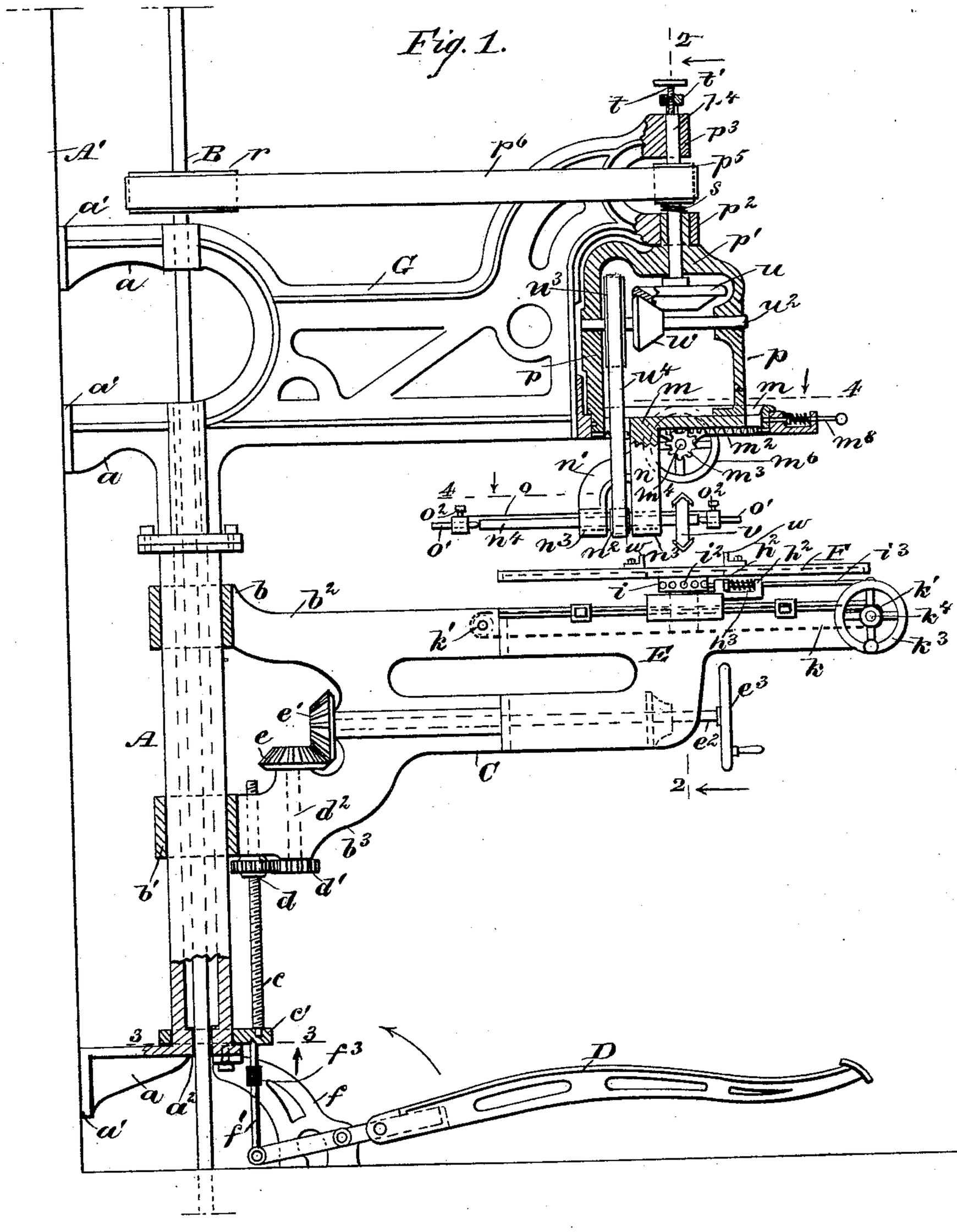
(No Model.) 3 Sheets—Sheet 1.

W. R. SNYDER.

WOOD CARVING MACHINE.

No. 480,524. Patented Aug. 9, 1892.

Fig. 1.

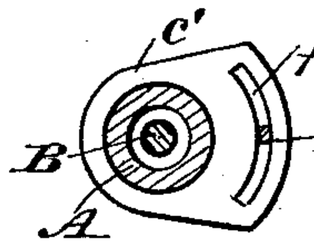


WITNESSES:

Donn Twitchell

C. Sedgwick

Fig. 3.



INVENTOR

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W. R. SNYDER.

WOOD CARVING MACHINE.

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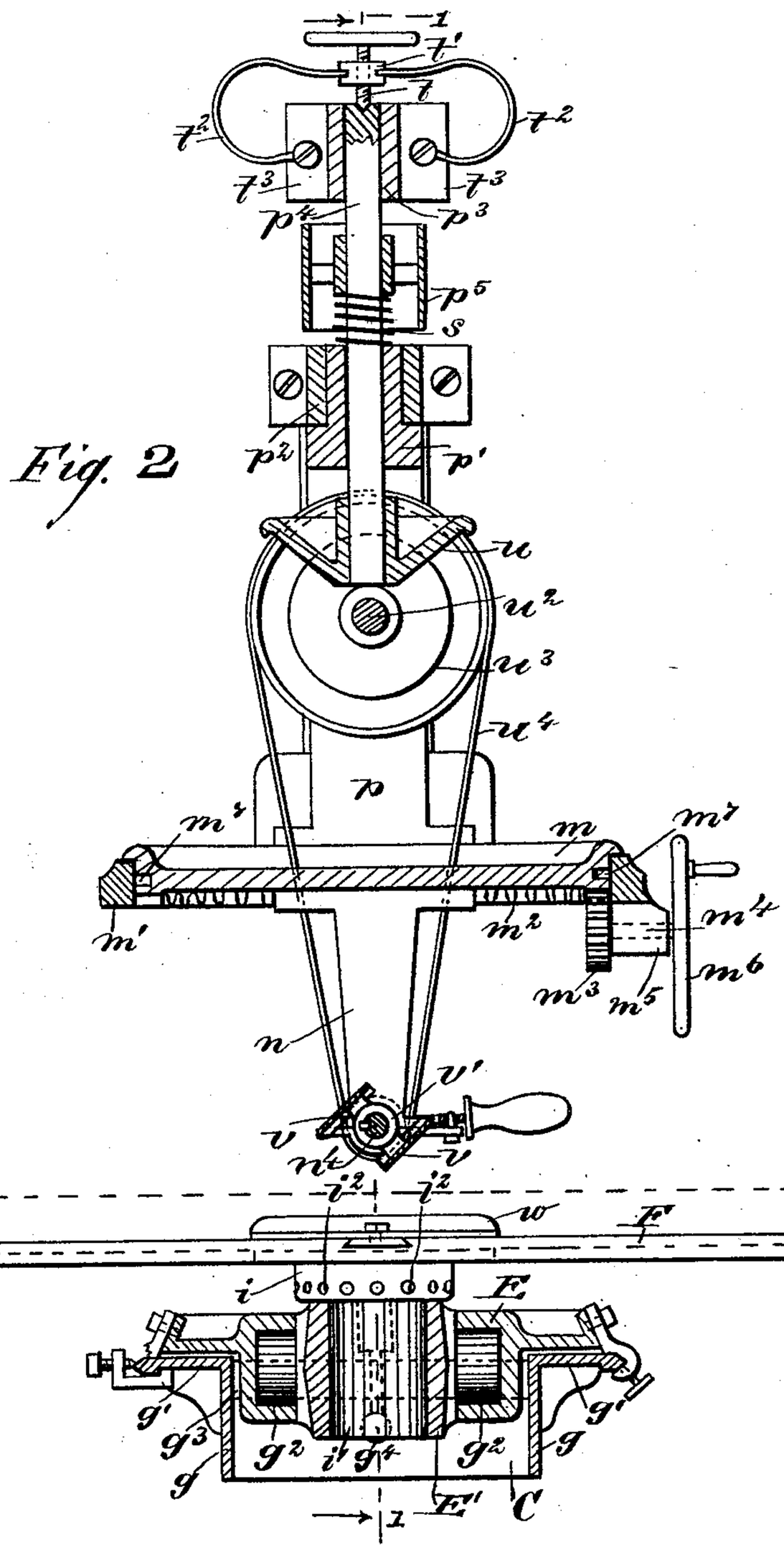
Fig. 2



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(No Model.) 3 Sheets—Sheet 3.

W. R. SNYDER.

WOOD CARVING MACHINE.

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Fig. 4

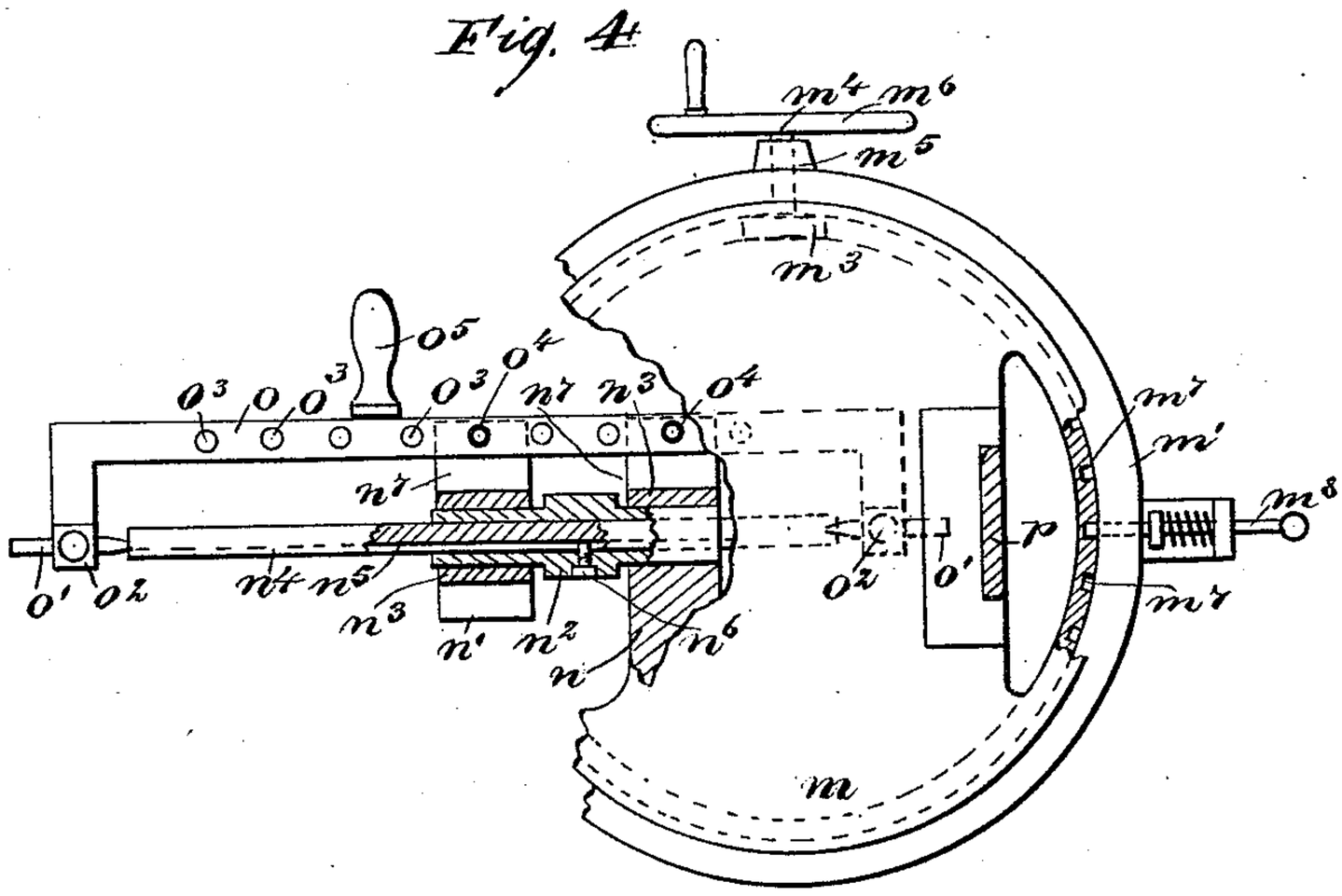

Fig. 5.

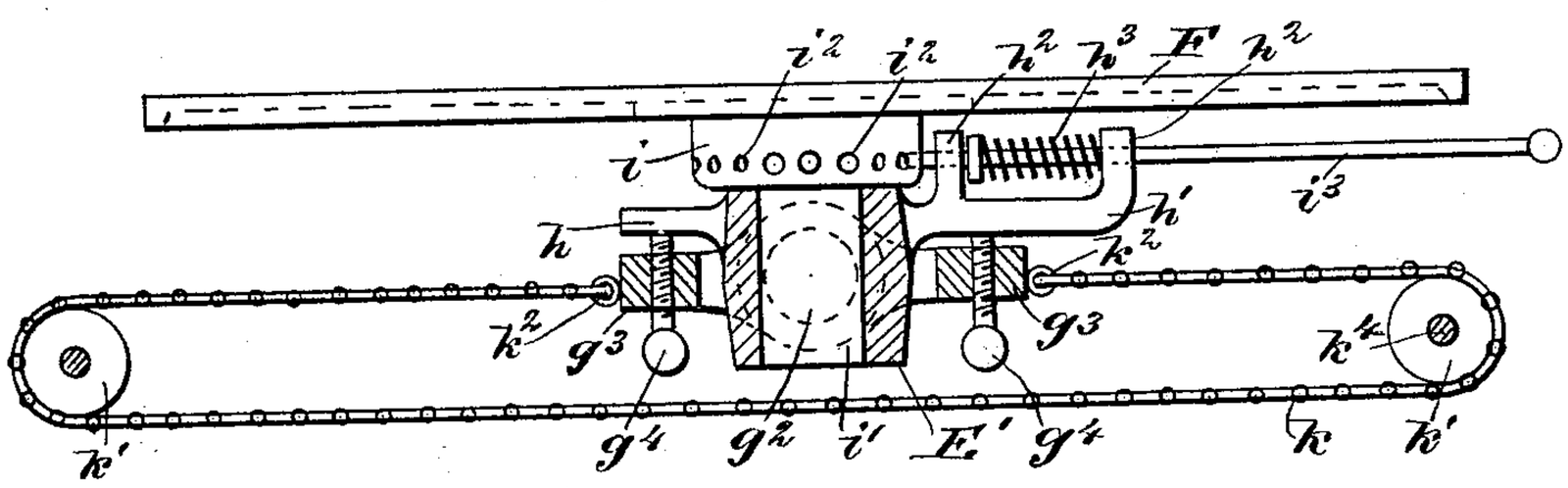

Fig. 6.

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UNITED STATES PATENT OFFICE.

WILLIAM R. SNYDER, OF ROYER'S FORD, PENNSYLVANIA.

WOOD-CARVING MACHINE.

SPECIFICATION forming part of Letters Patent No. 480,524, dated August 9, 1892.

Application filed August 24, 1891. Serial No. 403,565. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM R. SNYDER, of Royer's Ford, in the county of Montgomery and State of Pennsylvania, have invented a new and useful Wood-Carving Machine, of which the following is a full, clear, and exact description.

This invention relates to improvements in power-driven carving-machines, and has for its objects to provide a compact and convenient device which may have its cutting mechanism actuated by any suitable power and that will afford means for the rapid superior execution of intaglio carving upon a surface of wood or other material that may be cut by an expert manipulation of working parts of the machine, thereby producing any predetermined design without requiring an outline of said design to be imposed upon the surface to be carved.

With these objects in view my invention consists in the construction and combination of parts, as is hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation, partly in section and broken away above and below, showing the working parts, the section being indicated by the line 1 1 in Fig. 2 and adjacent arrows. Fig. 2 is a transverse section of working parts, taken on the line 2 2 in Fig. 1. Fig. 3 is a reverse sectional plan view of a detail of construction, taken on the line 3 3 in Fig. 1. Fig. 4 is an enlarged sectional plan view of features of construction, taken on the broken line 4 4 in Fig. 1. Fig. 5 is an enlarged side view, partly in section, of the work-holding platen and attached mechanism for its vertical rocking and reciprocal adjustment; and Fig. 6 is a diagram representing some of the ornamental forms that may be carved with the machine.

A is a vertical tubular column provided with arms a, extended in the same direction, having pads a' on their ends, which by their attachment to the wall A′ retain the column in a fixed upright position. Within the column A an upright main shaft B is inserted and rotatably supported by its loose engagement therewith at proper points, as at a^2 in Fig. 1. Said shaft (shown broken away above and below in the figure named) may be stepped in a pedestal below (not shown) of ordinary form, which will permit its rapid rotation, that may be effected in any desired manner.

The exterior of the tubular column A is rendered a true cylinder for the rotatable support of a laterally-projecting swing-frame C, which is provided with encircling sleeves at b b', that are terminals of two limbs b^2 b^3 on the frame. These separated sleeves afford a suitable connection for the swing-frame with its support A and hold it braced to sustain weight or pressure that may be imposed upon its projected portions.

It is necessary that the swing-frame C be adapted for changes of position vertically as well as laterally. To effect this, a screw-cut shaft c is rotatably stepped in a socket formed in a foot-plate c', which is made to encircle the lower portion of the column A, and rests upon its lower bracket-arm a. The upper portion of the threaded shaft c passes loosely through the limb b^3 and has a threaded engagement with a central perforation in a spur-pinion d, whereon the limb b^3 is seated. Said pinion has a meshing engagement with a similar pinion d', that is affixed on the lower end of a spindle d^2, that is journaled in the limb b^3 parallel to the screw-shaft c and provided with a bevel-pinion e on its upper projecting end, which pinion is engaged with a mating bevel-pinion e', that is affixed upon the adjacent end of a horizontal shaft e^2, which is supported to revolve in an elongated box that is a part of the swing-frame C, and has a hand-wheel e^3 on its outer end to afford means for its rotation and vertical adjustment of the swing-frame on the column A.

A means of adjustment for the swing-frame C, just described, is designed to regulate the height of said frame from the base of the column A. It is furthermore essential that a provision be made for the quick vertical reciprocation of the frame to facilitate the execution of work, as will be explained subsequently. The preferred method of effecting this movement consists in providing a treadle-lever D, that is pivoted on a bracket-foot f, and has its end nearest the column A loosely jointed to an upright post f', the upper end

of the latter being seated in a curved groove f^2, formed on the lower side of the foot-plate c', concentric with the column, the post having a sliding engagement with a perforated boss f^3, formed on the bracket-foot f, whereby the depression of the free end of the treadle-lever will raise the swing-frame C and its supporting foot-plate, while a lateral movement of the frame is permitted.

The upper and outer portion of the swing-frame C is vertically apertured, forming two longitudinally-extending side bars g, that are integrally joined to horizontal portions g'. The latter, lying in the same plane, provide a bed-plate for the support of a sliding carriage E, that is gibbed upon the side edges of the bed-plate, as shown in Fig. 2, so as to permit a longitudinal movement of the carriage on the swing-frame.

There are opposite cylindric cavities formed horizontally and transversely in the carriage E in a portion that is located between the separated frame members g, which cavities intersect a vertical central aperture and receive the trunnions g^2, which oppositely project from a rocking table E', that is located in said aperture.

Two arms h h' are extended from the rocking table E', in alignment with each other laterally considered, and at right angles to the axis of the trunnions g^2. (See Fig. 5.)

A central vertical perforation of proper caliber is formed in the rocking table E' for the reception of a cylindric depending journal end portion i' of a central hub i, that is formed upon a preferably-circular platen F. The hub i is radially perforated at spaced intervals, as indicated at i^2 in Figs. 2 and 5. These socket-holes, extending in series around the hub, are designed to receive an end of the locking slide-bolt i^3, which latter is loosely supported by its engagement with two ears h^2, that project from the forwardly-extended arms h', and has sufficient length to allow it to be readily grasped and manipulated from the front side of the carving-machine. A spiral spring h^3, that encircles the slide-bolt, is attached by one end thereto, and from its position between the ears h^2 is adapted to press the bolt end into any one of the socket-holes i^2 which may be moved opposite the same.

Two cross-bars g^3 are located in the space between the swing-frame side bars g, substantially in the same plane, and are vertically perforated and threaded in the holes to receive the set-screws g^4, which afford means to adjust the platen's upper surface in a horizontal plane or give it any desired inclination therefrom, said screws having a bearing upon the lower surface of the arms h h', as shown in Fig. 5.

The longitudinal movement of the sliding carriage E and parts supported by it is preferably produced by a double sprocket-chain k and sprocket-wheels k', the latter engaging the bights of the chain where it is doubled and being rotatably supported on the side of the swing-frame. Said chain has its ends oppositely secured to the carriage, as shown at k^2 in Fig. 5, a hand-wheel k^3, which is mounted on the end of the forward journal shaft k^4, whereon one wheel k' is affixed, enabling the operator to slide the carriage E from the front of the machine when necessary.

A bracket-frame G is secured upon the upper end of the column A and projects forwardly therefrom at a proper distance above the platen F for the support of the carving mechanism, the latter being sustained by a turn-table m and attached parts. An annular base-piece m' is formed of the bracket-frame G for the rotatable support of the turn-table m, the latter having its exterior side surface rendered circular and of correct diameter to fit loosely within the true circular inner wall of the annular base-piece. On the lower side of the turn-table m, near its edge, a circular toothed rack m^2 is formed or secured, which is engaged by a spur-pinion m^3, that is affixed on a transverse journal-shaft m^4, which is rotatably held in position so as to permit the pinion to mesh with the rack by a bracket-box m^5, that is a part of the annular base-piece m', a hand-wheel m^6, secured on the outer end of the journal-shaft m^4, enabling an operator to revolve the turn-table. As shown in Fig. 4, a series of spaced and radial socket-holes m^7 are formed in the turn-table's periphery, wherein the inner end of a spring-pressed locking slide-bar m^8 will enter when any hole of the series is brought opposite said end, the engagement of the bar, as stated, retaining the turn-table from rotation at any desired point.

An arm n depends from the turn-table m and is provided with a laterally and downwardly bent limb n', sufficiently separated from the arm to allow space for the reception of a pulley n^2, which latter is a central portion of a sleeve, the reduced cylindric ends of which rotatably engage with boxes n^3, that are formed on the lower ends of the arm and attached limb, the aligning apertures of said boxes loosely retaining the pulley with its sleeve extensions in a horizontal plane. An arbor n^4 is slid into the pulley n^2 and adapted to rotate with it, while longitudinal adjustment is permitted by provision of a key-slot n^5, that extends lengthwise of the arbor and receives the point of a set-screw bolt n^6, that is inserted through one side of the pulley and has its head embedded therein, as shown in Fig. 4. A laterally-projecting pad n^7 is formed on each box n^3, these pads that align on their upper surfaces affording seats whereon a rocking frame o is imposed. The rocking frame is formed of a flat bar bent edgewise in the same direction at each end, which end portions are of equal length and are perforated in a plane parallel with that of the main part of the frame to receive cone-pointed center pins o'. Set-screws o^2 serve to secure the center pins o' adjustably in the rocking

frame *o*, their cone-points entering cupped center holes in the ends of the arbor n^4.

A series of suitably-spaced holes o^3 are formed in the straight bar of the rocking frame *o*, which will receive the upwardly-projecting studs o^4 that are affixed in the pads n^7, so that when it is desired to slide the arbor n^4 longitudinally and retain it free to rotate at any point of such an adjustment it is only necessary to rock the frame *o* upwardly and draw it endwise by its handle-piece o^5 and then interlock the frame with the studs o^4, which will effect the desired result.

Two upright standards *p* are erected on the turn-table *m*, which are joined together at their upper ends by a cross-piece *p'*, the latter having a cylindric hub projected vertically therefrom, which rotatably engages a perforated limb p^2 of the bracket-frame G. Above the limb p^2 a similar limb p^3 is formed on the frame G and vertically perforated in axial alignment with the perforation in the limb p^2. The hub on the cross-piece *p'* and said piece itself are vertically perforated in alignment with the hole in the upper limb p^3 for the revoluble support of an upright counter-shaft p^4, whereon pulley p^5 is secured, that receives motion from the main shaft B through a belt p^6, which is placed on said pulley and also on a driving-pulley *r* on the main shaft. A spiral spring *s* is placed on the counter-shaft p^4 between the pulley p^5 and hub on the cross-piece *p'*, and an adjustable screw *t* has its cone-point pressed into an axially-cupped center of the counter-shaft by its threaded engagement with a nut *t'*, the latter being attached to the opposite upper terminals of two similar bow-springs t^2, the lower ends of which are secured upon lateral flanges t^3 of the upper limb p^3 on the bracket-frame G. On the lower end of the counter-shaft p^4 a bevel-faced friction-wheel *u* is secured that is in contact with another bevel-faced friction-wheel *u'*, the latter being mounted upon a horizontal shaft u^2, which is journaled at its ends in the standards *p*, said shaft having a pulley u^3 secured upon it, which is in the same vertical plane with the pulley n^2, and is connected therewith by a belt u^4. The adjusting-screw *t* is employed to produce more or less friction between the impinging faces of the wheels *u u'*, the spiral spring *s* by its elastic force breaking their contact when the screw is retracted, and as the bowed plate-springs t^2 press downwardly these serve to steady the parts and prevent rattling when the screw *t* is relaxed to arrest a rotation of the arbor n^4.

The tools *v*, used for intaglio carving, are secured by any suitable means upon a head-stock *v'*, which is affixed upon the arbor n^4 near its outer end, the head-stock being shaped to give a proper inclination to the cutting-edges of the tools, so that a clean cut will be produced in the material operated upon.

Any desired shape may be given to the cutting-edges of the tools *v*—angular, round, or coved—so as to produce the desired effects.

In use the material which is to receive the carved design is held upon the platen F by a pair of chuck-jaws *w*, which are adjustable toward or from each other, and when so clamped is adapted to receive the impinge of the cutters *v* upon its upper surface. Rapid rotary motion is now given to the arbor n^4, that from its connection with the turn-table *m* may be given an orbital movement around and above the platen F with the turn-table by means already described, and the treadle-lever D is depressed by the operator, who also moves the platen F and turn-table *m* successively or simultaneously to cause the cutters *v* to excavate a predeterminal pattern or design in the material on the platen. As previously explained, the platen F may be inclined from a horizontal plane, which will afford means to cut deeper at the center and graduate the depth of the cut until its outer terminal will vanish on the surface of the material. The progressive movement of the sliding carriage E in either direction and rotatable adjustment of the platen F, together with a similar adjustment of the turn-table *m* and swing-frame C, are all utilized by an expert operator to produce a multitude of artistic designs *in intaglio*, which may also be reproduced as frequently as desired.

It is not necessary for any pattern to be indicated upon the material that is to be carved if the operator has sufficient skill to properly manipulate the several parts of the machine. Preferably the design should be laid off upon a pattern-sheet as a guide when intricate effects are to be produced.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a carving-machine, the combination, with a platen that is rotatably and reciprocally adjustable on a frame, of a horizontal rotatable arbor on a sliding frame, a cutter on the arbor, means to axially rotate the arbor, and means to move it orbitally around the platen, substantially as described.

2. In a carving-machine, the combination, with a platen that is supported on a laterally-movable frame and is adjustable to incline it from a horizontal plane and also rotatably and reciprocally adjustable, of an arbor rotatably supported above the platen and adapted to swing orbitally, a cutter adjustable thereon, a turn-table support for the arbor, means to move the turn-table, and mechanism to effect the rotation and longitudinal adjustment of said arbor and secure said adjustment, substantially as described.

3. In a carving-machine, the combination, with a platen that may be adjustably rocked, rotated, and moved reciprocally on a frame and means to adjust the platen vertically, of an axially-rotatable arbor, a cutter thereon above the platen, a rocking frame that is longitudinally movable and that engages the ar-

bor at its ends, a rotatable turn-table from which the arbor is hung, and mechanism which will transmit rotary motion to the arbor, substantially as described.

4. In a carving-machine, the combination, with a swinging frame laterally movable on an upright fixed column, a device to vertically adjust the swing-frame and support it where adjusted, a treadle connected to the swing-frame supports, and a platen on the swing-frame which is reciprocally and rotatably adjustable and adapted to be inclined from a horizontal plane, of a rotatable arbor, a cutter thereon, a rotary adjustable turn-table from which the arbor is hung, and means to rotate the arbor axially, substantially as described.

5. In a carving-machine, the combination, with a supported bracket-frame, a turn-table rotatable thereon, a circular toothed rack below on the turn-table, a pinion meshing with the rack, a hand-wheel controlling the pinion, and a device to lock the turn-table from rotation, of an axially-rotatable arbor below the turn-table suspended therefrom, a transverse cutter thereon, and a longitudinally movable and securable frame whereon the arbor rotates, substantially as described.

6. In a carving-machine, the combination, with a supported bracket-frame, a horizontal circular turn-table thereon, a circular rack on the table below near its edge, a pinion and hand-wheel on a shaft journaled on the turn-table and adapted to rotate the table when manipulated, and a locking-bar that will interlock with holes in the periphery of the turn-table, of a horizontal arbor on a depending frame axially rotatable thereon, and a cutter on the arbor, substantially as described.

7. In a carving-machine, the combination, with a supported bracket-frame, a turn-table thereon, gearing on the table, and a device to secure the table from rotation, of an arbor below hung from the turn-table and rotatable and longitudinally adjustable and a rocking frame adapted to be slid endwise and held at any point of such adjustment and engaging the ends of the arbor and controlling its longitudinal movement, substantially as described.

8. In a carving-machine, the combination, with a column, a bracket-frame laterally extended therefrom, a main shaft in the column, and a rotatable turn-table on the bracket-frame, of friction-gearing on the turn-table, adapted to move an arbor below the table, a horizontal axially-rotatable arbor on an arm depending from the table, and a rocking longitudinally-movable frame engaging the ends of the arbor, substantially as described.

9. In a carving-machine, the combination, with a swinging frame on an upright column, of a platen which is rotatable, a device that secures the platen from rotation, a sliding carriage on the swing-frame, a rocking adjustable table thereon, a rotatable platen on the table, and a sprocket chain and gearing to move the sliding carriage, substantially as described.

10. In a carving-machine, the combination, with a supported bracket-frame, a turn-table rotatable thereon, gearing to revolve the table, an adjustable locking-bar that will enter one of a series of holes in the rim of the turn-table, a frame on the turn-table which rotatably supports two engaging bevel-faced friction-wheels, and shafts whereon the wheels are affixed, of a rotary arbor revoluble on a depending bifurcated arm, adjustable cutters thereon, a longitudinally movable and securable rocking frame having its bent ends pivotally engaged with the ends of the arbor, a pulley mounted to slide on the arbor and adapted to rotate it, and a connection from a source of power to the friction-gear and from the friction-gear to the pulley on the arbor, substantially as described.

11. In a carving-machine, the combination, with a fixed upright column, a laterally-movable swing-frame thereon, a mechanism that will raise, lower, and support the swing-frame, a vibratable treadle-lever, and a post jointed at its lower end to an end of the treadle-lever and loosely engaging its upper end with the swing-frame support, of a sliding carriage gibbed on a bed-plate of the swing-frame, a rocking table thereon which is adjustable from a horizontal plane, a rotatable platen on the table, a locking-bolt adapted to engage any of a series of radial holes in the periphery of a hub on the platen, a doubled sprocket-chain attached by its ends to the sliding carriage, sprocket-wheels engaging the bights of the chain, and a hand-wheel on the end of one journal-shaft that supports a sprocket-wheel, substantially as described.

12. In a carving-machine, the following elements, in combination, viz: an upright tubular column, a main shaft therein adapted to rotate, a swing-frame laterally movable on the column, mechanism which will adjust the swing-frame and retain it at a desired height, a treadle-lever connected to the frame-support, a platen on the swing-frame which may be adjustably rocked, rotated, and reciprocated, a bracket-frame above the platen, a turn-table thereon, means to rotate the turn-table, a locking device for the turn-table, an axially-rotatable and longitudinally-adjustable arbor hung from the turn-table, cutters thereon, and a friction-gearing connected with the main shaft and also with the arbor, so as to transmit rotary motion from the shaft to the arbor, substantially as described.

WILLIAM R. SNYDER.

Witnesses:
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WASHINGTON SMITH.