

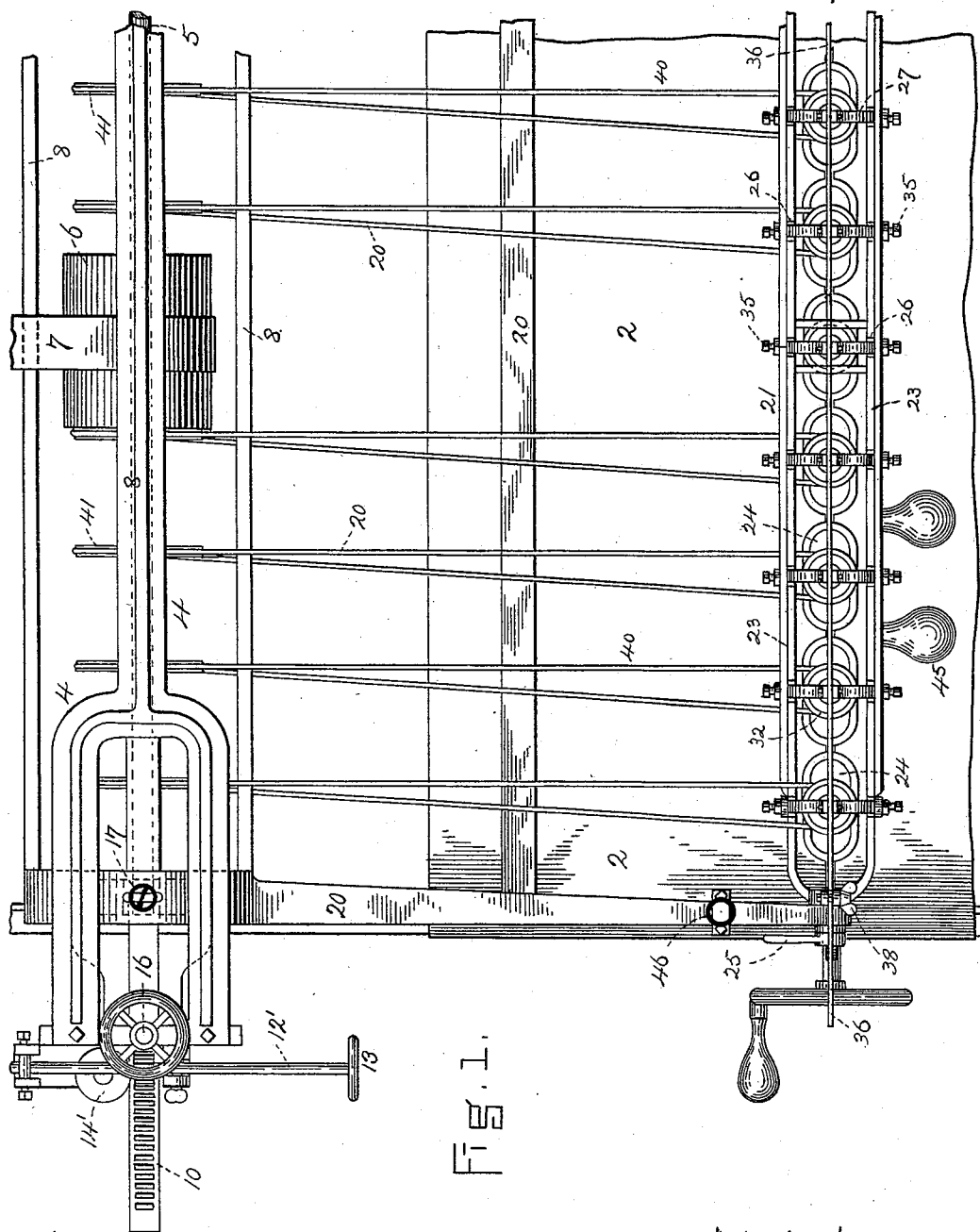
(No Model.)

4 Sheets—Sheet 1.

H. H. ADAMS.
CARVING MACHINE.

No. 488,047.

Patented Dec. 13, 1892.



WITNESSES.

L. Henry Marsh.

Francis C. Stanwood

INVENTOR.

Hanson H. Adams.

by H. I. Lodge Atty.

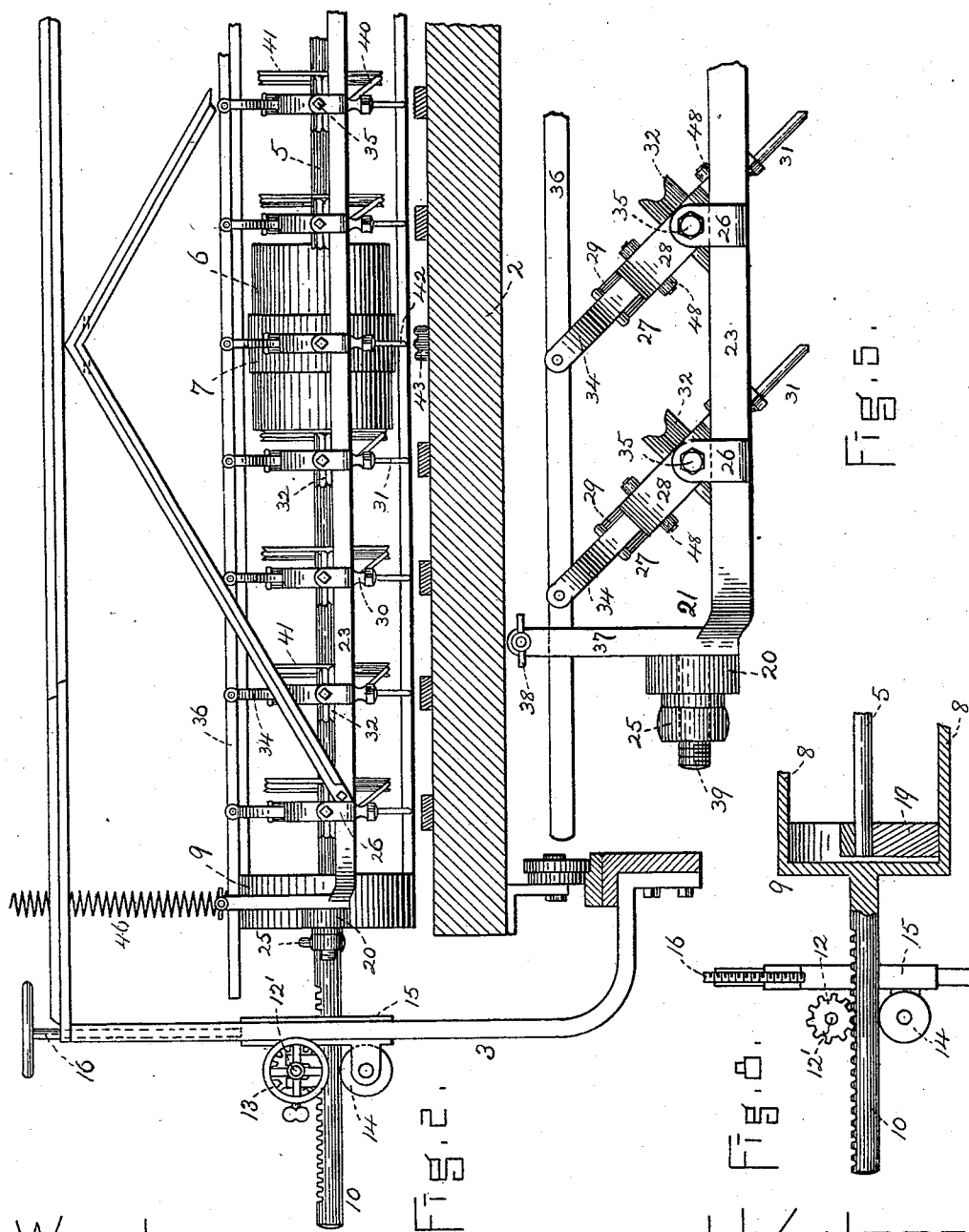
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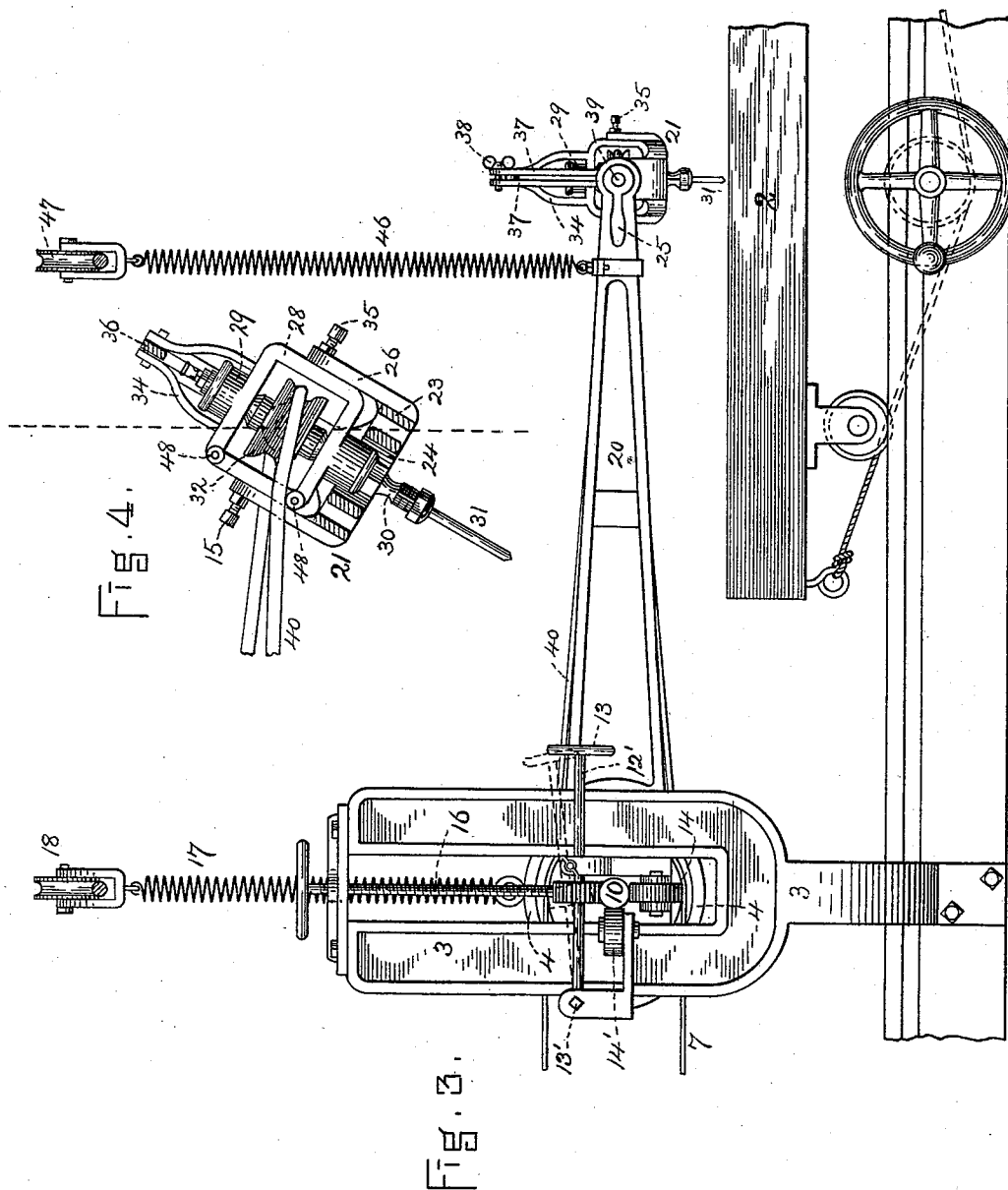
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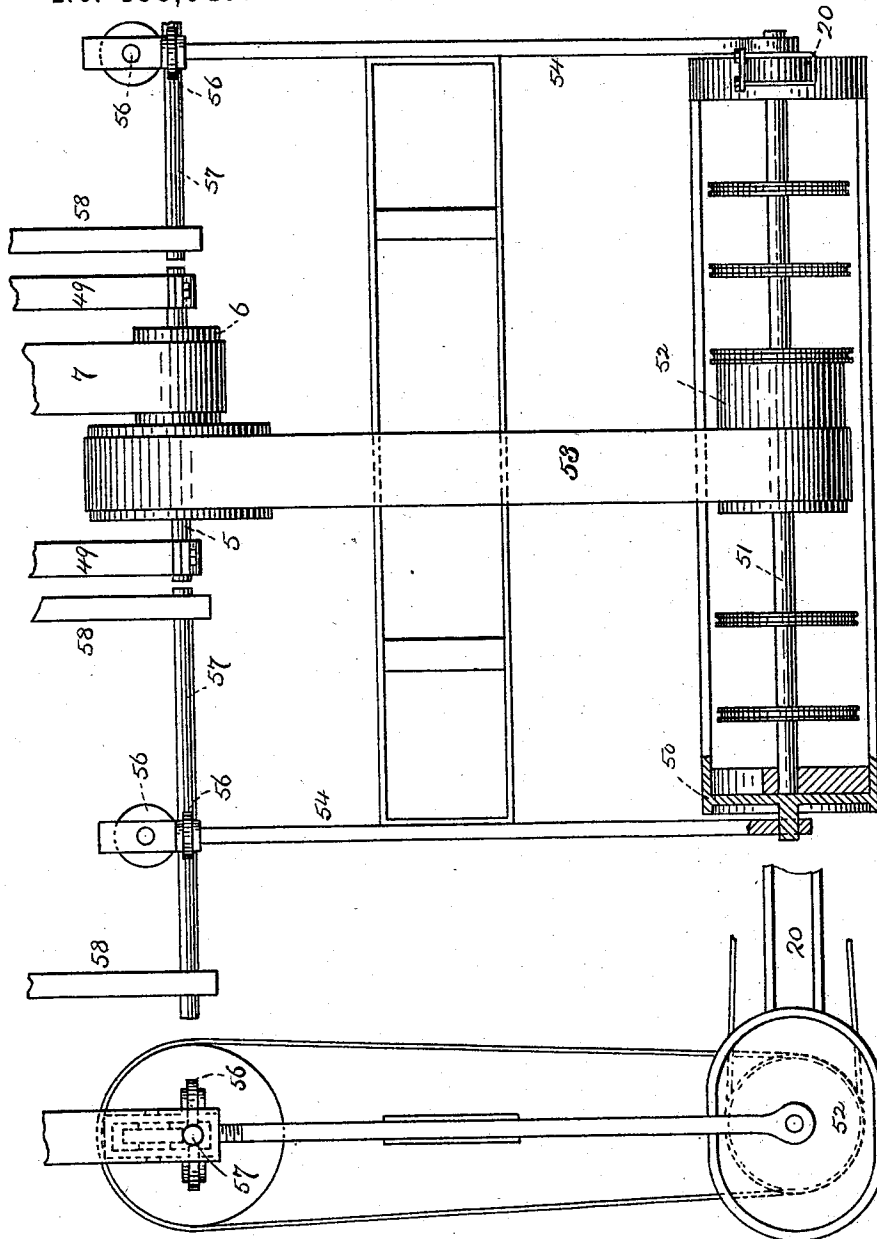


Fig. 7.

Fig. 6.

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UNITED STATES PATENT OFFICE.

HANSON H. ADAMS, OF EVERETT, MASSACHUSETTS.

CARVING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 483,047, dated December 13, 1892.

Application filed October 28, 1891. Serial No. 410,046. (No model.)

To all whom it may concern:

Be it known that I, HANSON H. ADAMS, a citizen of the United States, residing at Everett, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Wood-Carving Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification

This invention relates to improvements in wood-carving machines, particularly that class in which a gang of rotary cutting-tools are employed and all operated simultaneously and similarly to produce carvings of every description in multiple.

My improvements are embodied, primarily, in the construction of the tool-carriage and the individual tool-heads, whereby the rotary cutters are given universal movement, and thus they are capable of performing not only plain vertical work, but are enabled to produce undercut work in any direction. This feature is of the utmost importance.

My improvements, moreover, are embodied in the mechanism whereby a movable support in which is mounted the counter-shaft is adapted to have as a whole both vertical and horizontal endwise adjustment.

My improvements further consist in supporting upon said movable support the pivotal frame in which are affixed the tool-carriage and tool-heads, and likewise in the several elements by which the various adjustments are accomplished, whereby the table upon which the work is placed may be made stationary in lieu of having a reciprocating movement; and lastly in the various instrumentalities hereinafter fully described, whereby the rotary cutters can be held in any position and then caused to move over the work in process.

The drawings accompanying this specification represent, in Figure 1, a plan in part of a wood-carving machine embodying my invention. Fig. 2 is an end view of the tool-carriage and tool-heads with the table in vertical

section. Fig. 3 is a side elevation of the machine. Fig. 4 is an end view of the tool-carriage, showing its inclination from the vertical to position the tools for undercut work. Fig. 5 is a front view of the tool-carriage in part with the tools adjusted for undercut work, but in a plane at right angles to that in Fig. 4. Fig. 6 is an end elevation. Fig. 7 is a front view of the counter-shaft hanger which I propose to employ more especially when a stationary table is used. Fig. 8 is a sectional elevation longitudinally of the movable support, showing its adjusting mechanism with a part of the counter-shaft and its journal-supports.

In wood-carving machines of the above class, as premised, it is particularly desirable that the machine should be simple in construction and yet permit the cutting-tools to be held and adjusted in any desired position for work of every conceivable character.

The prominent feature in machines of this class is that a series of cutting-tools is similarly and simultaneously operated, each upon a separate piece of work, with the result that each piece is identical with every other. This identity in carving is effected by means of a pattern of the desired form, while a "pattern-tool," so called, or a non-revoluble pointed steel rod is drawn over the said pattern, so as to pass over every portion of its surface. Inasmuch as the pattern-tool is mounted in the tool-carriage with the cutting-tools it follows that every motion of the pattern-tool is accompanied by similar movements of the cutting-tools. As a result the carved pieces, in shape identical with the pattern, are produced in multiple, the number depending upon the number of cutting-tools employed.

Upon reference to the drawings, 2 represents a traveling table adapted to be reciprocated by any suitable mechanism, in the present instance by a hand-wheel and a band, which is given a half-turn about a pulley secured upon the table-support, the latter being fitted with guides.

3 represents one of twin housings or stationary uprights which support a movable support 4, carrying a counter-shaft 5, furnished with a drum 6 and a belt 7, which connects with a suitable prime motor. Said sup-

port 4 is composed of four horizontal bars 8 8, attached to end heads 9 9, from which extend short shafts 10 10, one of which (see Fig. 2) is notched and, in connection with a toothed wheel 12, fast upon a shaft 12' on one of the housings 3, and a hand-wheel 13, serves to give the support lateral movement and to steady the latter and prevent uncertain action when blocking or roughing out work. At other times this positive feed motion is not required. Hence the shaft 12', which carries the wheel 12, is pivoted at 13', and an upward movement of the hand-wheel serves to disengage the said wheel from its notched shaft. The support is then capable of free sliding movement to and fro upon its bearings and is generally operated in this manner after the preliminary or roughing-out work has been accomplished. By the arrangement of the above elements it is evident that the lateral feed movement may be made entirely positive by swinging the shaft 12' upon its pivot to cause the toothed wheel 12 to engage the notched shaft 10; or by raising the said shaft 12', as indicated by the dotted lines in Fig. 3, free movement of the support is obtained and its travel is then to be controlled solely by the hand of the operator who grasps the tool-carriage. Antifriction-rollers 14 14' support said journals 10 10, as shown in Fig. 3, the pressure of the belt 7 serving to hold it against the rollers 14'.

To enable the support to be adjusted vertically, journal-supports or guide-blocks 15 are fitted upon the uprights 3 and are actuated each by a screw-rod 16. The weight of this support, together with the various elements attached thereto, is counterbalanced in part by the springs 17, with their pulleys 18, to enable the support to be moved with greater ease.

To provide a suitable bearing for the shaft 5, the end heads 9 9 are recessed (see Fig. 8) each to contain a journal-box 19, in which the ends of said counter-shaft 5 revolve.

In connection with and attached to the movable support 4, which supports the counter-shaft, is an extension-frame 20, of rigid construction and pivotally attached to said support 4. In the free end of this frame is secured the tool-carriage 21.

The several instrumentalities above specified for controlling the position of the support 4 likewise serve to control the position of the tool-carriage. Hence the latter can be moved laterally across the table or raised above the table and is capable of every adjustment which belongs to the said support.

The tool-carriage proper 21 consists, primarily, of a horizontal plate 23, pivoted at the ends in the outer extremity of the oscillating frame 20. Said plate is formed with openings or apertures 24 in number to correspond with the cutting-tools employed. The position of this plate can be accordingly changed or partially revolved, as desired, while it is held rig-

idly, after being shifted in position, by means of a clamping-nut 25, which engages the screw-threaded end of one of the pivots. This latter projects through the frame 20 at this point. Furthermore, disposed in pairs and transversely of the center of each aperture are short vertical ears 26, which serve as journals for the tool-heads 27. These latter consist of a hollow rectangular frame 28, having solid ends or short cylindrical bosses 29, centrally bored to receive a spindle 30, longitudinally journaled therein. At the lower end of said spindle is removably attached a cutting-tool 31, while upon that part within the frame 28 of the head is secured a pulley 32, suitably operated by a belt. Rising from the top of said frame are two rigid curved arms 34, which are pivotally connected with a rod hereinafter described. Oscillating movement of the tool-head is effected by means of transverse bolts or trunnions 35, which rest in the ears 26. By means of the above mechanism the gang of tools are enabled to oscillate in vertical planes, as illustrated in Fig. 5, or transversely of the table.

To provide for simultaneous movement of each tool-head in the series, so that the position of every individual tool shall be the same with every other as regards the surface of the table, a longitudinal rod 36 is pivotally connected to the arms 34, before mentioned, of every tool-head, and finally, passing through two clamping-bars 37 at one end of the plate 23, is held in any desired position by a thumb-screw 38.

Since the pivots 39 of the plate 23, which constitutes the tool-carriage 21 and in which are mounted the respective tool-heads, are at right angles to the longitudinal axes of said tool-heads, it is evident that the tools are capable of oscillating in vertical planes lengthwise of the table, or as illustrated in Fig. 4—that is, at right angles to the adjusting movement. (Shown in Fig. 5.) Hence undercut work of any description can be accomplished, since each tool can be made to circumscribe a cone, the base of which is on the surface of the table, while its apex is at a point on the spindle 30, opposite the trunnions 35, and this is accomplished by the combined oscillatory movements of the pivotal carriage 21 and the tool-heads 27.

To rotate the tools, belts 40 pass from the pulleys 32 to corresponding pulleys 41 on the counter-shaft 5. Preferably to balance the tool-carriage and prevent a thrust, which might occur if all the tools revolved in the same direction, those on one side of the center of the carriage revolve in one direction, while those on the other side rotate oppositely.

In the present instance the machine is fitted to carry eight cutting-tools. The center tool-head, similarly mounted after manner of the others, is equipped with a pointed metallic rod 42, which is not intended to revolve, but simply to be passed or dragged over the pat-

tern-plate 43 by means of a hand-grasp 45, (see Fig. 1,) attached to the tool-carriage or to the extension-frame 20. When the machine is in readiness to operate, the lower extremities of each tool are then to be in the same horizontal plane with each other and with the end of the pattern-tool. Hence every movement, rise or fall, lateral, oblique, or otherwise, is participated in by each and all of the cutting-tools. Such movements are controlled by the surface contour of the pattern, and hence when the pattern-tool has been passed across every portion of the surface of said pattern an identical reproduction has been created by each one of the cutting-tools.

To relieve the operator from fatigue incidental to the weight of the frame 20 when the latter is moved about, I have attached pendent springs 46, which are upheld by suitable links and pulleys 47, adjustable vertically.

When the tool-carriage is positioned obliquely, as shown in Fig. 4—that is, in a plane parallel with the longitudinal axis of the belt, or when the latter is moving at an oblique angle with the tool-spindle 30 in lieu of at right angles, or thereabout, as is usually the case—there is a tendency for the belt to ride up and slip off. Hence I have arranged guide-rolls 48 above and below, as shown in Fig. 4. Thus when the carriage has been tilted to a certain angle the belt is brought against one of said guides, and it is thus held against any further tendency to run off until the carriage is returned to a more normal position.

In Figs. 2 and 3 of the drawings the wood-carving machine is shown as equipped with a traveling table and a pivotal or oscillating frame 20, with a counter-shaft 5, the said frame being attached to a support 4, which is adjustably mounted in two fixed uprights 33.

To avoid the use of a movable table and its guides, I have shown a modified way of mounting the swinging frame 20, in which the cutting-tools are secured. By means of this arrangement a stationary table can be substituted for the movable table now in general use.

Reference to the drawings, Figs. 6 and 7, shows the counter-shaft 5, with its drum 6 and belt 7, supported in two fixed standards 49, while an intermediary hanger-frame 50, furnished with a shaft 51, having a drum 52, the latter receiving motion from a belt 53, is pivotally attached to the lower ends of a pair of rods 54, suitably trussed and capable of movement laterally by means of rolls or wheels 56, affixed in their upper ends and adapted to travel on horizontal guides 57 in fixed hanger-posts 58. To this swinging hanger-frame 50 is attached the oscillating frame 20, which contains the tool-carriage and tool-heads. To provide for lateral movement of said frame 20, the drum 52 is elongated, while longitudinal movement is effected by the swinging movement of the rods 54 upon their

supports. By such mechanism circular, oval, or other curvilinear motion may be described by the cutting-tools without change in the position of the tool-carriage or the individual tool-heads. For undercut work the necessary adjustments in the positions of the tool-carriage and of the tool-heads must be made in the usual manner, as before explained, when the table had traveling movement.

The mode of operation when the above-described instrumentalities co-operate is as follows: The screw-rod 16 serves to adjust the horizontal support 4 at a suitable distance above the table. At the same time the pivotal shaft 12' is in an upraised position (see Fig. 3) to disengage the wheel 12 from its notched shaft 10. In this way the carriage and tools are readily positioned above the work. After the preliminary adjustment is obtained the hand-wheel 13 is grasped, the shaft 12' swung down, and the toothed wheel caused to engage the notched shaft. The machine is then in readiness to perform the rough or blocking-out work and all lateral thrusts or unsteady motion is avoided by the positive feed mechanism now employed. When blocking out is finished, the hand-wheel and shaft are again raised, the toothed wheel 12 and shaft 10 disengaged, and the standard free to be controlled by a slight push or thrust from the hand of the operator. The tool-carriage is now tilted or rocked by loosening the thumb-nut 25 to adjust the tools in a proper position, considered with reference to a vertical plane longitudinally of the table, as would be indicated by reference to Fig. 4 of the drawings. This position may be vertical with respect to the surface of the table or oblique thereto. A further adjustment can be made to bring the carriage in such position as to cause the longitudinal axes of the tools to be maintained in a plane vertically of the table, considered lengthwise, but obliquely with respect to a plane transversely of the table, as is indicated in Fig. 5. In such event the clamp-nut 38 is relaxed and the controlling-bar 36 thrust endwise or until the tools are positioned at the desired angle. These two last adjustments are more particularly for undercut work.

In case plane straight carving is to be performed the tools are to be adjusted to stand normal with the surface of the table when the operator grasps the hand-hold 45 and causes the tools to follow the pattern and cut the work, which is actuated in traverses after the manner of a planer when a movable table is employed. Lateral movement is produced by means of the pinion 12 and the notched rod 10 of the standard in blocking work.

In the event of a stationary table being used the frame 20, with the tool-carriage and its tools, is reciprocated in right lines by the oscillation of the hanger-frame 50 upon its rollers 56 transversely about the rods 57. Lateral movement or feed is easily obtained by the operator giving a thrust or pull to the en-

tire frame 20, which causes the frame 50 to roll upon its rods 57, while the length of the drum 52 enables the belt to accommodate itself for such feed movement. It is evident with such an arrangement that the tools can be caused to describe curvilinear movement, while their axes are at all times normal to the table. Should, however, curvilinear undercut work be desired, the locking-nuts 25 38 are relaxed, in which event the operator is enabled not only to rock the tool-carriage, but likewise move the bar 36, which will produce a compound resultant movement, hereinbefore described, of great utility.

15 What I claim is—

1. In a carving-machine, the combination, with fixed uprights, a rigid support pivotally mounted in said uprights and movable endwise therein, means whereby vertical adjustment of said support as a whole on said uprights is effected, and a horizontal extension-frame secured at one end to said support, of a tool-carriage rocking transversely in the free end of said frame, a non-revoluble pattern-tool, and one or more revoluble cutting-tools mounted in said carriage, substantially as specified.

2. In a carving-machine, the combination, with fixed uprights, a support pivotally mounted in said uprights and movable endwise therein, means whereby vertical movement of said support as a whole on said uprights is effected, a frame attached to said support to swing therewith, and a carriage mounted to rock transversely in the free end of said frame, of a series of independent tool-heads pivotally mounted in said carriage, a non-revoluble pattern-tool, and one or more revoluble cutting-tools secured in said heads and adapted for universal movement, substantially as explained.

3. In a carving-machine, the combination, with a work-table, a support free to move endwise and to rock on its axis and in which is supported a counter-shaft, a frame attached at one end to said support and rocking or swinging therewith, and an axially-rocking tool-carriage in the free end of said frame, of a series of tool-heads adapted to swing pivotally in planes coincident with the longitudinal axis of the carriage, one or more removable cutting-tools, and a single pattern-tool in the lower end of said heads, and mechanism for rotating said cutting-tools independently from said counter-shaft, substantially as described.

4. In a carving-machine, an endwise-movable swinging frame, means for adjusting said frame as a whole vertically and for moving it as a whole horizontally when required, an axially-rocking tool-carriage composed of an apertured plate with upright ears arranged in pairs at intervals thereacross, and upright end arms 37, connected with said bar 36, combined with independent tool-heads, means for clamping them together when desired, and a bar 36,

passing between said arms 37, a non-revoluble pattern-tool, a series of revoluble cutting-tools, and means for actuating the cutting-tools, substantially as set forth and stated. 70

5. In a carving-machine, the combination, with a swinging frame having horizontal and vertical adjustment and a tool-carriage adapted to rock axially in its free end and be held in any position, of a series of tool-heads oscillating at right angles to the rocking movement of the carriage and mounted thereupon, a series of revoluble spindles in said head, operating-tools, a longitudinally-movable rod pivotally attached to each tool-head to produce simultaneous and similar movement of every head, and a clamp whereby the said rod and connected parts may be held in desired position of adjustment, substantially as set forth. 85

6. In a carving-machine, a swinging frame capable of horizontal and vertical adjustment, an axially-rocking tool-carriage in its free end, composed of an apertured plate 23, its journal-supports, the upright ears in pairs thereacross, a reciprocating bar 36, and end arms 37, combined with a series of tool-heads, each composed of a frame 28, trunnions 35, a revoluble spindle to receive a cutting-tool and furnished with a pulley, and guide-rolls 48, all operating substantially as explained. 95

7. In a carving-machine, the combination, with a swinging frame, an axially-rocking tool-carriage in its free end, a series of tool-heads pivotally mounted in said carriage, a non-revoluble pattern-tool, and a series of revoluble cutting-tools adapted for universal movement, of an oscillating hanger-frame which upholds the pivoted end of the swinging frame, the fixed supports, and mechanism to provide right-line movement of the hanger-frame upon its supports, substantially as stated. 100

8. In a carving-machine, a rigid swinging frame, a support capable as a whole of horizontal endwise movement and also vertical adjustment, and the counterpoise springs or weights, combined with a tool-carriage adapted to rock upon its axis parallel with the horizontal axis on which the frame swings, a pattern-tool and one or more cutting-tools, and tool-heads which receive said tools and are capable of adjustment pivotally in planes coincident the longitudinal axis of the tool-carriage, substantially as explained. 115

9. The fixed uprights 3, an oscillating extension-frame 20, upon which is mounted a pivotal tool-carriage with rocking tool-heads, combined with a movable support 4, which interconnects said extension-frame with the uprights and is composed of end heads 9, supporting-shafts 10, and longitudinal connecting-bars 8, and with the pivotally-supported shaft and its toothed wheel 12, and hand-wheel 13, said toothed wheel being adapted to be engaged with one of the shafts 10 when desired, substantially as specified and set forth. 120

10. In combination with fixed uprights, a 130

movable support capable of vertical and longitudinal adjustment thereupon, an oscillating extension-frame pivoted at one end to said support, the pivotal tool-carriage with rocking tool-heads in the free end of said frame, and a counter-shaft 5, actuated by some prime motor and having journal-supports 19 in the end heads of said support, a series of pulleys upon said shaft, and belts therefrom to oper-

ate the individual cutting-tools in the tool-heads, substantially as explained.

In testimony whereof I affix my signature in presence of two witnesses.

HANSON H. ADAMS.

Witnesses:

H. E. LODGE,

FRANCIS C. STANWOOD.