

No. 696,950.

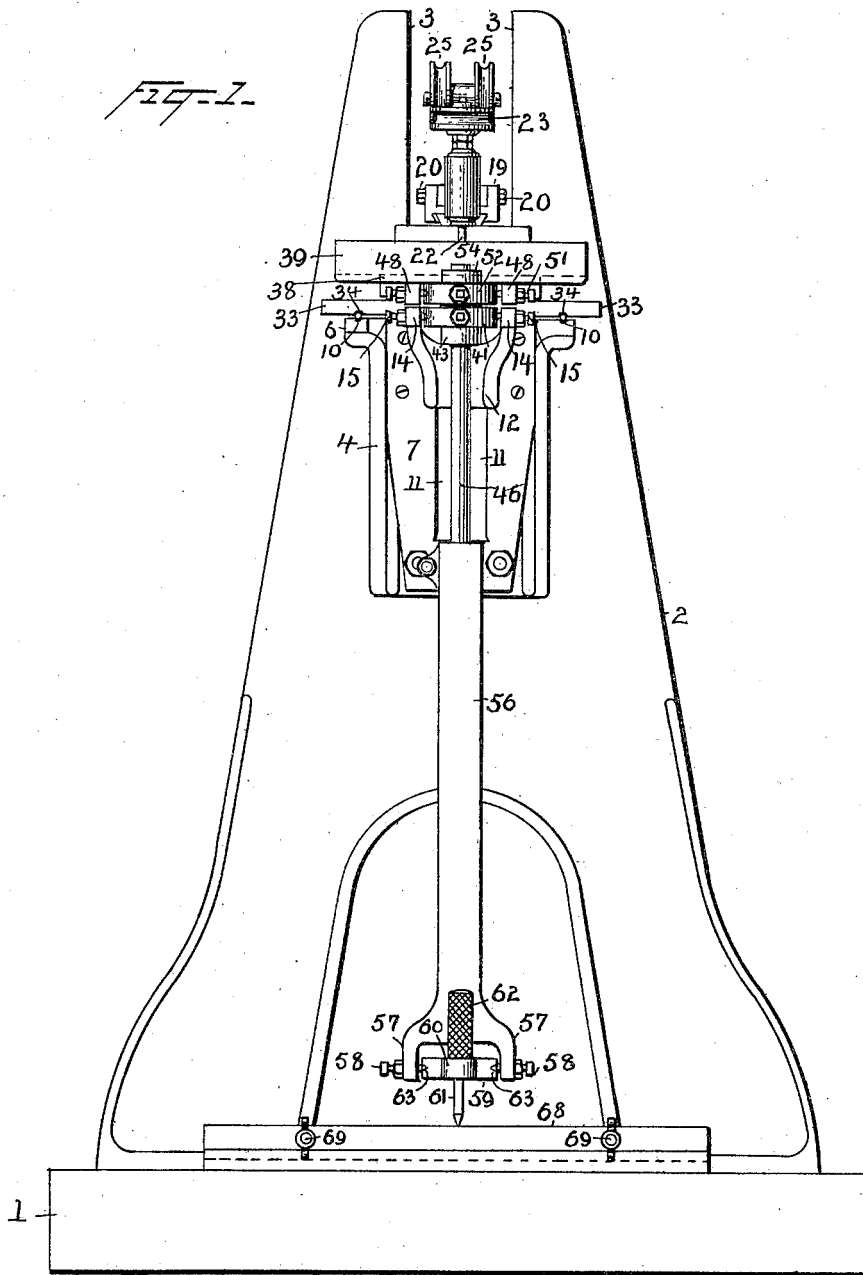
Patented Apr. 8, 1902.

W. S. EATON.
ROUTING OR ENGRAVING MACHINE.

(Application filed Nov. 23, 1899. Renewed Nov. 1, 1901.)

(No Model.)

4 Sheets—Sheet 1.



WITNESSES

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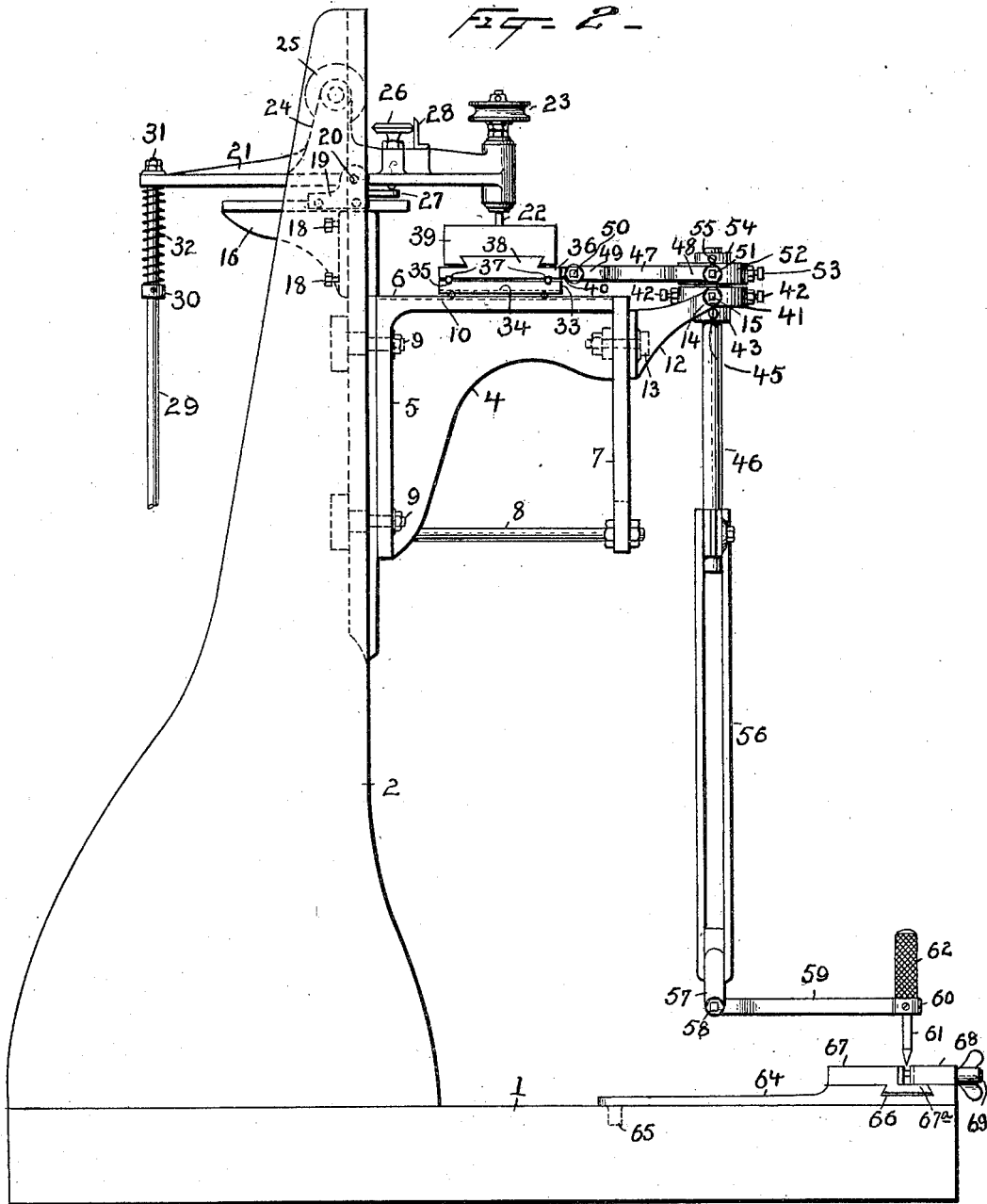
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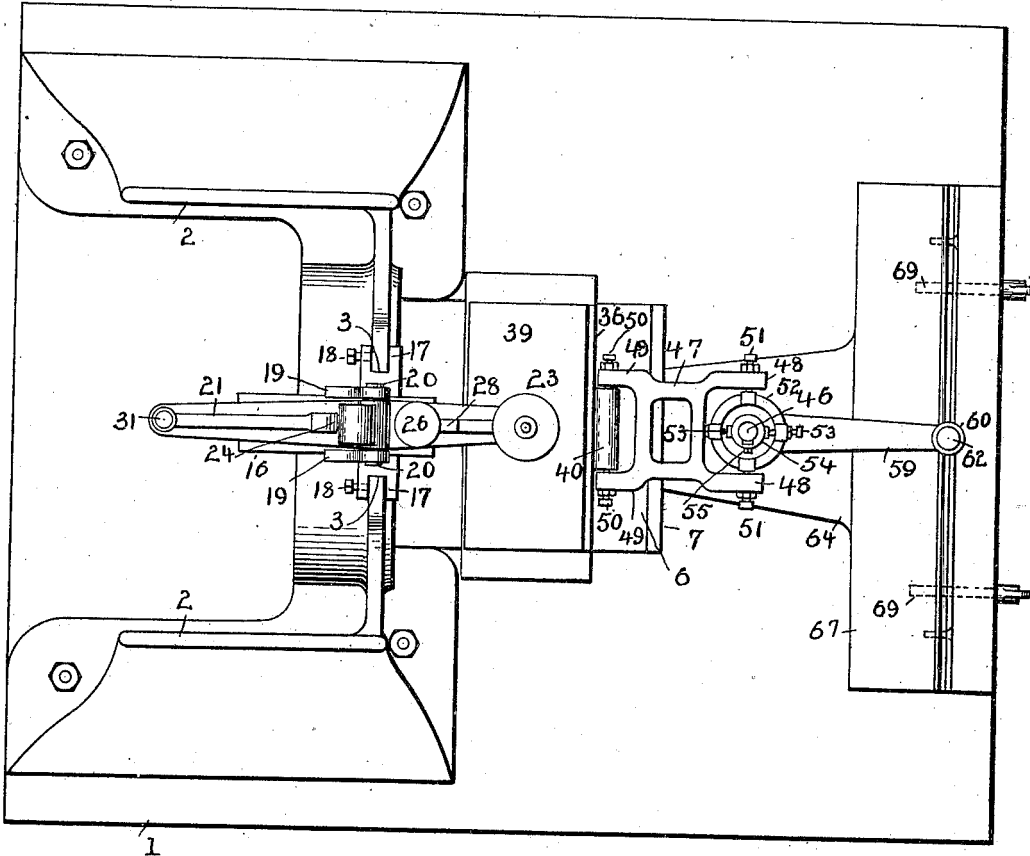
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Fig. 5 -



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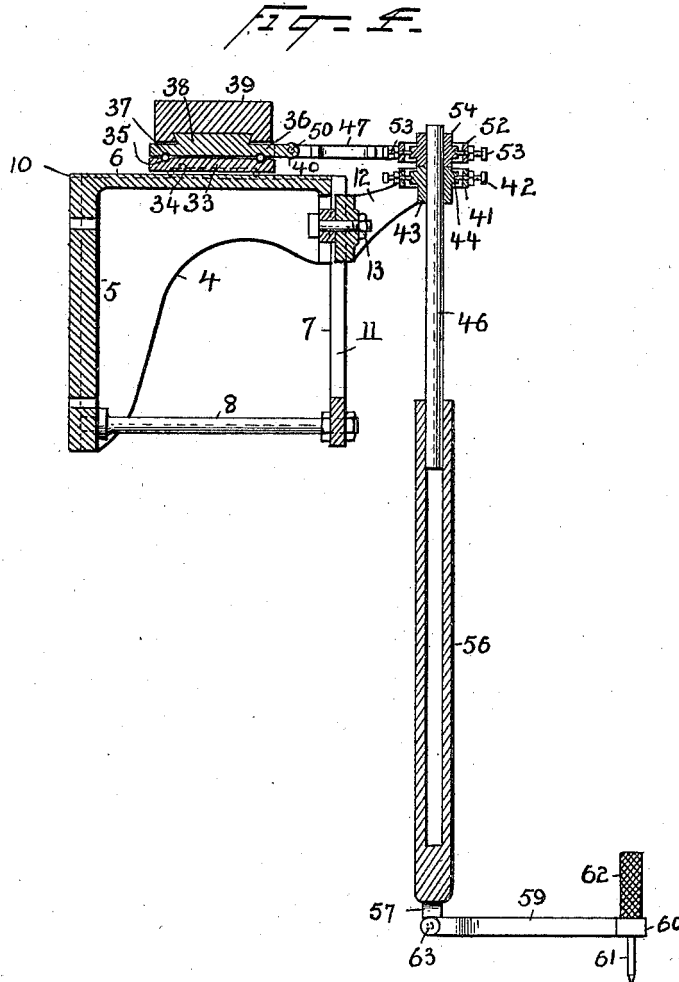
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UNITED STATES PATENT OFFICE.

WILLIAM S. EATON, OF SAG HARBOR, NEW YORK.

ROUTING OR ENGRAVING MACHINE.

SPECIFICATION forming part of Letters Patent No. 696,950, dated April 8, 1902.

Application filed November 23, 1899. Renewed November 1, 1901. Serial No. 80,809. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. EATON, a citizen of the United States of America, and a resident of Sag Harbor, county of Suffolk, State of New York, have invented certain new and useful Improvements in Routing or Engraving Machines, of which the following is a specification.

My invention relates to improvements in that class of machines known as "routing" or "engraving" machines. I have particularly described my mechanism as the same pertains to a routing-machine—that is to say, one wherein the cutting instrument is caused to revolve during the process of engraving; but it will be understood that it is applicable where a stationary cutting instrument is used. Generally speaking, the instrument is operated on what is known as the "pantograph" plan of reduction.

My present invention relates more particularly to the economical and practical arrangement of parts whereby I accomplish the result and also to the automatic adjustment of which my machine is capable and the arrangement of a leverage system on the pantograph plan, wherein a very perfect universal movement is obtained with a relatively small degree of friction.

My machine is capable of simple engraving or die-cutting or other routing operations.

I have designated this machine more particularly with the view of uniting strength of construction with ease of adjustment and harmony of operation.

I have illustrated my invention in the accompanying drawings, referring to the parts by numerals, like parts being designated by like numerals.

Figure 1 is a front elevation of my machine, and Fig. 2 is a side elevation. Fig. 3 is a plan view, omitting the guide-pulleys and their brackets. Fig. 4 is a vertical section of the leverage system and engraving-table.

I will now proceed to describe the structure of my machine. The frame consists of the base-plate 1, upon which is mounted an upright 2. The upper end of this upright is bifurcated, as at 3 3, to permit of the introduction of a bracket supporting the routing instrument, which bracket is arranged to move between said bifurcated arms, as in ways. 4 is a right-angular frame or bracket

having a back plate 5, a top plate 6, a front plate 7, and a supporting-rod 8, together forming what I term a "right-angular frame." This frame is secured to the upright 2 by the bolts 9 9, which work in ways (which are not shown) in the upright 2, permitting, as will readily be understood, a vertical adjustment of the bracket or right-angular frame 4. This vertical adjustment is necessary when the routing or engraving is to be done upon an object which is of a thickness requiring more space between the routing instrument and the table than is exhibited in these drawings. The top plate 6 of the right-angular frame 4 is provided with ball-bearing ways 10. These ways are parallel, and the plate 7 is provided with ways 11, in which the bracket 12 is mounted to move vertically. This bracket is held adjustably within said ways by the screw-bolt 13. The bracket 12 terminates in bifurcated arms 14 14, which arms carry center-bearing points 15 15. This bracket becomes the support for the suspended leverage system, which will be described hereinafter.

I will now describe the routing instrument and its supporting-beam. 16 is a bracket having ways 17 17, which slide within the jaws 3 3 of the upright 2 and are secured at any desired position therein by the set-screws 18. 19 19 are upright brackets secured to the brackets 16, and supported between these brackets is a shaft 20, which is the pivot of the rock-beam now to be described. 21 is a rock-beam pivoted on the shaft 20. 22 is a routing instrument suitably journaled at one end of the rock-beam 21. I deem it unnecessary to describe this journaled routing instrument, for there are many well known in the art which could be employed for this purpose. 23 is a pulley secured to the routing instrument or its connections adapted to convey to said instrument a rotary movement. 24 is an upright secured to the beam 21, which supports suitable bearings for the guide-pulleys 25 25, which are shown in Fig. 1. In Fig. 3, which is a plan view, I have purposely omitted these pulleys in order that the structure beneath might be seen. 26 is a set-screw passing through a screw-hole in the beam 21 and protruding beneath said beam, and 27 is a knife-spring suitably secured to the bracket 16, against which said set-screw engages as the routing instrument or tool is about to en-

gauge the work on the downward swing of the tool-carrying end of the rock-beam. Said spring thus acts to cushion the said beam in its fall, whereby jamming of the tool against its work is prevented. 28 is a finger secured to the beam 21. The said screw 26 is provided on its periphery with a micrometer-scale, which is read in comparison with the position of the index-finger 28, so that the position of the routing instrument may be very delicately adjusted. 29 is a pressure-rod secured to the other end of the beam 21 by the nut 31, and 30 is a collar secured to the arm 29, and 32 is a helical spring interposed between the collar 30 and the beam 21, the rod 29 passing through the beam 21 loosely, the spring 32 being interposed to allow for a cushioning effect. The operation of this routing instrument will be readily understood. A suitable power-cord passes around the pulley 23 and over the guide-pulleys 25 25, thus giving a rotary motion to the routing instrument 22. When it is desired to lift the routing instrument from the plate upon which it is operating, pressure is exerted, preferably by the foot, upon a pedal to which the rod 29 is attached, the pedal not being shown in the drawings to avoid complicating the latter. Said rod 29 is drawn down, and the routing instrument is lifted off of the surface upon which it is operating by the rocking of the beam 21 upon its pivot 20. It is again lowered into operative position by removing the pressure from the pedal, and it is delicately adjusted with reference to the operative surface by the micrometer-screw 26, which is read in relation to the index-finger 28.

I will now describe the construction and operation of the engraving-table. As heretofore stated, the top plate 6 of the right-angular frame 4 is provided with parallel ball-bearing ways. The plate 33 is provided on its under side with parallel ball-bearing ways 34 to correspond with those in the plate 6, and the plate 33 is also provided with ways in its upper side at right angles to those on its under side. The plate 36 forms what I call the "engraving-table" and is provided on its under side with parallel ball-bearing ways 37, corresponding to those on the upper side of the plate 33. Suitable balls are introduced within the bearings between these plates. 38 is a beveled tongue cut from the top of the table 36. 39 is a block having on its under side beveled ways adapted to fit over the tongue 38 of the table 36 and forming a base for the surface to be engraved. 40 is a tongue attached to the table 36, with center bearings on either side thereof, which are not shown. It will be understood that the plate 36 will take a movement in any direction—that is to say, it will have a universal movement, for the combination of two-way right-angular movements constitutes a universal movement. The construction and operation of these plates forming the engraving-table have been

by me fully described in another application, filed November 27, 1899, Serial No. 738,498, title "routing and engraving machine," and I have claimed in such application their particular features; but it is necessary for me to refer to them here for the reason that they form part of the operative mechanism of this machine.

I will now describe the leverage system, which is constructed, as heretofore stated, on the pantograph plan, by which I transmit motion from a tracing-stylus to the engraving-table last referred to. 41 is a ring having oppositely-disposed center bearings (not shown) and oppositely-disposed center-bearing points 42. 43 is a collar having oppositely disposed center bearings 44. This collar is secured to a vertical lever 46 by the set-screws 45. 46 is a vertical lever forming part of the leverage system. 47 is a link interposed between the lever 46 and the engraving-table 36, as follows: The link 47 has bifurcated ends 48 48 and 49 49, in which are mounted the center bearings 50 50 and 51 51. 52 is a ring having oppositely-disposed center bearings (not shown) and oppositely-disposed center-bearing points 53 53. 54 is a second collar having oppositely-disposed center bearings, (not shown,) and 55 is a set-screw securing said last-mentioned collar to the lever 46. 56 is a sleeve adapted to receive the lever 46, which is suitably secured therein by a set-screw. The sleeve 56 is provided with bifurcated arms 57, carrying center-bearing points 58. 59 is a guide-arm having at one end an adjustable sleeve 60 for the tracer 61, which has a head 62, and at the other end the guide-arm 59 is provided with center bearings 63. 64 is the base of the tracer-table, mounted on the base of the machine by the pivotal points 65, so that it has a pivotal movement upon said base. It is also provided with ways 66. 67 is a table having on its under side a beveled tongue 67^a and clamp-jaw 68, which is adjustably secured to the table 67 by the screw 69.

It will be understood that the leverage system last described consists of a suspended lever connected by universal joints adapted to transfer the movement of the tracing-point 61 to the engraving-table 36, for it will be seen that every movement of the tracer will move the tracer-arm, and therefore the vertical lever 46, which in turn will rock either on the pivotal points 15 or 42, and in like manner each movement of the lever-arm 46 will transmit to the link 47 a pivotal movement, operating either on the center-bearing points 51 or 53, and in these movements the plate 36 will be moved in a direction corresponding to the movement of the tracer-point. It will be understood that by raising or lowering the bracket 12 and collar 43 the degree of the angular movement may be increased or diminished. It will be readily understood that a variety of adjustments may be accomplished by raising or lowering the

brackets 4 and 12 and collar 43, all of which can be defined by a definite rule of measurement, which it is unnecessary for me here to elaborate.

5 What I claim is—

1. In an engraving-machine or the like, a freely-pivoted tool-carrying beam, the tool-carrying arm of said beam being free to be lifted from its working position and falling
10 freely toward said position, and a spring interposed between some portion of said beam and the frame of the machine and operatively engaging both of said parts just about as the beam reaches its working position but out of
15 operative engagement with one of said parts when the beam is lifted, thereby providing a cushion for said beam; substantially as described.

2. In an engraving-machine or the like, a
20 freely-pivoted tool-carrying beam, the tool-carrying arm of said beam being free to be lifted from its working position and falling freely toward said position, a spring between some portion of said beam and the frame of
25 the machine and operatively engaging both of said parts just about as the beam reaches its working position but out of operative engagement with one of said parts when the beam is lifted, thereby providing a cushion
30 for said beam, said spring being attached to one of said parts, and a set-screw attached to the other of said parts and engaging said spring as the said beam is about to reach its working position; substantially as described.

3. In a routing-machine, an upright support provided with vertical ways in combination with means mounted in said ways to support and adjust the routing-tool, and a supporting-table or right-angular frame mounted
40 in said ways to be adjusted and secured therein, said table provided with vertical ways in combination with a supporting-bracket mounted in said ways to be adjusted and secured therein, and a lever suspended from
45 said bracket and means to secure said parts together or to adjust the same with reference to each other, substantially as described.

4. In an engraving or routing machine, a suspended lever and adjustable connections
50 pivotally connected and mounted as follows: a bifurcated bracket carrying center-bearing points in its arms, said bracket being adjustably mounted in vertical ways in a supporting-frame, a ring having oppositely-disposed
55 center bearings and oppositely-disposed center points, a vertical lever provided with a collar adjustably secured thereto and having oppositely-disposed center bearings, the ring being mounted between the arms of the
60 bracket and the collar within the ring in combination with a link having a bifurcated end, with center-bearing points in the arms of said bifurcated end, a ring having oppositely-disposed center bearings and oppositely-disposed
65 center-bearing points; a second collar adjustably secured to said vertical lever, said collar having oppositely-disposed center bear-

ings, the ring being mounted between the arms of the link and the second collar within the ring, substantially as described. 70

5. In an engraving or routing machine, an adjustable suspended lever pivotally connected and mounted as follows: a bifurcated bracket carrying center-bearing points in its
75 arms, said brackets being adjustably mounted in vertical ways in a supporting-frame, a ring having oppositely-disposed center bearings and oppositely-disposed center points, a vertical lever provided with a collar adjustably secured thereto and having oppositely-
80 disposed center bearings, the ring being mounted between the arms of the bracket and the collar within the ring in combination with a link having a bifurcated end, with center-bearing points in the arms of said bifurcated
85 end, a ring having oppositely-disposed center bearings and oppositely-disposed center-bearing points; a second collar adjustably secured to said vertical lever, said collar having oppositely-disposed center bearings, the
90 ring being mounted between the arms of the link and the second collar within the ring, the link being pivotally connected at the other end with an engraving-table having a universal movement, and the vertical lever being
95 pivotally connected to a tracer-stylus, substantially as described.

6. In an engraving or routing machine, a leverage system pivotally connected and mounted
100 as follows: a bifurcated bracket carrying center-bearing points in its arms, said brackets being adjustably mounted in vertical ways in a supporting-frame, a ring having oppositely-disposed center bearings and oppositely-disposed center points, a vertical lever
105 provided with a collar adjustably secured thereto and having oppositely-disposed center bearings, the ring being mounted between the arms of the bracket and the collar within the ring in combination with a link having a
110 bifurcated end, with center-bearing points in the arms of the said bifurcated end, a ring having oppositely-disposed center bearings and oppositely-disposed center-bearing points; a second collar adjustably secured to
115 said vertical lever, said collar having oppositely-disposed center bearings, the ring being mounted between the arms of the link and the second collar within the ring, the link being pivotally connected at the other end
120 with an engraving-table having a universal movement, and the vertical lever being pivotally connected to a tracer-stylus, the vertical lever being of two parts a sleeve and a shaft, the shaft being adjustable within the
125 sleeve and means to secure the same therein, substantially as described.

Signed by me at New York, N. Y., this 6th day of November, 1899.

WILLIAM S. EATON.

Witnesses:

EMMA W. FINLAYSON,
THOMAS P. DALTON.