

No. 731,686.

PATENTED JUNE 23, 1903.

F. G. JOHNSON.
METAL WORKING MACHINE.

APPLICATION FILED JAN. 9, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.

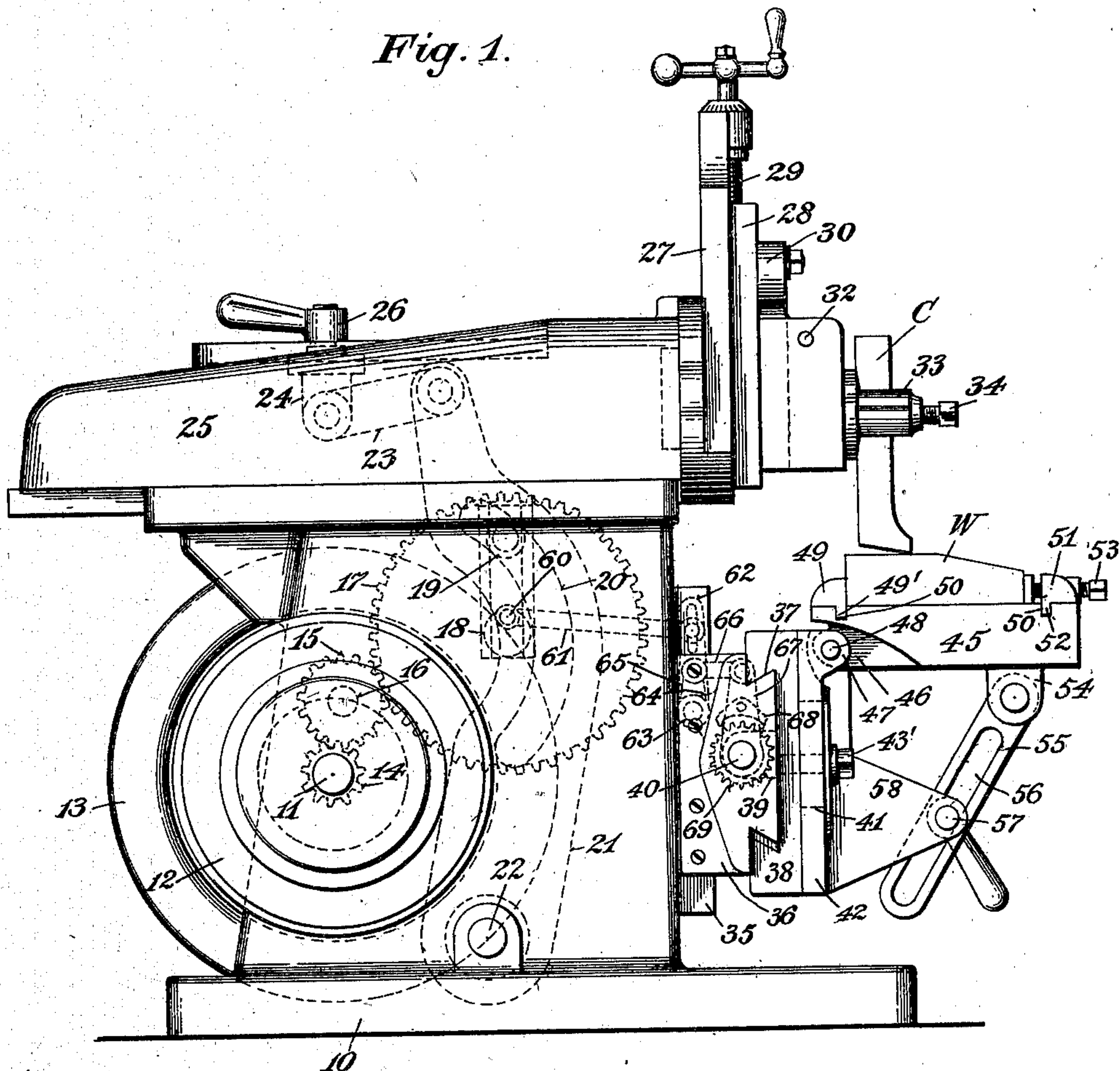
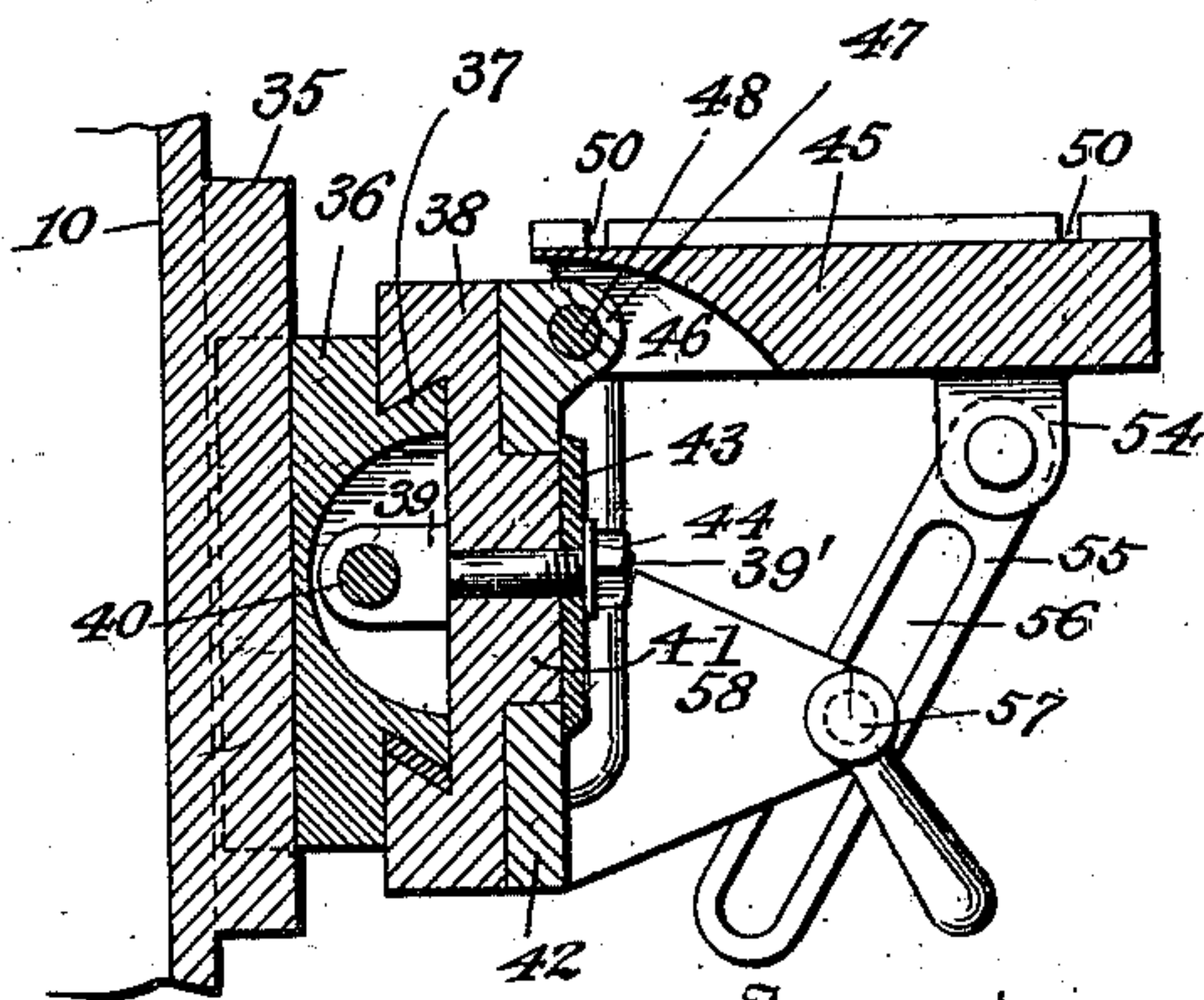


Fig. 4.



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2 SHEETS—SHEET 2.

Fig. 3.

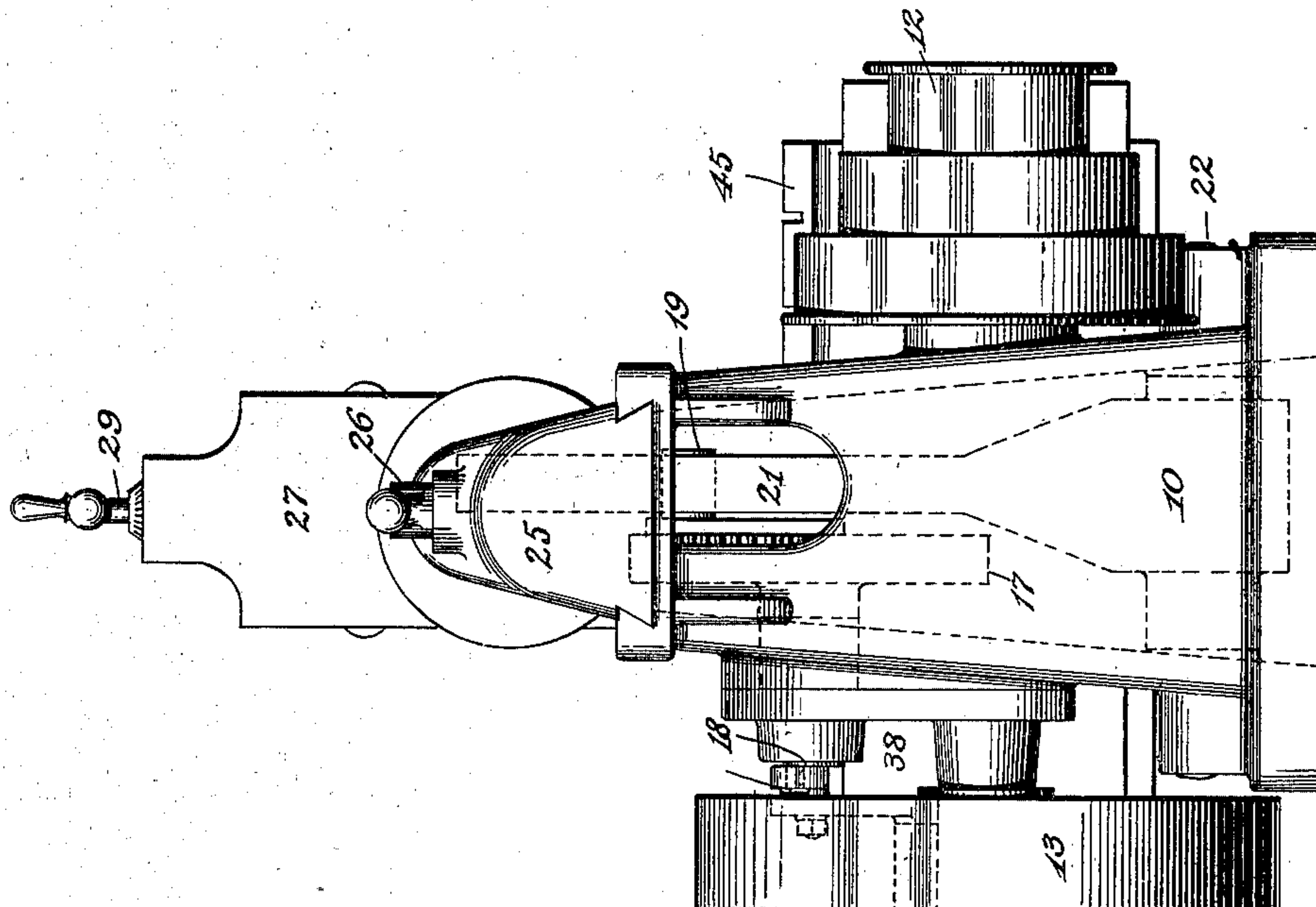
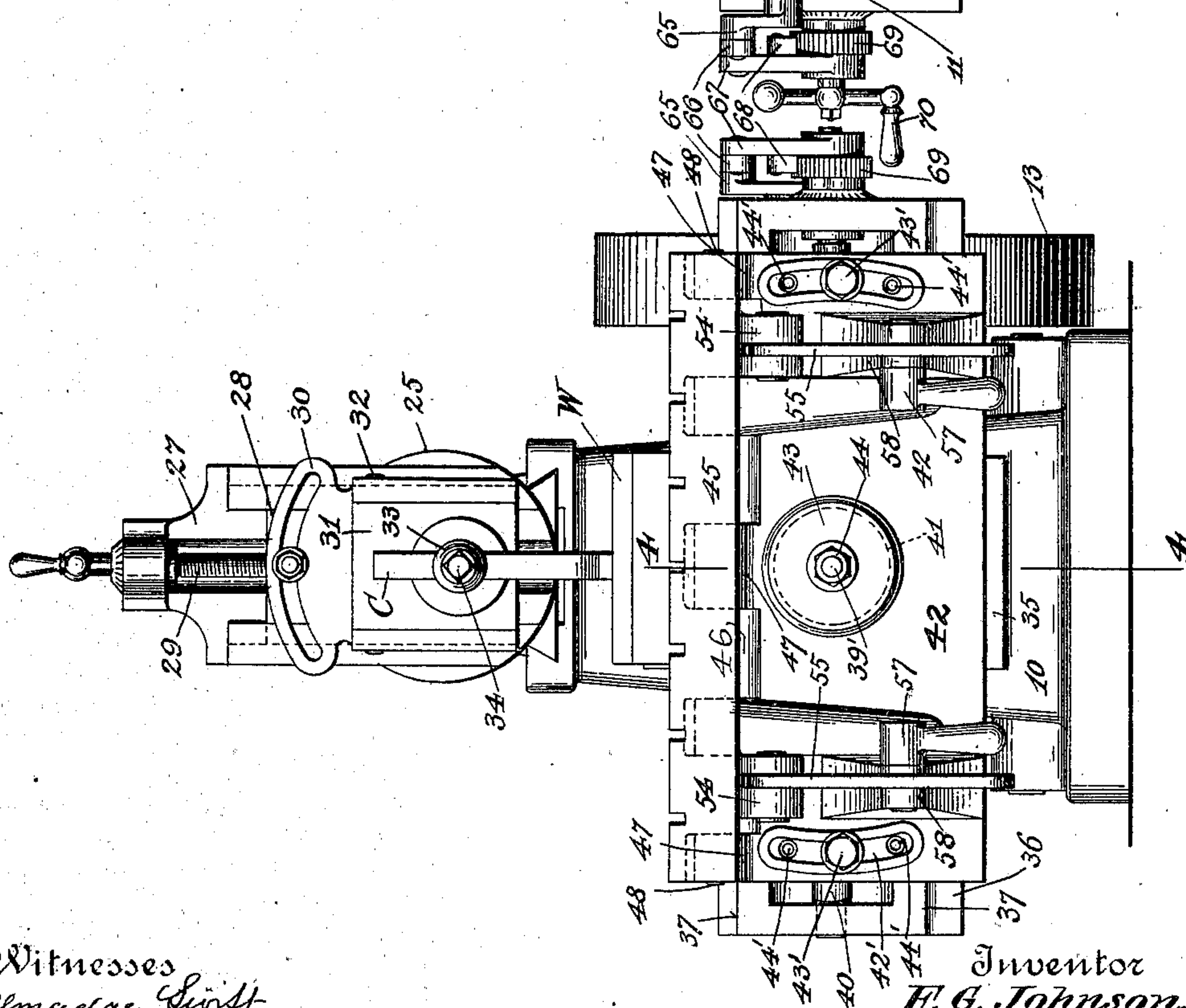


Fig. 2.



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UNITED STATES PATENT OFFICE.

FREDERICK G. JOHNSON, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE
F. G. JOHNSON COMPANY, OF HARTFORD, CONNECTICUT, A CORPORATION OF CONNECTICUT.

METAL-WORKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 731,686, dated June 23, 1903.

Application filed January 9, 1902. Serial No. 88,973. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK G. JOHNSON, a citizen of the United States, and a resident of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Metal-Working Machines, of which the following is a full, clear, and exact specification.

This invention relates to metal-working machines, and more especially to that class thereof which are known in the art as "planing" or "shaping" machines; and it has for one of its objects the provision of a machine of this character which is simple in construction and yet is adapted to meet all the requirements for machines of this class.

My invention has, furthermore, for its object the provision of a machine which is comparatively small in size and in which the wear of the several parts may be readily taken up, so that the machine may be classed among what is generally known as "precision-tools" to be placed on a work-bench or analogous stand.

My invention has, furthermore, for its object the provision in such a machine of a work-table which may be adjusted vertically and laterally of the machine and which may also be swung around a horizontal axis disposed in alinement with the longitudinal center of the machine, while in addition thereto said table may be swung around a horizontal axis disposed at right angles with said longitudinal center line. In this manner a machine constitutes a device the work-table of which may be adjusted or tilted into any desired position and which may therefore be properly termed a "universal" shaping-machine.

My invention has, furthermore, for its object the provision of means whereby the work-table may be fed relatively to and laterally of the cutter, irrespective of the particular inclination or position thereof.

Further objects of my invention may be found in the particular construction and organization of some of the elements, as will be hereinafter described, and particularly pointed out in the claim.

My invention has been fully illustrated in the accompanying drawings, in which similar characters denote similar parts, and of which—

Figure 1 is a side view of a machine embodying my improvements. Fig. 2 is a front view of the machine looking from the right of Fig. 1. Fig. 3 is a rear view looking from the left of Fig. 1, and Fig. 4 shows a section on line 4 4 of Fig. 2 and illustrates the manner of adjustably holding the work-table in position.

In the drawings, 10 denotes a suitable base, having journaled therein the main driving-shaft 11, which is provided at one end with a cone-pulley 12 and at its other end with a fly-wheel 13. Mounted on the shaft 11 is a pinion 14, in engagement with an intermediate 15, which may be journaled upon a stud 16 and meshing into a gear 17, mounted upon the shaft 18, also journaled in the base 10. The gear 17 carries a crank-pin 19, preferably disposed on said gear, so as to vary its throw to the required amount. This crank-pin 19 projects into a slot 20 of an oscillatory lever 21, journaled at 22 on the base and having its upper end connected—as, for instance, by means of a link 23—with a clamp-bolt 24, which is mounted for adjustment on the ram 25 and may be clamped in its adjusted position by a hand-nut 26.

By referring to Fig. 1 it will be seen that the slot 20 is curved, so that as the crank-pin 19 revolves the movement of the lever 21 will be comparatively rapid when causing the rearward movement of the ram 25, while, on the other hand, the forward movement of the latter during its working stroke will be materially retarded, so that all liability of the cutting-tool "breaking out" the work will be obviated.

While primarily the contour of the slot 20 may be of any desired shape, I preferably form the same concentric with a center almost in alinement with that of the shaft 18 when the lever is in its forward position, so that therefore the crank-pin or actuator 19 may have a comparatively great angular movement and yet produce only a very small

advancing movement of the lever 21, and consequently of the ram or tool-carrier 25.

From the organization of the mechanism herein shown it will be understood that when the crank-pin 19 is traveling through its arc of movement at the left of the shaft 18 the movement of the lever 21 will naturally be more rapid than when traveling in the arc at the right of said shaft and that therefore the movement of the ram during its working stroke will be slower than that during its return stroke.

The ram 25 is shown provided at its forward end with the head 27, carrying a slide 28, which may be adjusted vertically, as, for instance, by a screw 29 in the ordinary manner. Attached to the slide 28 is a swivel 30, on which the clapper 31 may be pivotally supported, as at 32. The clapper 31 has in this instance a tool-post 33, provided with a clamping-screw 34 for securing a cutting-tool C in place thereon.

The front end of the base is provided with ways 35, adapted to receive a cross-bar 36, which is movable vertically on said ways and may be held in its position by gib-screws, while the cross-bar 36 is provided with ways 37 to receive a cross-slide 38, which is shown provided with a nut 39 in engagement with a feed-screw 40, journaled in the bar 36.

The cross-slide 38 has a forward projection 41, serving as a pivot for a table support or swivel 42, which is thus mounted for rotation on said slide and may be held in place thereon by a washer 43 and a nut 44, which in the present instance is in screw-threaded engagement with a bolt 39', forming a part of or secured to the nut 39, above mentioned. The projection 41 serves as a trunnion for the swivel 42, which may be swung around the axis of said trunnion, so as to tilt the same laterally of the machine, said swivel 42 being provided with slots 42', (see Fig. 2,) through which bolts 43' may pass and enter one of a series of concentrically-disposed screw-threaded apertures 44' in the cross-slide 38, in this manner providing for a greater range of tilting movement of the swivel 42 than the length of the slot 42' would naturally permit.

Pivoted for vertical movement on the swivel 42 is a table 45, having a plurality of ears 46 alternating with projections 47, formed on the swivel 42, while a rod 48 may pass through all the ears 46 and projections 47, and thus serve substantially as a hinge-rod for the table 45 on the swivel 42. It will therefore be seen that the table 45 may be swung upward or downward from its horizontal position, (shown in Fig. 1,) so that the work may be presented to the cutting-tool at any desired angle.

The work, which is herein denoted by W, may be caused to rest at one side against a stop or jaw 49, having a lip 49', adapted to enter a groove 50 in the table, while at its front end the table may carry a clamping-block 51, provided with a lip 52, also adapted

to enter a groove 50, and provided with set-screws 53 for forcing the work W against the bar above referred to.

Means are provided for securing the table 45 in its vertically-adjusted position, the table having at its under side ears 54, to which links 55 are pivoted. The links 55 are slotted, as shown at 56, to straddle clamping-bolts 57, which may be in screw-threaded engagement with ears 58, provided on the swivel 42.

By the organization of the elements described I am enabled, first, to firmly secure the work upon the table; secondly, to tilt the work upwardly or downwardly, as the case may be; thirdly, to tilt the work laterally in either direction; fourthly, to move the table bodily up or down and without in any way altering its other position, and, fifthly, to feed the work laterally of the cutting-tool, which of course will produce a chip laterally of the work, while, on the other hand, the depth of the cut may be regulated by the adjustment of the cutting-tool in a vertical direction either in the tool-post or by rotating the screw 29.

The lateral feed or traverse movement of the table, or more particularly of the cross-slide 38 on the bar 36, may be accomplished in any desired manner, the mechanism shown in the drawings comprising as a prime mover a crank-pin 60, secured to the outer end of the shaft 18 and connected by a link 61 with a vertically-disposed arm 62, secured upon a rod or shaft 63, which is journaled in a bearing 64 on the bar 36. The arm 62 may be slotted to vary the angular movement of said arm, and consequently that of the shaft 63. Also secured upon the rock-shaft 63 is an arm 65, the free end of which may be connected by a link 66 with an arm 67, journaled upon the feed-screw 40, above mentioned, and having a click 68, adapted for engagement with a ratchet-wheel 69, secured upon said screw 40, so that said screw may be rotated in either direction and the cross-slide 38 moved laterally on the table in conformity with the movement of the screw 40, the latter having also a crank 70, whereby said screw may be operated by hand when the click 68 is disengaged from the ratchet 69, as shown in Fig. 1.

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

In a machine of the type set forth the combination with a base, a cross-bar mounted for vertical movement thereon, a slide transversely movable on said bar, a swivel carried by said slide, and a table pivoted to said swivel, said table carrying work-securing means, the axis of said pivot lying at right angles to the axis of the swivel, and means for securing said table to said swivel in an adjusted position, substantially as described.

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