(No Model.) 4 Sheets—Sheet 1.

J. OLSON.

PLANING MACHINE.

No. 539,999. Patented May 28, 1895.

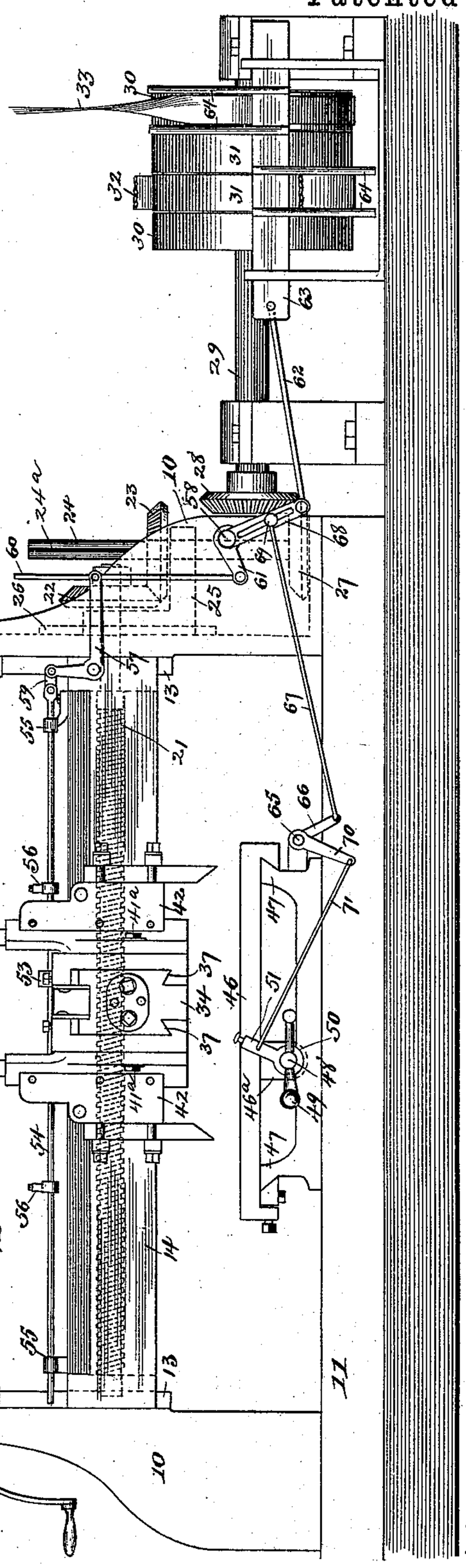

Fig. 1.

Witnesses,
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(No Model.)

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PLANING MACHINE.

4 Sheets—Sheet 2.

No. 539,999. Patented May 28, 1895.

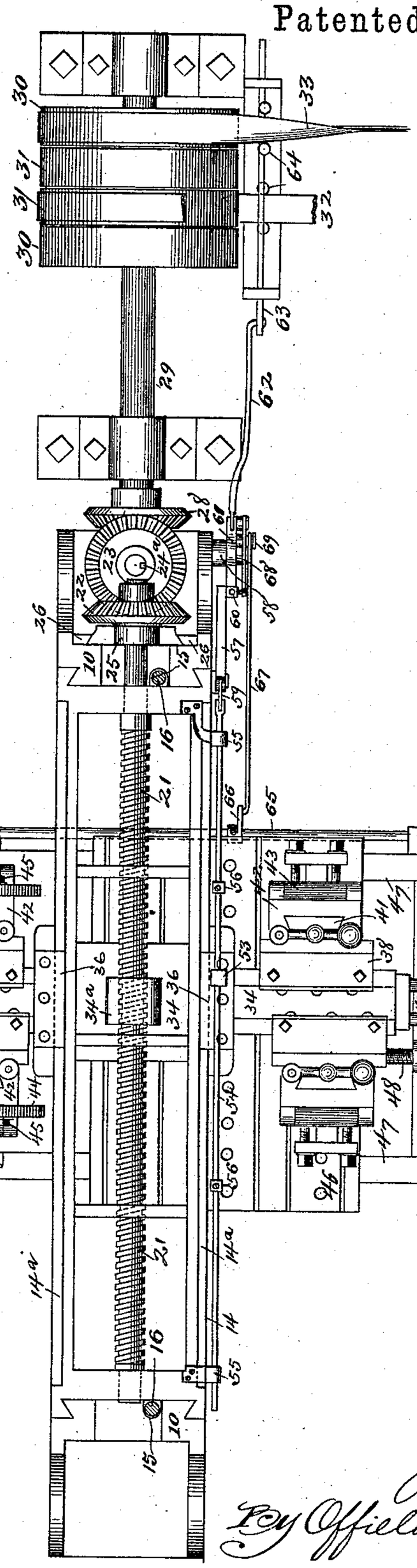

Fig. 2.

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(No Model.) 4 Sheets—Sheet 3.

J. OLSON.

PLANING MACHINE.

No. 539,999. Patented May 28, 1895.

Fig. 3.

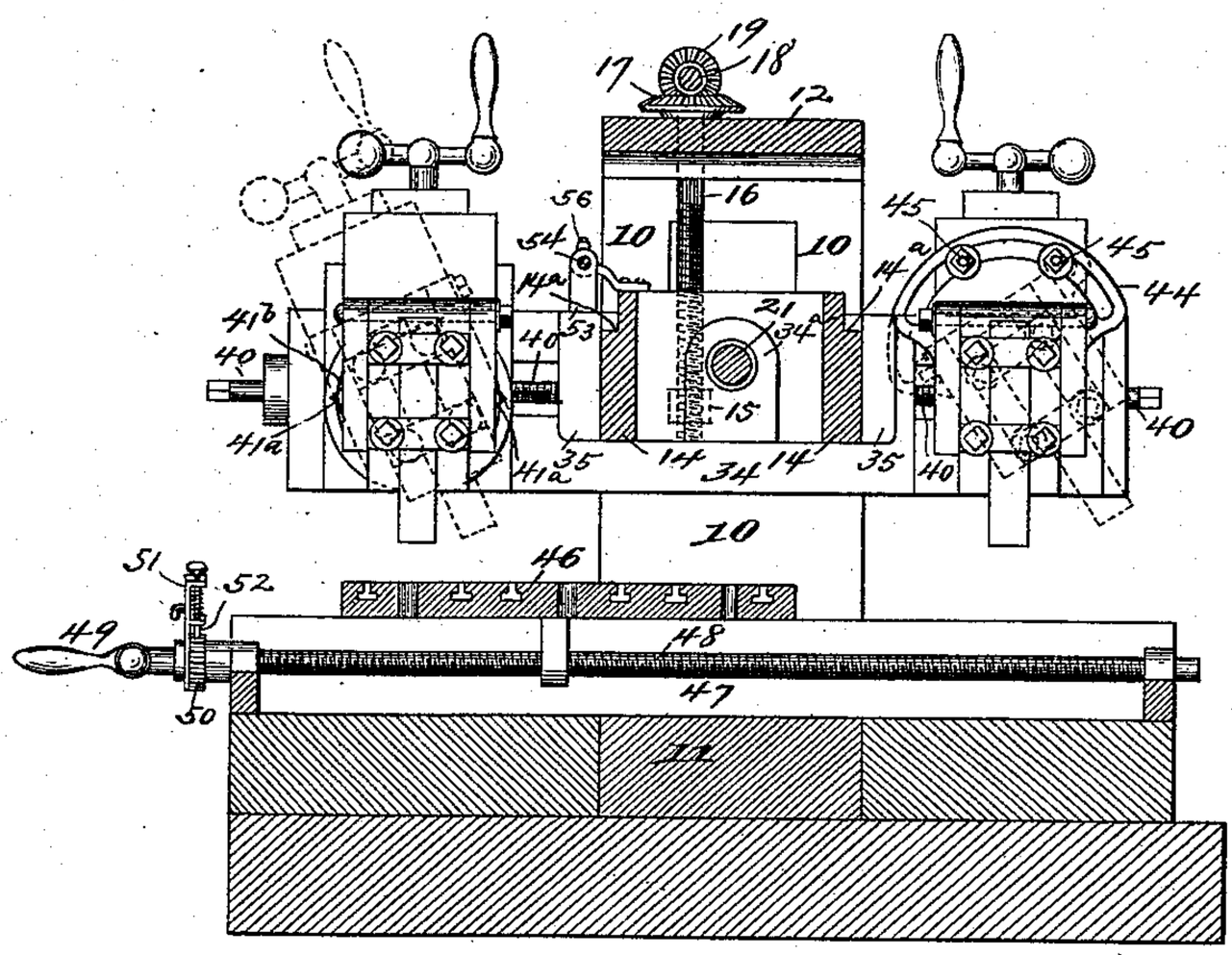
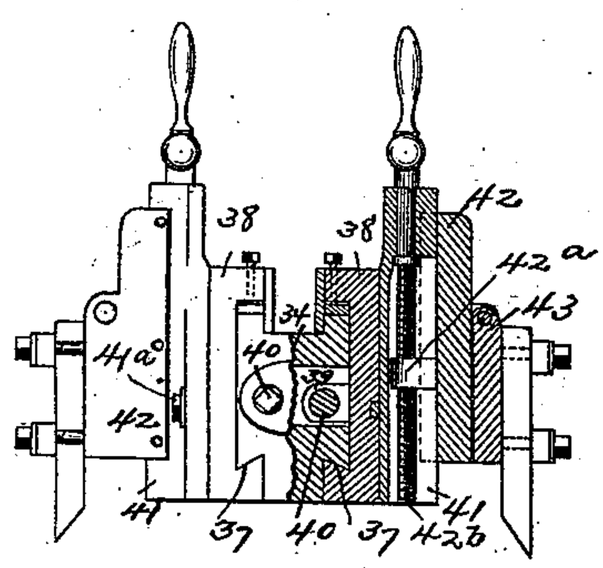


Fig. 6.



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(No Model.) 4 Sheets—Sheet 4.

J. OLSON.

PLANING MACHINE.

No. 539,999. Patented May 28, 1895.

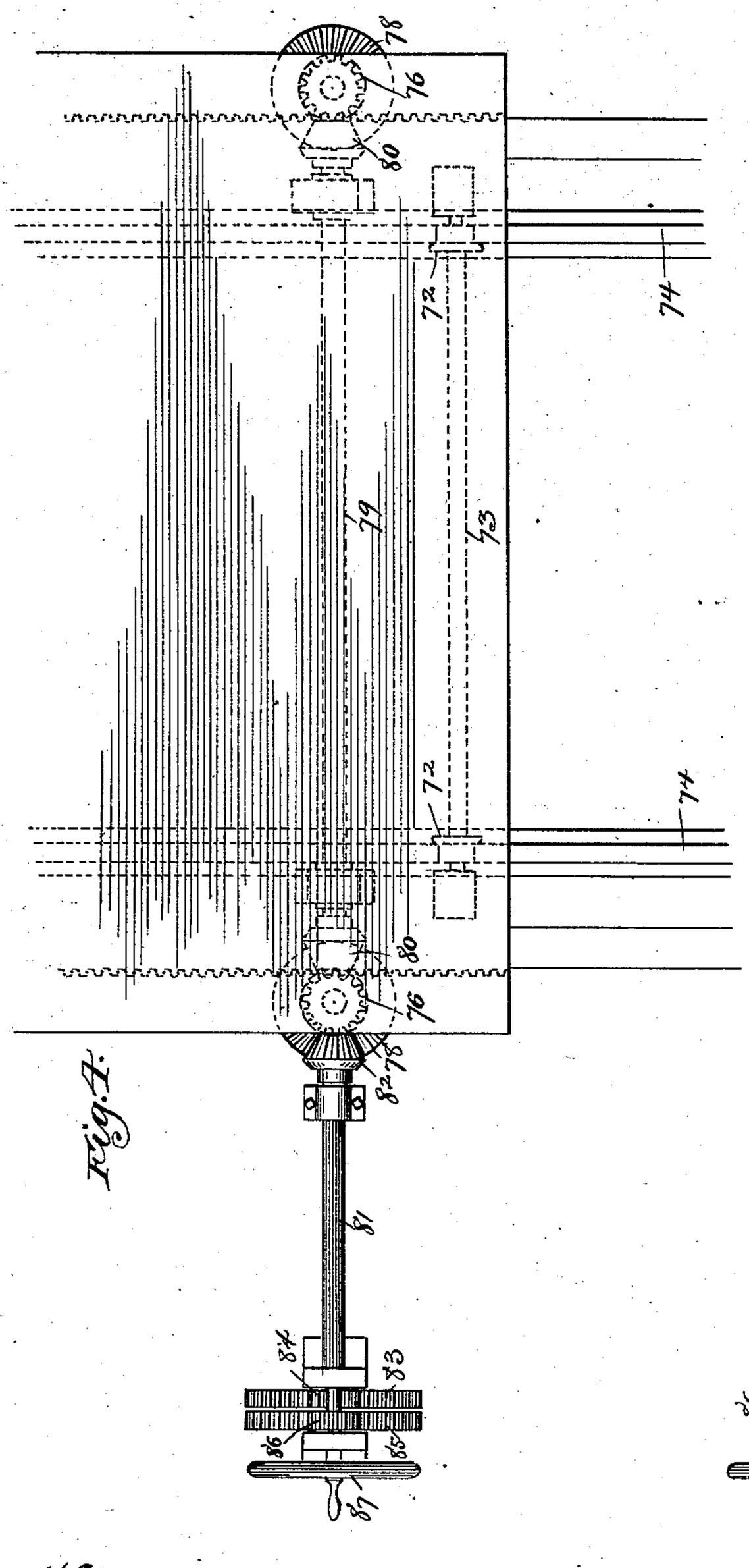

Fig. 4.

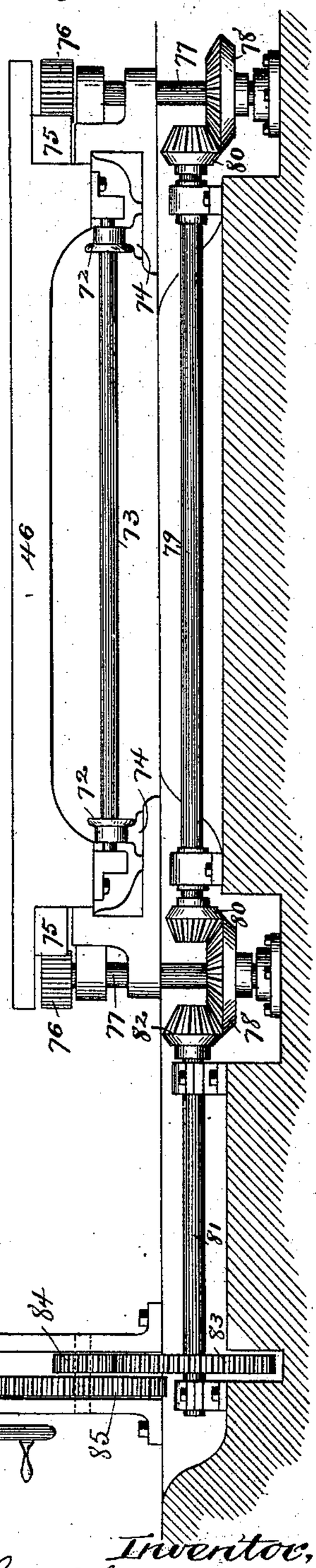

Fig. 5.

Witnesses,
F. D. Mann,
F. C. Goodwin.

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UNITED STATES PATENT OFFICE.

JOHN OLSON, OF CHICAGO, ILLINOIS.

PLANING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 539,999, dated May 28, 1895.

Application filed February 10, 1894. Serial No. 499,772. (No model.)

To all whom it may concern:

Be it known that I, JOHN OLSON, of Chicago, Illinois, have invented certain new and useful Improvements in Planing-Machines, of which the following is a specification.

This invention relates to a planing machine for surfacing stone, iron or other materials and is characterized by a transversely moving bed on which the material is clamped, and by a longitudinally traversing carriage which in operation carries the tool back and forth longitudinally over the surface to be planed. This carriage is mounted upon a supplemental bed having a vertical adjustment and there is employed in the construction represented in the drawings a plurality of tool holders all of which are mounted upon and reciprocate with the carriage but are capable of a movement at right angles to the travel of the carriage, while the tool chucks are capable of an adjustment independent of such lateral movement of the tool holders. The distinguishing features are the vertically adjustable bed, the reciprocating carriage, the laterally adjustable holders and the separately adjustable tool chucks. There is also provided suitable mechanisms for effecting the reciprocation of the carriage, the lateral movement of the bed, the vertical adjustment of the supplemental frame, and the lateral and other adjustments of the tool chucks and tools, together with a stop and reversing mechanism for effecting a change in the direction of movement of the carriage and for feeding the material by the lateral adjustment of the sliding bed. These last named mechanisms operate automatically, while the adjustments spoken of are manual.

In the accompanying drawings, Figure 1 is a side elevation. Fig. 2 is a plan. Fig. 3 is a vertical transverse section. Figs. 4 and 5 show a modified construction of the bed in plan and elevation, respectively; and Fig. 6 is a detail view, partly in section, of the tool-holding mechanisms.

In the drawings, 10 represents the vertical standards, which constitute the end portions of a supporting frame and which are connected at their lower ends to a suitable foundation 11, while their upper ends are connected by the top plate 12. On the inner faces of the end standard are provided the guides 13, and slidably mounted on these guides is the supplemental frame 14, which is provided at each end with a nut 15. Threaded shafts 15 engage these nuts, said shafts being placed in a vertical position and carrying on their upper ends, above the top plate 12, the bevel gears 17. An adjusting shaft 18, journaled in bearings on the top plate, has bevel pinions 19 enmeshed with the bevel gears 17 and a crank handle which affords means for rotating the adjusting shaft and through the bevel pinions and bevel gears above mentioned effects the vertical adjustment of the supplemental frame.

21 represents a screw shaft extending longitudinally of the supplemental frame, its ends having bearings in the end pieces of the frame, and the forward end of said shaft being extended through an opening in the front standard and provided with a bevel gear 22 enmeshed with a gear 23. The bevel gear 23 is carried upon a vertical shaft 24, the latter being rotatable and having a longitudinal slot or key seat 24[a] in order to permit the gear 23 to slide up and down thereon. In order to secure the gears 22 and 23 in position to enmesh at all positions of the sliding or supplemental frame, I employ an angle bracket 25, which is fitted to slide in suitable ways 26 on the upper face of the front standard, and which has a bearing at the extremity of each of its members, one of the bearings receiving the extended end of the threaded shaft 21, the other bearing receiving the vertical shaft 24, and the bevel gear 23 being splined on the shaft 24 above the horizontal member of the angle bracket. The threaded shaft 21 engages and reciprocates the carriage which carries the tool in a manner presently to be described. The vertical shaft 24 has its lower end stepped or otherwise suitably mounted for rotation, and carries a bevel gear 27, which is enmeshed with gear 28 on the driving shaft 29. The latter is provided with the tight pulleys 30 and the loose pulleys 31, and over these pulleys a straight belt 32 and a cross belt 33 are carried, thus providing for driving the carriage operating shaft in either direction and effecting the consequent movement in either direction of the carriage. The carriage consists of a long block 34, which is arranged beneath the sup-

plemental frame and transversely thereto, the central portion of said block resting in the operative position against the lower side of said frame and the block being provided with the vertical cheek pieces 35 on the upper edges of which are removably secured the clamping plates 36, the latter being adapted to engage ways 14ª of the supplemental frame 14. The carriage has a nut 34ª through which shaft 21 is threaded. The central block or body of the carriage projects at substantially equal distances on each side of the supplemental frame and is constructed to provide suitable ways 37 on which slide the head blocks 38. Said head blocks have nuts 39 with which are engaged threaded adjusting shafts 40, by means of which the blocks may be moved along the ways at right angles to the direction of travel of the carriage. Each of the head blocks carries a guide 41, and upon these guides are slidably mounted the blocks 42 on which are pivoted the tool holders 43. The blocks 42 have nuts 42ª and threaded shafts 42ᵇ working in the guides 41 and engaging said nuts afford means for adjusting said blocks carrying the tool holders vertically.

The guides 41 may be formed integrally with the laterally sliding blocks 38, but in the construction shown they are held thereto by bolts 41ª passing through curved slots 41ᵇ in the guide, so as to provide for a set adjustment of said guides.

As shown the tool holders on each side of the machine are capable of being set obliquely; and this may be accomplished by pivoting the tool holders upon a slotted plate 44, the latter being clamped to the blocks 42 by bolts 45 projecting through the said slots and provided with tightening nuts. In this case the tool holder may have its position angularly changed without changing the position of the guide. This position is shown at the right in Fig. 3, while a secondary position of the guide, block, tool and tool holder is shown by dotted lines at the left of said Fig. 3. The slots will be of such length as to enable the tool to be adjusted through an arc of ninety degrees outwardly from a horizontal plane and also inwardly sufficiently to cut on a bevel surface. This range of movement adapts the cutters so constructed to varying positions in which it may be convenient to arrange the work, and adapts the machine as a whole to operate with some of its cutters upon material arranged with the surface to be planed in a horizontal position, while others of the cutters may be worked upon the surface of material arranged in a vertical position at the side of the machine.

In Figs. 1, 2 and 3 I have shown a bed 46 which is arranged to slide on the stationary ways 47. The bed 46 has a nut 46ª and a threaded shaft 48 engages said nut and is provided at one end with an operating handle or crank 49 and also with a ratchet 50 and a bracket standard 51 carrying a spring controlled pawl 52. This bracket standard is connected with a belt shifting mechanism which is operated automatically by the traveling carriage and which will now be described. The carriage has a perforated stud 53 through which a sliding rod 54 passes, said sliding rod having a lengthwise reciprocation through suitable keepers 55 mounted on the supplemental frame. Said sliding rod carries also the adjustable limit blocks 56 between which the stud on the carriage moves, and at its forward end this slide rod is connected with one member of a pivoted bell crank lever 57 by a link 59, the other member of the bell crank being adjustably connected by a rod 60 with a second bell crank 61 mounted on a stud 58 on the front standard of the frame. The forward member of this bell crank is connected by a rod 62 with a shifting bar 63, the latter having the shipping fingers 64 which straddle the belt. Obviously, when the carriage in its travel reaches one of the limit lugs on the shifting rod, the latter will be reciprocated endwise and, through the described connection, shift the belts from one set of pulleys to the other, thereby reversing the direction of movement of the train of gears by which the carriage is reciprocated. I also prefer to effect the lateral movement of the bed and the consequent feed of the material carried thereby automatically, and in Figs. 1 and 2 of the drawings the mechanism for effecting this automatic feed is shown. Said mechanism comprises a rock shaft 65, which is journaled in bearings on the bed guides and which is connected by means of the arm 66 and link 67 with the bell crank 61. As the adjustment vertically of the supplemental frame on which the carriage is mounted will effect this shifting mechanism, I prefer to connect the feeding mechanism of the bed adjustably with the bell crank, and to this end there is secured on said bell crank a slotted arm 68 and the forward end of the rod 67 has a pin traversing the slot of said arm and is adapted to be locked therein by the set nut 69. The rock shaft 65 has a second arm 70, which is connected with the bracket standard 51 by the rod 71.

In Figs. 4 and 5 I have shown a modified construction of the bed, which modification consists in mounting the bed upon travelers 72, which are shown joined in pairs by the axles 73, the latter being adapted to turn in bearings on the bed. The travelers roll upon rails 74, and the bed is provided with the racks 75 in which are enmeshed the gears 76 on the shafts 77, the latter having bevel gears 78 which are geared to rotate in unison through the shaft 79 and the bevel pinions 80. Rotary motion is transmitted to the gears 78 by means of the shaft 81 and bevel pinion 82, shaft 81 being driven by the series of spur gears 83, 84, 85 and 86, the latter being mounted upon a short shaft having the crank wheel 87. In this construction the automatic shifting mechanism is not employed.

The operation of the machine in the pre-

ferred construction, which is shown in Figs. 1 to 3 inclusive, will now be described. The material being operated upon is suitably clamped upon the laterally movable bed, the carriage is run back and the tools adjusted in position to engage the work. The belts being driven, the carriage is advanced, the several tools operating upon the surfaces with which they are in contact. When the carriage in its travel reaches the forward limit lug of the shifting mechanism, the belts are shifted and the return movement of the carriage begins. In the forward travel the cutters or their tools on the front side of the carriage are in operation while those on the rear of the carriage simply ride over the work, their hinged connection with the carriage permitting them to thus operate. On the backward movement of the carriage the cutters on the rear side of the carriage will cut while those on the front side are out of action. At the end of the movement of the carriage in either direction and at the time of the reversal of its movement the bed is automatically moved laterally, thus feeding the material so as to bring a new portion of the surface thereof under the action of the tools for the next line of cut.

If the construction shown in Figs. 4 and 5 be employed, the feeding will be done manually at the end of each movement of the carriage.

It will be observed that the arrangement of the carriage and the cutter-heads is such that the said heads are capable of independent vertical adjustment with respect to the bed and the work thereon, and are also adjustable simultaneously and vertically with respect to the said bed and work, by means of the adjustment of the frame 14 upon which the carriage travels. It will further be seen that the cutter-heads are also capable of angular adjustment. This construction of the carriage with double cutter-heads renders the said cutter-heads capable of two vertical adjustments, which greatly increases the capacity of the machine, as the cutting is effected while the carriage is traveling in either direction. Moreover, by means of the independent vertical adjustment, the work may be cut in two different horizontal planes, or in planes at right-angles, or beveled and surfaced at one operation.

I claim—

In a planing machine, the combination with the main frame thereof, of a vertically adjustable frame located between ways in said main frame, a tool carriage adapted to slide upon said frame, and having its ends projecting at opposite sides of the frame, and vertically and pivotally adjustable tool-holders mounted upon the projecting ends, whereby the work may be cut in various angular positions, substantially as specified.

JOHN OLSON.

Witnesses:
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FREDERICK C. GOODWIN.