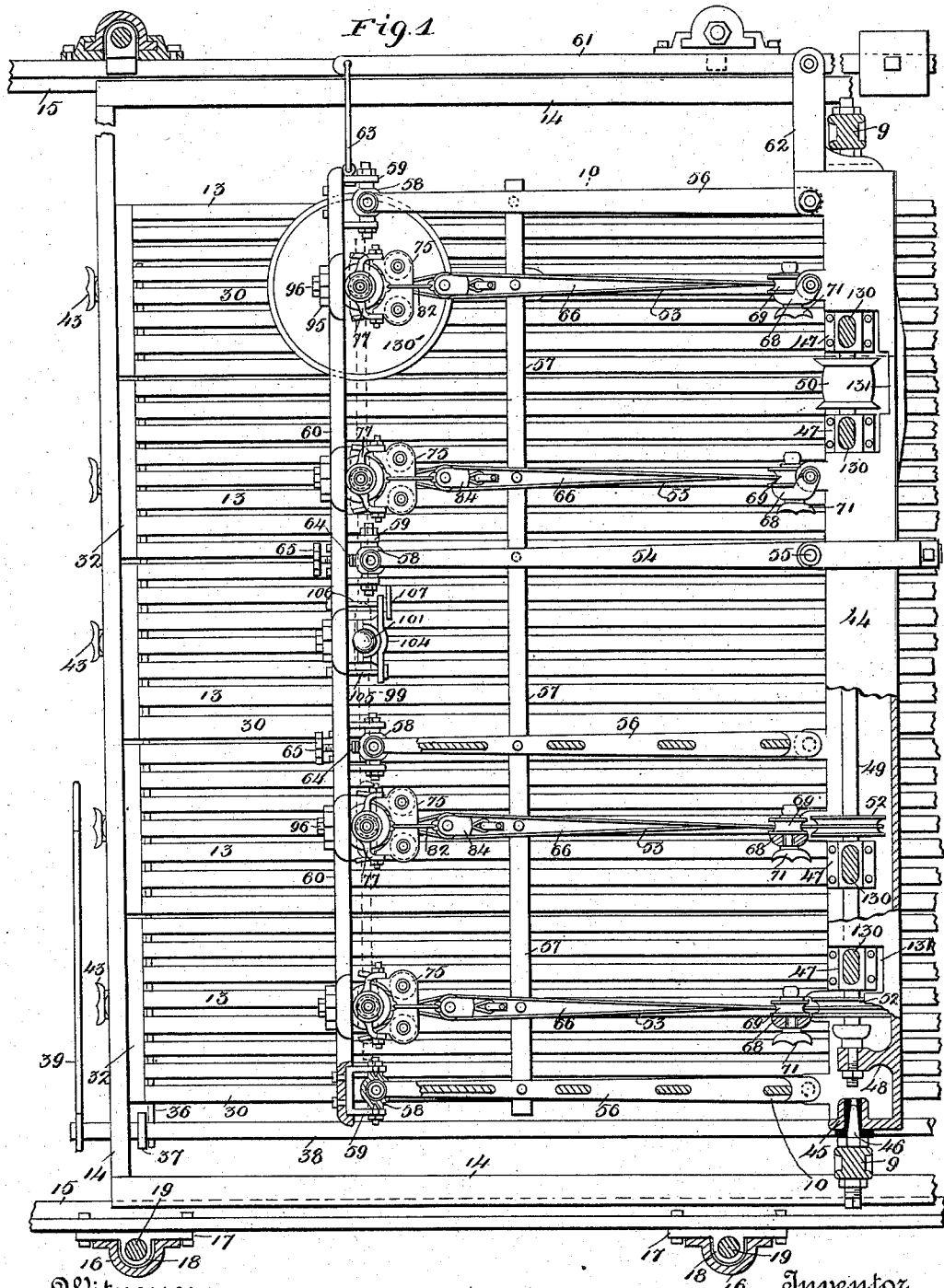
(No Model.) 6 Sheets—Sheet 1.

E. LOCHMAN.

WOOD CARVING MACHINE.

No. 571,535. Patented Nov. 17, 1896.

Fig. 1.



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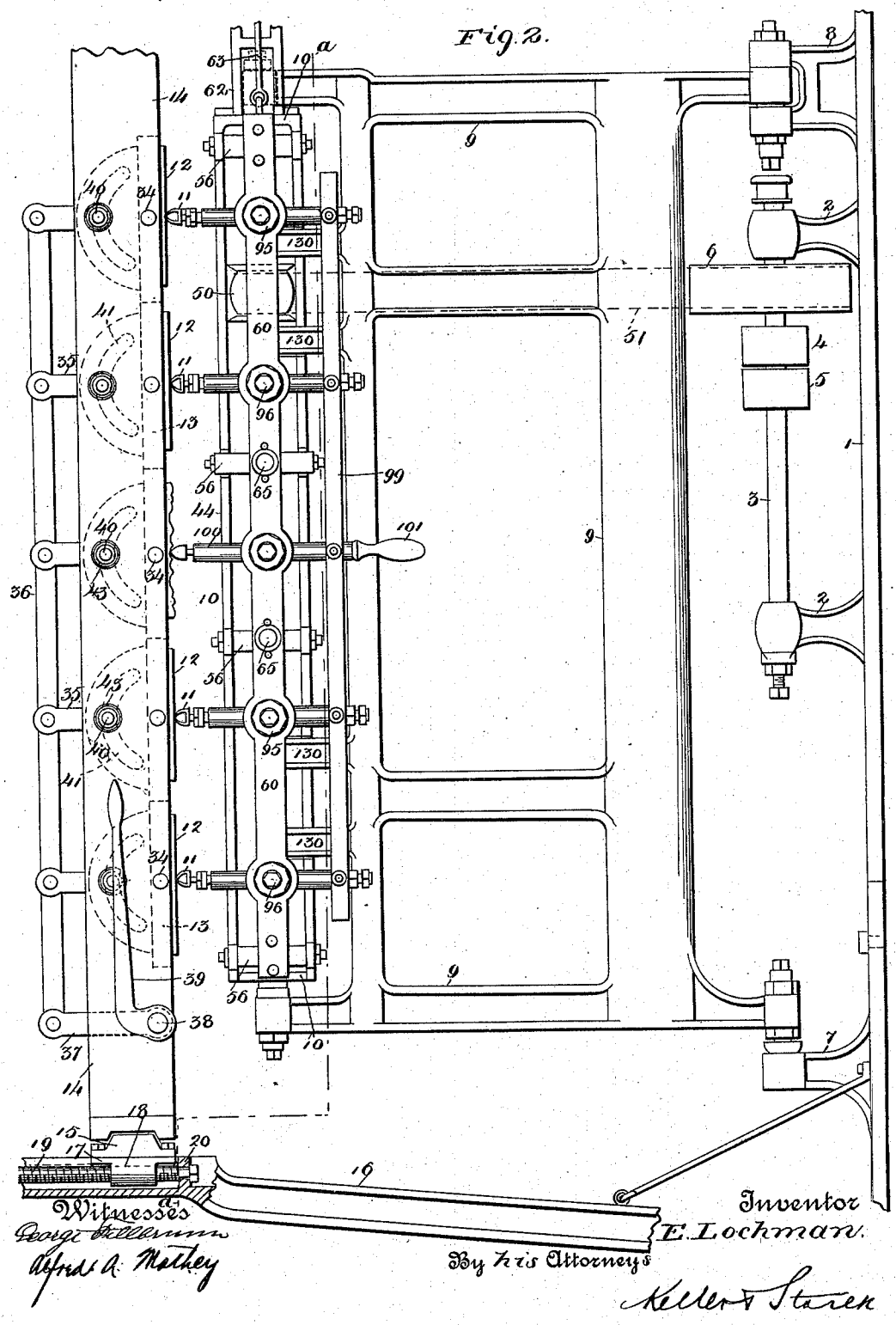
(No Model.) 3 Sheets—Sheet 2.

E. LOCHMAN.

WOOD CARVING MACHINE.

No. 571,535. Patented Nov. 17, 1896.

Fig. 2.



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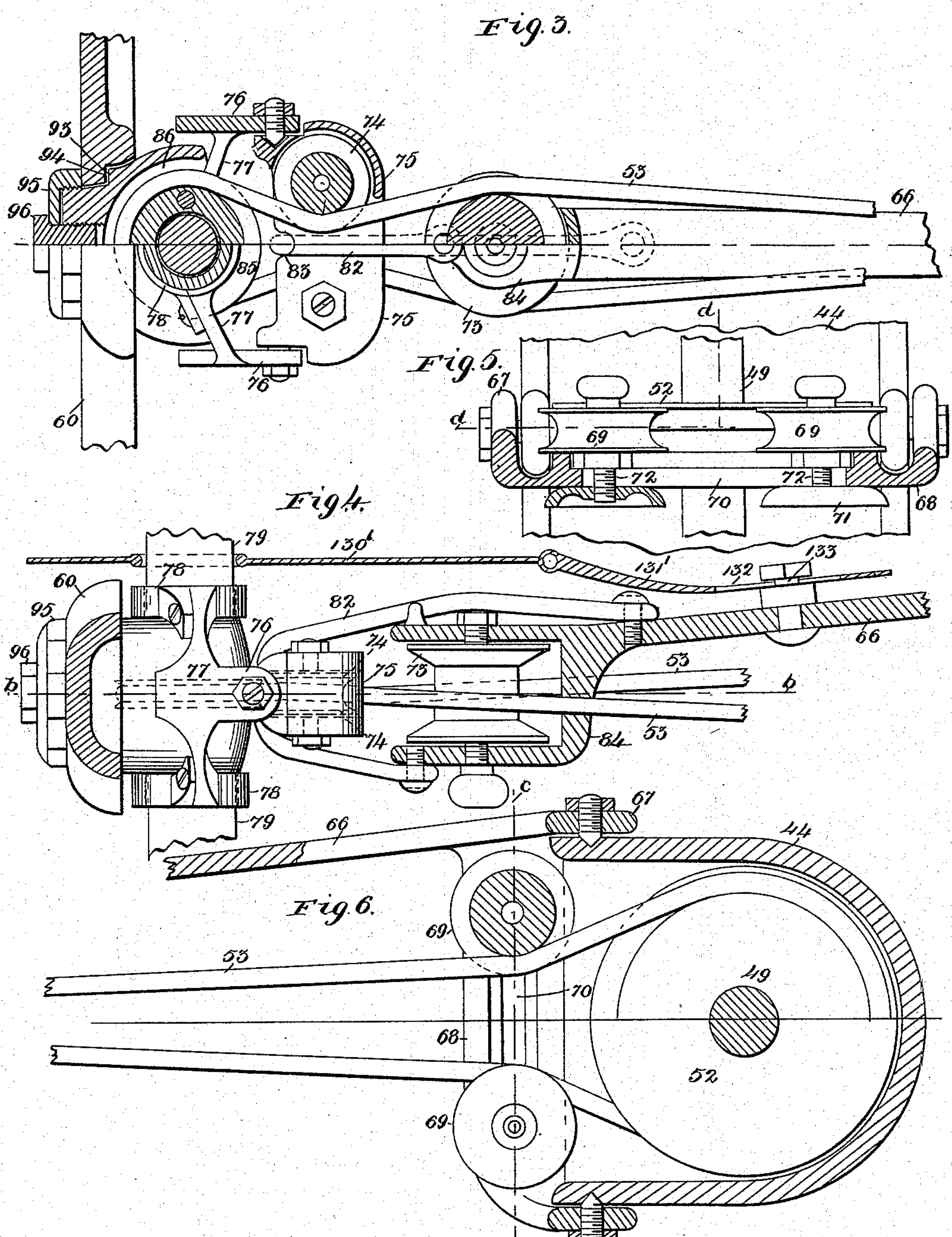
(No Model.)

6 Sheets—Sheet 3.

E. LOCHMAN.

WOOD CARVING MACHINE.

No. 571,535. Patented Nov. 17, 1896.



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(No Model.) 6 Sheets—Sheet 4.

E. LOCHMAN.

WOOD CARVING MACHINE.

No. 571,535. Patented Nov. 17, 1896.

Fig. 7.

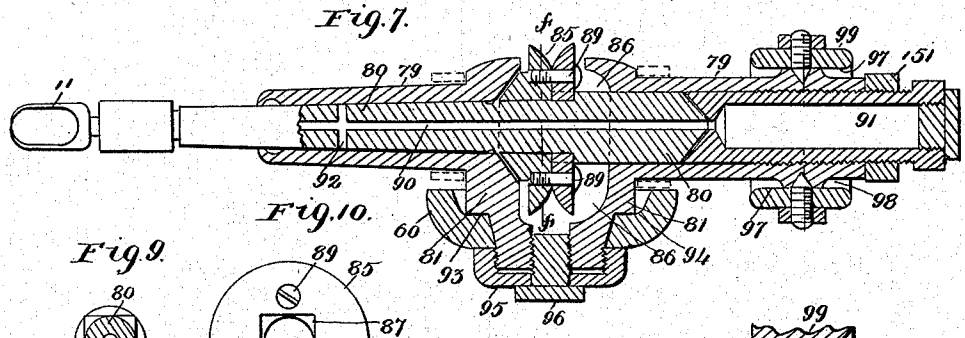


Fig. 10.

Fig. 9.

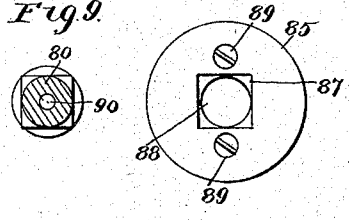


Fig. 8.

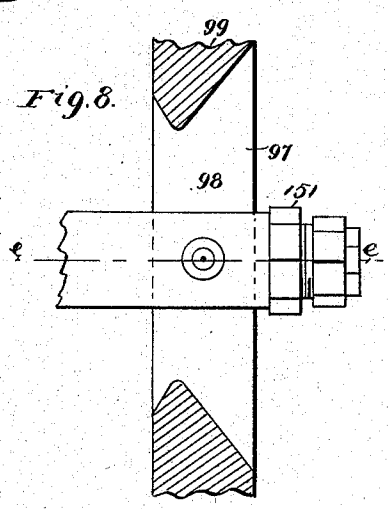


Fig. 11.

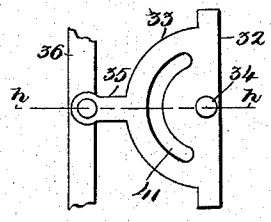


Fig. 12.

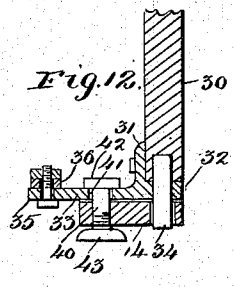
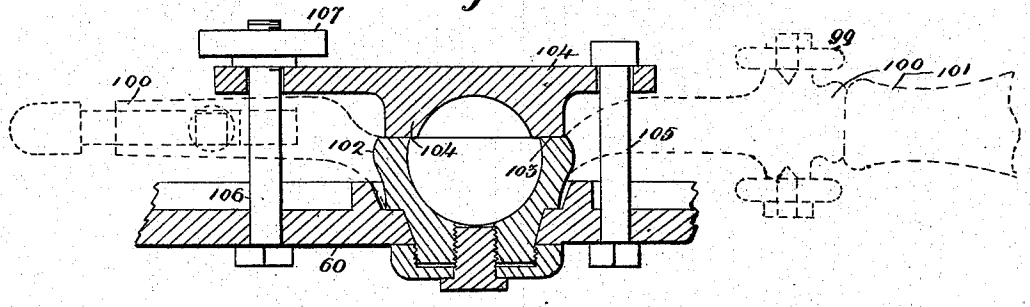


Fig. 13.



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WOOD CARVING MACHINE.

No. 571,535. Patented Nov. 17, 1896.

Fig. 14.

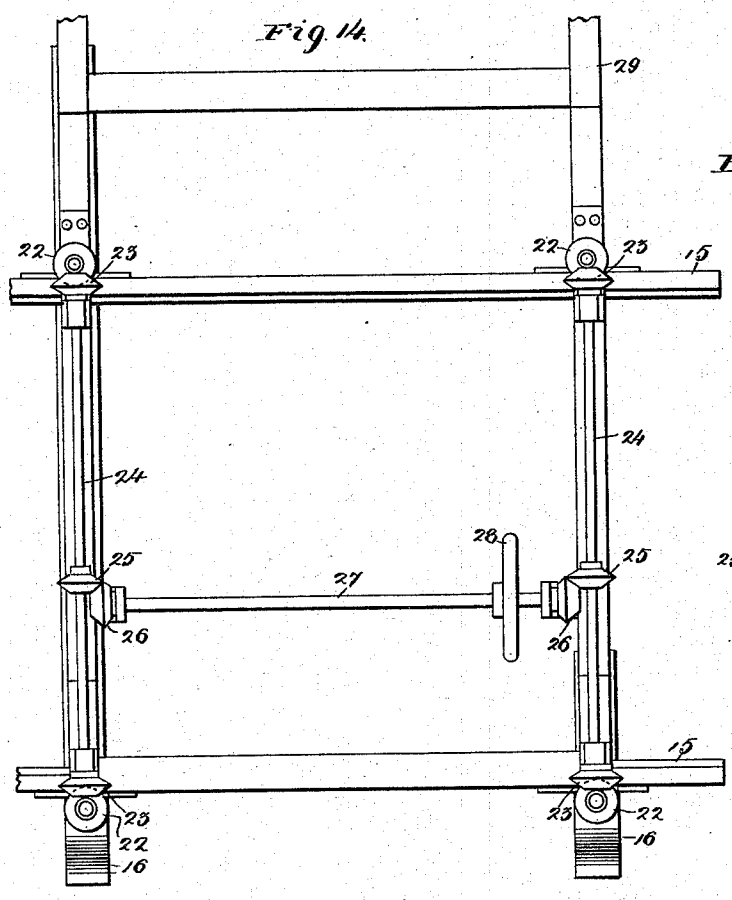


Fig. 15.

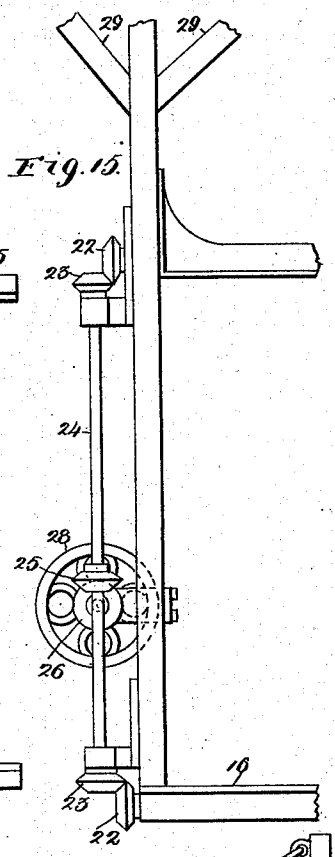


Fig. 16.

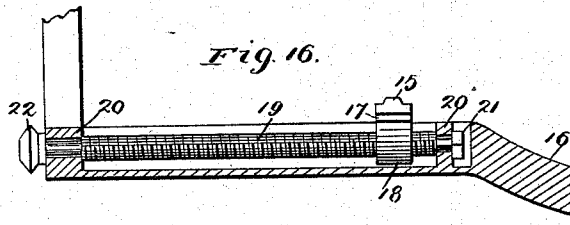
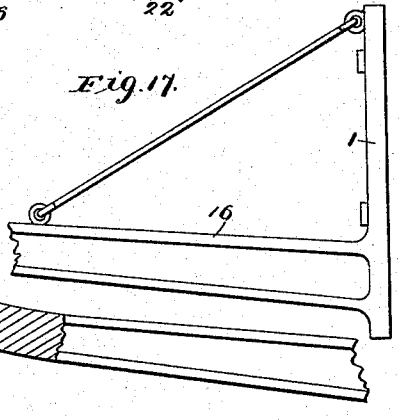


Fig. 17.



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(No Model.) 6 Sheets—Sheet 6.

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WOOD CARVING MACHINE.

No. 571,535. Patented Nov. 17, 1896.

Fig. 18.

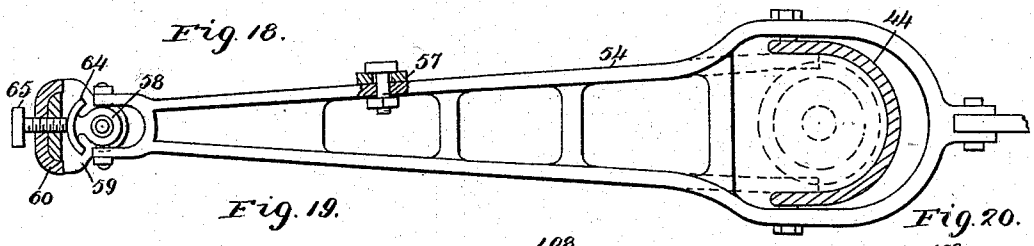


Fig. 19.

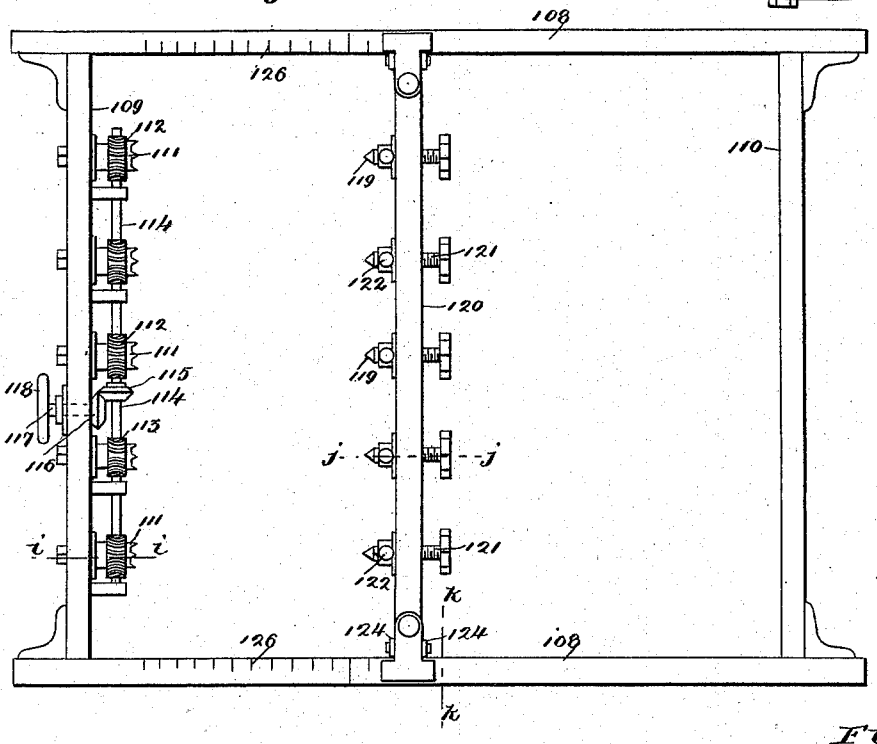


Fig. 20.

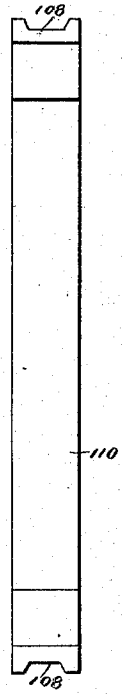


Fig. 21.

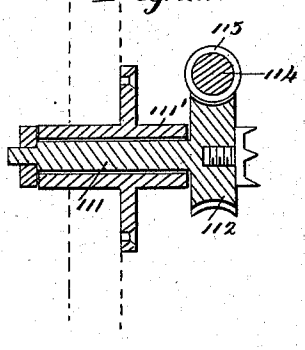


Fig. 22.

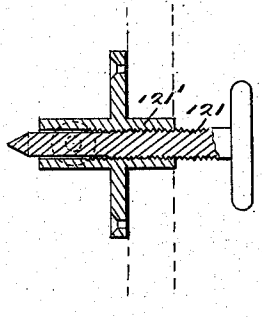
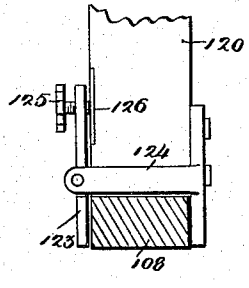


Fig. 23.



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UNITED STATES PATENT OFFICE.

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WOOD-CARVING MACHINE.

SPECIFICATION forming part of Letters Patent No. 571,535, dated November 17, 1896.

Application filed June 7, 1895. Serial No. 551,995. (No model.)

To all whom it may concern:

Be it known that I, EMIL LOCHMAN, a citizen of the United States, residing at St. Louis, State of Missouri, have invented certain new and useful Improvements in Wood-Carving Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention has relation to improvements in wood-carving machines; and it consists in the novel arrangement and combination of parts more fully set forth in the specification and pointed out in the claims.

In the drawings, Figure 1 is a vertical section taken through the swinging frame on the line *a a* of Fig. 2. Fig. 2 is a side elevation of my invention. Fig. 3 is a half side elevation and half-section taken on the line *b b* of Fig. 4. Fig. 4 is a plan view of the casing for the spindle of one of the carving-tools, the guide-yoke, and block carried by it, showing also in section one end of the pulley-supporting arm from which the tool-spindle derives its motion. Fig. 5 is a transverse section on the line *c c* of Fig. 6. Fig. 6 is a transverse vertical section on the line *d d* of Fig. 5, showing the tension-pulleys carried by the opposite end of the arm shown in Figs. 3 and 4 and the driving-pulley mounted in the hollow post about which the said arm is pivoted. Fig. 7 is a middle horizontal longitudinal section taken through the tool-spindle and its casing along a line represented by *e e* of Fig. 8. Fig. 8 is a side elevation of one end (rear end) of the spindle-casing, showing its pivotal connection with the vertical bar by which the entire series of tools is controlled. Fig. 9 is a cross-section of the spindle only on the line *f f* of Fig. 7. Fig. 10 is a plan view of the pulley secured to the spindle. Fig. 11 is a plan view of one of the tilting plates to which the stock-boards are secured. Fig. 12 is a section on line *h h* of Fig. 11, showing also in section one of the slats composing the stock-board. Fig. 13 is a transverse section taken through the casing of the tracer-tool, showing also its attachment to the front vertical beam of the swinging extension of the frame. Fig. 14 is an end view of the frame and the operating-shafts carried thereby by which the distance of the stock-frame to and from the swinging frame carrying the tools is controlled. Fig. 15 is a side view thereof. Fig. 16 is a section of the end of one of the supporting-arms projecting from the wall and which carries the adjusting-bolt by which the position of the stock-frame is controlled. Fig. 17 is a side elevation of the same arm, showing the manner of securing the inner end of the same to the main supporting-beam carried by the wall of the building. Fig. 18 is a plan of one of the series of vertically-swinging arms of which the horizontal swinging extension of the tool-carrying frame is mainly built up. Fig. 19 is a side elevation of a modified form of stock-frame. Fig. 20 is an end view thereof. Fig. 21 is a section on line *i i* of Fig. 19. Fig. 22 is a section on line *j j* of Fig. 19, and Fig. 23 is a section on line *k k* of Fig. 19.

The object of my invention is to construct a wood-carving machine wherein a maximum efficiency will be developed and wherein stock of unusual dimensions can be operated on by virtue of an improved construction of stock-frame and the stock-boards carried thereby; to construct a machine which embodies a superior form of tool carriage or casing whose tool-spindle is susceptible of a maximum velocity of speed whatever be the angle to which the spindle may be directed during the carving operation; to construct a machine wherein the slipping of the belts leading to the tool-carriage is reduced to a minimum for high speeds of such belt, a machine whose tool-casing and parts coöperating therewith offers a minimum amount of friction to the revolution of the belts operating the spindles, a machine capable of diversified adjustments under all conditions of speed, and one presenting other and further advantages to be hereinafter more specifically referred to.

In detail the machine may be described as follows:

Referring to the drawings, 1 represents a beam adapted to be secured to the wall of the building or shop, said beam having brackets or arms 2 for the support of the main driving-shaft 3, having fast and loose pulleys 4 and 5, respectively, and a drive-pulley 6. To the exterior lower bracket 7 and upper bracket 8 is pivoted a horizontally-swinging frame 9, to which in turn is pivoted, along

the vertical edge thereof, a horizontally-swinging extension 10, whose free edge carries the several carving-tools 11. The cutting ends of the tools are adapted to operate against the stock 12, carried by the stock-boards 13 on the stock-frame 14. The stock-frame as a whole is removable and adjustable to and from the swinging extension carrying the tools. The stock-frame is removably mounted between the lower and upper guide-bars 15, between which it is adapted to be introduced, said bars having suitable tongues to enter corresponding depressions in the lower and upper beams of the stock-frame. The guide-bars, on the other hand, can be adjusted to and from the tools, or the horizontally-swinging extension carrying the same, along the free ends of the outwardly-projecting supporting-arms 16, secured to or forming a part of the beam 1. By such an arrangement the stock-frame can be moved bodily to and from the tools as the nature of the work demands.

The adjustment referred to is accomplished as follows: The ends of each bar 15 carry each along their under surface a casting 17, through a lug 18 of which passes a screw-threaded adjusting-bolt 19, having bearings 20 at either end of the hollowed-out portion of each arm 16, the inner end of each bolt terminating in a retaining-nut 21 and the outer end of each in a bevel gear-wheel 22, with each of which coöperate the terminal bevel gear-wheels 23 at the ends of the vertical operating-shafts 24, mounted in the framework at the free ends of the supporting-brackets 16, the medial portions of the shafts 24 each carrying a bevel-pinion 25, which mesh with the terminal bevel-pinions 26 of a suitably-supported transverse shaft 27, controlled by a hand-wheel 28. It is obvious, therefore, that as the hand-wheel 28 is turned in one direction or the other the bars 15 will move toward or from the operating-frame carrying the tools, and thus the entire stock-frame can be adjusted at the will of the operator. It may be stated in passing that the terminal framework carried by the bars 16 is additionally supported by the roof or other overhead beams or trusses 29 of the building or factory in which the machine may be located.

The adjustment so far described is the adjustment of the stock-frame relative to its distance from the swinging extension carrying the tools, and, the entire stock-frame being moreover adapted to slide between the transverse bars 15, it is of course obvious that the stock-frame can be thus adjusted parallel to the general plane of operation of the series of tools carried by the swinging extension, thereby enabling the operator to carve along or operate upon stock of unusual length by simply sliding the stock-frame laterally along the supporting-bars 15 until every available portion of the stock 12 has been brought in contact with the cutting-tools 11.

It is now in order to describe the adjustments of which the individual stock-boards secured to the stock-frame are susceptible. Each stock-board is made up of a series of parallel slats 30, secured at either end of the stock-frame to a ledge 31, running parallel to the outer edge 32 of a tilting semicircular plate 33, pivoted at its free edge to the inner face of the lateral vertical bars of the stock-frame, the pivot 34 passing through a suitable opening in the plate and entering into a suitable depression at the end of one of the series of slats, (see Fig. 12,) said slats being of a thickness or width as to come flush with the outer edge 32 of the tilting plate. From the curved edge of each plate and in a radial line from the pivotal point thereof extends an arm 35, whose free ends are pivotally secured to an operating-rod 36, whose lower end connects pivotally with a lever 37, carried at each end of the rock-shaft 38, running parallel to the bottom of the stock-frame, said rock-shaft being operated by the handle 39, secured at one end to the projecting end of said shaft. It is obvious, of course, that as the handle 39 is tilted one way or the other the rock-shaft will be oscillated so as to tilt the entire series of stock-boards to any angle that may be desired by the operator. The stock-boards when tilted or inclined can thus accommodate stock-pieces of maximum width or size, as the stock operated upon and supported by each stock-board can be shifted along the board in the spaces formed between any adjacent pair of stock-boards so tilted. When the stock-boards are once tilted or adjusted as a series to any angle, they can be clamped and held stationary by means of the binding-bolts 40, passed through the end vertical bars of the stock-frame, the smooth portion of the bolts passing through a curved slot 41 of each tilting plate, which slot, it will be understood, conforms to the arc of the circle along which the plate oscillates. The inner end of the bolt carries a retaining-head 42, the outer screw-threaded end having passed over it an operating-disk 43. When the stock-boards are tilted to their proper position, the entire series can be clamped by screwing the disks 43 tightly against the member of the stock-frame to which the tilting plates are pivoted, thereby retaining the stock-boards permanently in their adjusted position. When the stock-boards as an entire series are tipped vertically, they present a plane surface, as seen in Figs. 1 and 2, on which the stock to be operated on can be clamped opposite each tool. The terminal post of the swinging frame 9, which constitutes the pivot for the swinging extension 10, is composed of a semicylindrical open beam 44, having at either end cups 45 for the reception of the pivotal bearings 46, carried by the swinging frame 9. Within the hollow post 44 are disposed a series of supporting-bearings 47, formed by the inner ends of the arms 130 of the frame 9, which penetrate the post through suitable cut-away portions 131 and terminal bearings 48, secured

directly to the hollow post for the support of the vertical shaft 49, from which motion to the tools is imparted, as subsequently to be explained, and which carries a drive-pulley 50, operated from the main belt-wheel 6 by a belt 51. About the shaft 49 are disposed a series of grooved pulleys 52, over each of which passes a belt 53, operating the tool-spindle, as hereinafter more fully explained.

The swinging extension 10 is built up as follows: Embracing the post 44 about the medial portion thereof is an arm 54, pivoted along the outer surface of the post. The portion embracing or spanning the post extends a sufficient distance beyond the post to allow the arm 54 a swinging motion in a vertical plane about its pivotal points 55, the short end of the arm being adapted to carry a counterweight. (Not shown.) Arms 56, similar to the arm 54, are pivoted to the post 44, except that instead of embracing the post, as does the arm 54, they are pivoted along the inner surface thereof, as seen in dotted lines in Fig. 18. The object of the arm 54 spanning the post is to make provision for a counterweight, as above specified. The medial portions of the series of arms 54 and 56 are pivotally connected by a rod 57. The free end of each arm is forked and between the members of the fork is pivoted a block 58, said block being adapted during the vertical swinging motion of the arms 54 and 56 to remain in a vertical position about its pivotal points. Pivotally embracing the opposite free ends of each block 58 are the ends of a U-shaped bracket 59, the bases of the U's being secured to the front vertical tool-supporting beam 60 of the swinging extension 10.

By the arrangement just described a universal joint results, which thus secures the beam 60 to the arms 54 and 56, said beam being adapted to oscillate in a horizontal plane about the pivotal points of the U-shaped brackets. It is in addition free to accommodate itself to the vertical swinging motion of the pivotally-connected series of arms 54 and 56, so that a universal movement can be thus imparted to the tools carried by the terminal beam 60. To further assist in balancing the series of arms 54 and 56 in their vertical swinging motion, I provide a counterbalancing-arm 61, pivoted to a bracket 62, carried by the post 44 and properly counterweighted, the free end being connected by a link 63 to the upper bracket 59 of the series. Two of the blocks 58 of the series—viz., that pivoted at the end of the arm 54 and the arm 56 below it—are provided each with a curved bearing-plate 64, against which the beam 60 can be clamped when once adjusted to any desirable position in the horizontal plane, in which it is adapted to oscillate about the pivotal points of its supporting-brackets 59. The clamping thus into position is accomplished by the binding-screw 65 passing through the beam 60 and the base of the U-shaped bracket, as best seen in Fig. 18.

Now that the variable adjustments of which the swinging extension 10 and the tools carried thereby are susceptible have been described it is in order to describe the mechanism by which the several tools are operated or set in motion. Pivoted to the post 44, in a manner similar to the arms 54 and 56, are a series of arms 66, also pivotally connected to the rod 57. The ends of the arms 66, which embrace the post 44, comprise a short arm 67 and a transverse arm 68. (See Fig. 6.) On the arm 68 are adjustably mounted the belt tension-pulleys 69 by which the belt 53, coming from the grooved pulley 52, is guided. The said pulleys are adjusted along a slotted guide 70, being clamped in any desirable position by the clamping disks or cups 71, passed over the screw-threaded ends of the bolts 72, carried by the shafts of said pulleys. (See Fig. 5.) The laps of the opposite end of the belt 53 pass over the terminal pulley 73 of the arm 66, said pulley rotating in a vertical plane, whereas the tension-pulleys 69 revolve in a horizontal plane. The belt thence passes between the vertically-rotating guide-pulleys 74, mounted in the horizontally-swinging guide-block 75, which latter is pivoted between the outer arms 76 of a yoke 77, which, by its encircling rings 78, loosely embraces the casing 79 of the operating-spindle 80 of the carving-tool, the said rings encircling the casing on either side of the enlarged lateral extension 81, by which the spindle-casing is coupled to the beam 60, as subsequently explained.

To insure a firm connection between the end of the arm 66 and the spindle-casing and the parts carried thereby and to prevent the latter from sagging, I connect the guide-block 75 and said arm 66 by a strap 82, one end of which is secured along the outer surface of the arm, the strap being then passed around a suitable depression 83 of the block 75, and the opposite end of the strap being secured to the free end of one of the members of the fork 84, between which the terminal pulley 73 is mounted. The belt 53 finally passes around the spindle-pulley 85, secured to the spindle within the open chamber 86, formed by the walls of the lateral extension 81.

The manner of securing the spindle-casing to the front beam 60 and the detailed construction of the casing are as follows: In the first place the pulley 85 is composed of two sections, one of said sections having a polygonal or square opening 87, (see Fig. 10,) passed over a correspondingly polygonal or square portion of the tool-spindle, and a second section having a smaller round opening 88, the two sections being secured together by bolts 89, (see Fig. 7,) the pulley being confined within the chamber 86 of the lateral extension. The pulley is introduced into the open end of the chamber 86 before the spindle of the tool is slipped through the central openings of the two sections. The spindle has a central longitudinal passage 90, which com-

municates with an oil-cup 91, secured at one end of the spindle-casing. The spindle is free to rotate within the casing, the oil from the oil-cup flowing freely from the cup into the central passage of the spindle and the lateral passages 92. The oil-cup is provided with a cap, which is unscrewed when it becomes necessary to refill the cup. The lateral extension 81 of the spindle-casing has a shoulder 93, adapted to rest against the annular base 94 of a suitable socket formed in the beam 60, the reduced exteriorly-screw-threaded end of the extension projecting from the outer face of the beam 60 and having a suitable cover 95 passed over it, the parts thus connected being further secured by a binding-screw 96, passed through the alining screw-threaded openings of the cover and spindle extension. (See Figs. 3 and 7.) The extension 81 of the tool-spindle casing acts as a pivot about which the entire spindle and tool carried thereby can be revolved, and thus directed in any desirable direction. We have already seen of what movements the beam 60 and the swinging extension 10 are susceptible. We now see that the tool-spindle can be tilted in a vertical plane with respect to the beam 60. Any movement of the tool-spindle and beam 60 carrying it in a vertical plane is accommodated by the yoke 77, which is free to revolve in such a plane about the spindle-casing. Any movement of the tool-spindle and beam 60 carrying it in a horizontal plane is accommodated by the guide-block 75, which is adapted to swing in such a plane. The vertical movement of the tool-carrying beam is further accommodated by the pivoted arms 66, carrying the terminal pulleys 73. The rotation of the spindle-casing about its pivot is likewise accommodated in its variable positions by the same parts. Thus it is that whatever be the direction of the tool-spindle and whatever the speed of the driving-belt 53 the spindle will revolve with like facility with a minimum amount of friction, and, further, with absolutely no danger of the belt slipping from the pulleys over which it runs and by which it is guided. In order to tilt the several tools simultaneously, the rear ends of their spindle-casings are pivotally embraced by the side walls 97 of the slots or openings 98 of a connecting-bar 99. (See Figs. 2, 7, and 8.)

The middle one of the series of tools constitutes the tracer 100, the rear end of which is provided with a handle 101, by which the entire series of tools is simultaneously controlled and tilted. (See Fig. 2.) The tracer of course does not revolve, but like the spindle-casings of the cutting-tools has a casing 102, pivotally secured to the beam 60. The medial portion of the tracer-casing has an annular lateral bearing-surface 103, coöperating with a correspondingly-shaped surface of a brake-block 104, the said block being held adjacent to the tracer-casing by the bolts 105 and 106, the latter being provided with a binding-disk 107 to firmly clamp the tracer-casing when it and the series of tools it controls have been tilted to any suitable angle.

During the operation of carving, the tools revolve with great rapidity, and they scatter splinters, shavings, &c., about them with great velocity, and to shield the eye of the operator I provide the upper tool of the series with a circular plate or similar shield 130′, loosely passed over the tool-casing, said shield being adapted to accommodate itself to all the angles of the casing and temporarily held on said casing against slipping by a pivoted arm 131′, having a terminal slit 132, through which passes a bolt 133, adjustably securing the pivotal arm to the arm 66. (See Fig. 4.)

It was stated at the outset that the stock-frame was replaceable. I have accordingly shown in Figs. 19 to 23, inclusive, a modified form of frame used in the carving of piano, table, and similar legs, the frame being adapted to be inserted between the guides 15 upon the removal of the frame first described. The modified form comprises a lower and upper horizontal beam 108 and terminal vertical beams 109 110. The front vertical beam has disposed thereon a series of rotatable stock-holding spindles 111, mounted in suitable bearings 111′, and each carrying a worm-wheel 112, with which coöperates a worm-pinion 113, disposed along a vertical shaft 114, mounted in suitable bearings and carrying a pinion 115, which coöperates with a pinion 116 at the end of a short rotatable shaft 117, controlled by a hand-wheel 118. The stock is placed between the spindles 111 and the opposite coöperating dead-spindle 119, carried by the adjustable sliding bar 120. The dead-spindles are composed of a series of a screws 121, adjustable within their bearings 121′, and after being once adjusted to hold the stock at that end the said spindles are prevented from working loose or unscrewing by the binding-screw 122, projecting from the side of the bearing within which the dead-spindle operates. After the sliding bar 120 has been adjusted to accommodate the length of the particular stock inserted between the spindles 119 and the rotating spindles 111 its lower and upper ends are firmly clamped to the guide-bars 15 by the clamping-plate 123, pivoted between the ends of the arms 124 of a suitable casting embracing the ends of the bar. The pivoted plate is provided with an operating-screw 125, having its inner end pressing against a bearing-plate 126. Upon turning the screw in the proper direction the clamping-plate will be tilted so as to bring its short arm firmly against the side of the beam 108, and thus securely hold the bar 120 in place. The lower and upper members 108 are provided with division-marks 126 for properly adjusting the movable bar 120. By means of the hand-wheel 118 the entire series of stock-pieces can be rotated between their spindles, and thus the entire series can be carved or operated on at all points.

As seen in Fig. 7, the oil-cup is screwed

into the spindle-casing, its inner conical depression bearing against a similar conical projection of the tool-spindle, by which arrangement more or less pressure can be brought against the rotating spindle, causing the rotating pulley 85, carried by the spindle, to bear more or less firmly against the inner walls of the chamber 86 and thereby regulating or varying the velocity of rotation of the spindle. A band 151 passes over the screw-threaded exterior of the cup, which is brought to bear against the free edge of the casing in any position of the oil-cup. The inner end of the oil-cup acts, therefore, as a brake for the rotating spindle.

Having described my invention, what I claim is—

1. In a carving-machine, a suitable horizontally-swinging frame, a swinging extension forming a part of the same, a series of tools carried by the free end of the said extension, an upright stock-frame comprising a series of adjacently-pivoted stock-boards adapted to be tilted about their pivotal points to accommodate variable dimensions of stock, means for adjusting said frame to and from the extension, said frame being adapted to slide in a plane parallel to the working plane of the tools carried by the extension, substantially as set forth.

2. In a carving-machine, a suitable upright stock-frame comprising a series of adjacently-pivoted stock-boards adapted to be tilted about their pivotal points to accommodate variable dimensions of stock, terminal tilting plates for said boards, an arm projecting from each plate, a general operating-rod connecting the several arms, a rock-shaft, an arm connecting said shaft with the operating-rod, a tilting lever for said rock-shaft, means for retaining the tilting plates in any desired position, a swinging frame, and a series of tools pivoted to the free end thereof for coöperating with the stock-boards in any of their tilted positions, substantially as set forth.

3. In a carving-machine, a horizontally-swinging frame, a swinging extension forming a part of the same, a terminal beam carried by the said extension and adapted to be operated in a vertical plane, a vertical stock-frame with which said extension is adapted to coöperate, suitable supporting arms or brackets, guide-bars mounted transverse to the free ends of the supporting-arms, and adapted to hold between them said stock-frame, adjusting-bolts mounted in the supporting-arms and passing through suitable lugs secured to the guide-bars, and means for operating said bolts and thus adjusting the position of the frame and guide-bars along the supporting arms or brackets, substantially as set forth.

4. In a carving-machine, a horizontally-swinging frame, a swinging extension pivoted to the same, a series of arms pivoted at their inner ends and forming a part of said extension said arms adapted to swing jointly in a vertical plane about their pivotal points, a tool-carrying beam disposed along the free ends of said arms, pivoted blocks connecting said beam with the arms and adapted to be held in a normally vertical position during the operation of the machine, said beam being adapted to oscillate in a horizontal plane, a suitable shaft and drive-pulleys carried by the swinging frame, tools mounted on the front beam of the extension, and drive-belts connecting said tools with the pulleys on the drive-shaft, substantially as set forth.

5. In a carving-machine, a swinging frame adapted to be secured to the wall of the building, a swinging extension forming a part of the same, a hollow post forming the pivotal point for said extension, a series of vertically-swinging arms pivoted to the post, one of said arms embracing the post and adapted to carry a counterweight at the outer end of its embracing portion, an upper arm pivoted to a bracket leading from the post and carrying a counterweight at the short end thereof, a link connecting said upper arm to the adjacent arm of the series of pivoted arms, a pivoted block carried at the free ends of the vertically-swinging arms, a tool-carrying beam having a series of vertically-disposed U-shaped brackets whose arms are pivoted to the free ends of the tilting blocks thereby permitting the tool-carrying beam to oscillate in a horizontal plane, a second series of arms pivoted to the post and having disposed at either end suitable pulleys, a series of tool-casings disposed along the tool-carrying beam, a pulley carried by each spindle, a pulley-supporting shaft located in the hollow post and supported by the swinging frame, belts connecting the several pulleys, and a general connecting-rod pivotally secured to the entire series of arms whereby the entire series of arms and the tool-carrying beam can swing in a vertical plane, substantially as set forth.

6. In a carving-machine, a suitable swinging extension, a post forming the pivotal point of the same, an arm having a forked end embracing the post, a suitable guideway in one of the members of the fork, belt tension-pulleys adjustably mounted in said guideway, and a terminal pulley carried by the free end of the arm, substantially as set forth.

7. In a carving-machine, a suitable tool-casing, means for pivotally securing said casing to the frame of the machine for allowing rotation of said casing in a vertical plane, a yoke embracing the casing and adapted to oscillate in a vertical plane but at right angles to the plane of rotation of the casing, and a pivoted guide-block carried by the yoke and adapted to oscillate in a horizontal plane, substantially as set forth.

8. In a carving-machine, a suitable tool-casing, a lateral enlarged extension forming a part of same, means for pivoting said extension to the frame, a chamber within said ex-

tension, a tool-spindle passing through the casing and having a pulley secured thereto within the chamber, a yoke having encircling bands embracing the casing on either side of the extension, said yoke adapted to swing in a plane at right angles to the plane of rotation of the casing, and a guide-block pivoted between the arms of the yoke and adapted to oscillate in a horizontal plane at right angles to the plane of oscillation of the yoke, said guide-block carrying guide-pulleys, substantially as set forth.

9. In a carving-machine, a suitable tool-carrying beam, vertically-swinging supporting-arms for said beam, intermediate connections between said arms and beam for permitting the swinging of the latter in a vertical plane and allow simultaneous movement of the same in a horizontal plane, a suitable tool-casing pivoted to said beam, a tool-spindle passing through the casing, means for rotating said spindle, a yoke embracing the casing and adapted to swing in a plane at right angles to the plane of rotation of the casing, and a guide-block pivoted to the yoke and adapted to swing in a horizontal plane, substantially as set forth.

10. In a carving-machine, a tool-casing adapted to rotate in the plane of its longitudinal axis, a yoke pivoted to the casing and adapted to oscillate in a plane at right angles to the first plane, and a guide-block pivoted to the yoke and adapted to oscillate in a plane at right angles to both the aforesaid planes, substantially as set forth.

11. In a carving-machine, a swinging extension, a series of vertically-swinging arms forming a part of the same, a vertically-oscillating block pivotally carried by the free ends of said arms a tool-carrying beam pivoted to the free ends of said blocks and adapted to oscillate in a horizontal plane, a bearing-plate forming a part of said blocks, and a binding-screw passing through the beam and adapted to be screwed against the bearing-plate to retain the beam in any adjusted position, substantially as set forth.

12. In a carving-machine, a suitable beam adapted to be secured to the wall of a building, supporting arms or brackets projecting from the same, guide-bars mounted transverse to the brackets and adapted to hold between them a suitable sliding stock-frame, adjusting-bolts mounted in the supporting-arms and passing through suitable lugs secured to the guide-bars, gear-wheels carried by the outer ends of the adjusting-bolts, operating-shafts having gear-wheels meshing with the aforesaid gear-wheels and means for turning the operating-shafts whereby the guide-bars and stock-frame confined between them are adjusted along the supporting-arms, substantially as set forth.

13. In a carving-machine, a tool-carrying beam, a series of tool-casings pivoted to the same, a rod connecting said series, a tracer-casing likewise pivoted to the beam and connected to the tool series, a brake-block cooperating with the tracer-casing, and a binding-bolt for binding the tracer and tool series connected thereto when said series are tipped to any desirable angle, substantially as set forth.

14. In a carving-machine, a suitable spindle-casing, a spindle mounted within the same, a pulley on said spindle adapted to bear against the inner walls of said casing, an oil-passage in said spindle, and an oil-cup secured to the casing and means for adjusting it to bear against one end of the spindle and vary the pressure of the pulley carried by it against the inner wall of the casing, substantially as set forth.

15. In a carving-machine, a suitable tool-casing, a spindle for the same, a pulley on said spindle, a suitable drive-belt for said pulley, a suitable shield carried by the casing, and suitable connections between the shield and the frame of the machine for permitting the shield to accommodate itself to the variable movements of the casing and spindle carried by it, substantially as set forth.

16. In a carving-machine, a swinging extension having a series of vertically-sweeping arms, a block pivoted to the free end of each arm and adapted to retain a vertical position during the sweep of said arms, a terminal tool-supporting beam, a series of U-shaped brackets secured thereto, each bracket having its arms embracing the pivoted block carried by the arms at opposite ends of the block, thus retaining the tool-supporting beam in a vertical position during the sweep of the arms, substantially as set forth.

17. In a carving-machine, a suitable swinging frame, a swinging extension pivoted to the same, a hollow post carried by the end of the swinging frame and forming the pivotal point for the swinging extension, a series of arms carried by the swinging frame and entering the post through suitable openings in its walls approximately to the center or axis thereof, a drive-shaft carried by said arms within the post, a series of pulleys disposed about said shaft, a series of tool-spindles carried by the free end of the swinging extension, pulleys carried by the tools, and a series of belts connecting the pulleys on the drive-shaft with the pulleys on the tool-spindles, substantially as set forth.

18. In a carving-machine, a swinging extension having a series of arms sweeping in a vertical plane, a series of pulleys carried by each arm, a series of tool-spindles carried by the free end of the swinging extension, a pulley for each spindle, a pulley guide-block connected to the tool-spindle, and a strap securing or connecting said guide-block with the free end of each of the vertically-sweeping arms, substantially as set forth.

19. In a wood-carving machine, suitable supporting arms or brackets, guide-bars

mounted transverse to the free ends of the supporting-arms, and adapted to hold between them a suitable sliding stock-frame, adjusting-bolts mounted in the supporting-arms and passing through suitable lugs secured to the guide-bars, and means for operating said bolts and thus adjusting the position of the frame and guide-bars along the supporting arms or brackets, substantially as set forth.

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

EMIL LOCHMAN.

Witnesses:

GEORGE TILLBRUNN,

ALFRED A. MATHEY.