

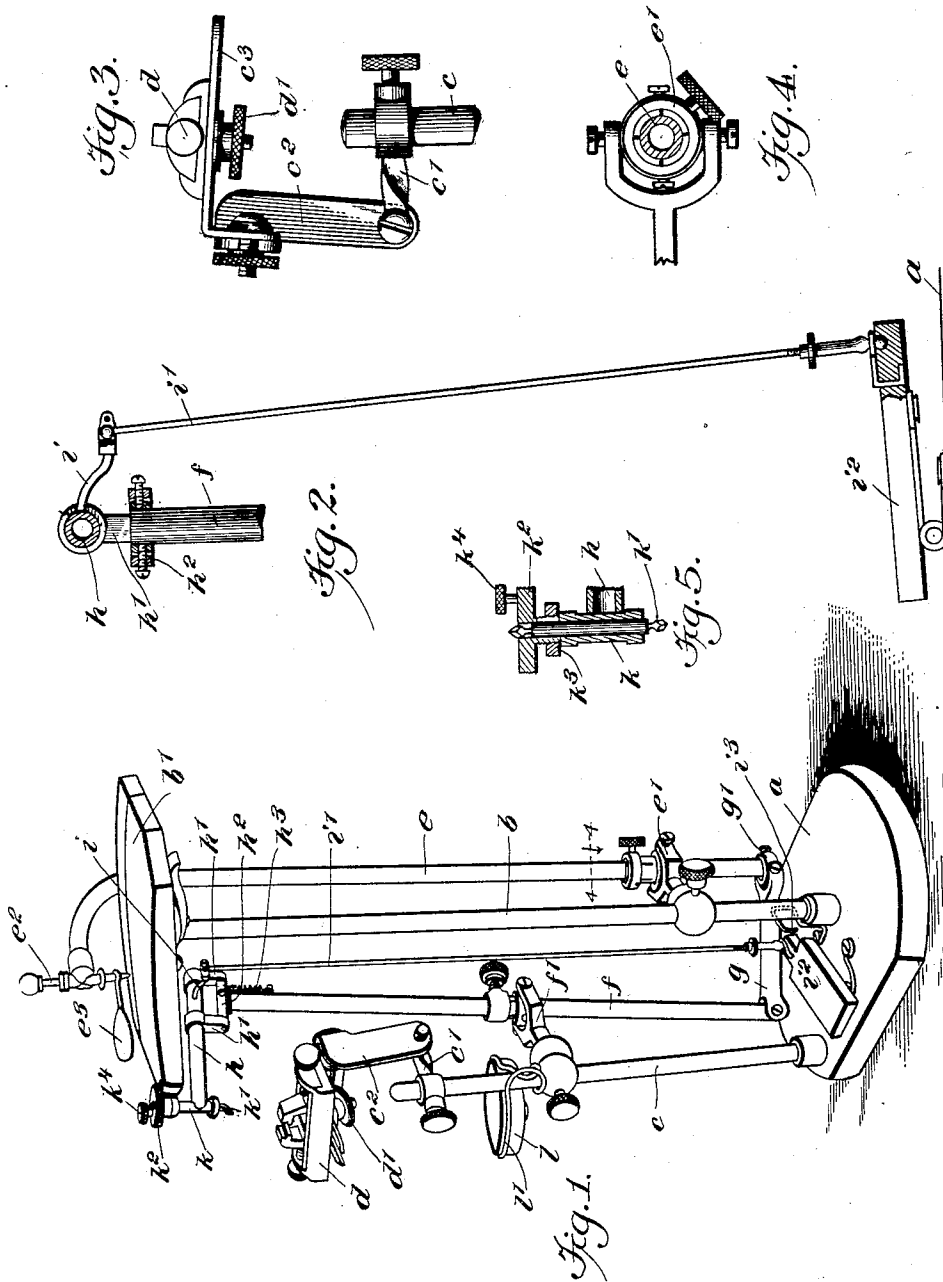
No. 738,149.

PATENTED SEPT. 8, 1903.

I. R. BEAM.  
ENGRAVING MACHINE.  
APPLICATION FILED FEB. 11, 1901.

2 SHEETS—SHEET 1.

NO MODEL.



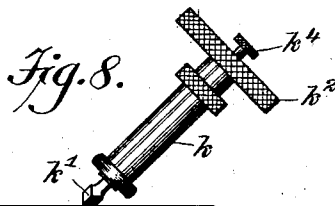
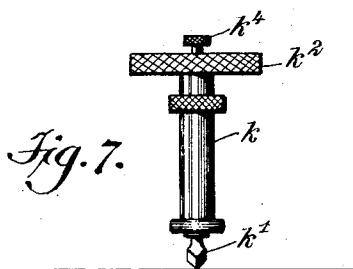
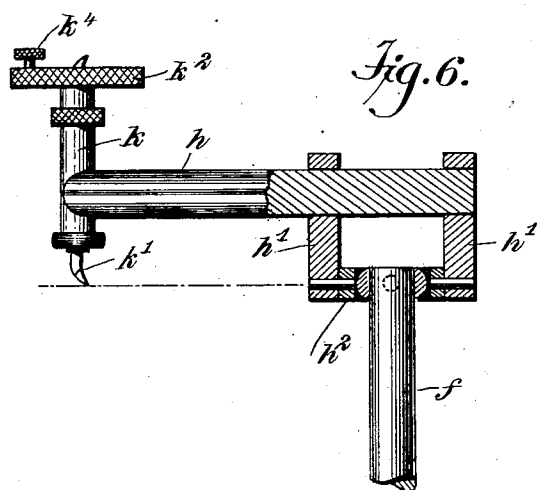
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# UNITED STATES PATENT OFFICE.

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## ENGRAVING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 738,149, dated September 8, 1903.

Application filed February 11, 1901. Serial No. 46,805. (No model.)

*To all whom it may concern:*

Be it known that I, IRA R. BEAM, a citizen of the United States, and a resident of Elmira, in the county of Chemung and State of New York, have invented a new and Improved Engraving-Machine, of which the following is a full, clear, and exact description.

This invention relates to a machine for engraving from patterns; and it comprises a tracer having connection with a graver, so that by moving the tracer over a pattern or copy the graver will be made to work on the plate to reproduce the subject of the copy or pattern.

The invention consists in certain peculiar features of construction and arrangement by which this end is effectively attained.

This specification is the specific description of one form of the invention, while the claims are definitions of the actual scope thereof.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a perspective view of the invention. Fig. 2 is a sectional elevation showing the means for tilting the engraving-tool to shade the lines produced thereby. Fig. 3 is a fragmentary elevation showing the means for mounting the vise which carries the plate to be engraved. Fig. 4 is a section looking down from the line 4 4 of Fig. 1. Fig. 5 is a section showing the device for carrying the engraving-tool. Fig. 6 is a sectional elevation illustrating the arms for carrying the graver and the means for mounting said arms, and Figs 7 and 8 are views showing the different positions assumed by the graver under the action of the devices shown in Figs. 2 and 6.

$a$  indicates the base of the apparatus, on which are mounted rigidly the two standards  $b$  and  $c$ . The standard  $b$  carries a device  $b'$  for holding securely the pattern or copy which the engraver is to follow. The standard  $c$  supports an adjustable arm  $c'$ , to which is attached adjustably a bracket  $c^2$ , carrying a slotted plate  $c^3$ . To this slotted plate is attached the vise  $d$ , which holds the work, this vise being adjustable on the slotted plate by means of a set-screw  $d'$ . By means of the

construction shown the vise may be tilted so as to hold the plate at an inclination to the workman, thus enabling him readily to inspect the progress of the engraving.

Supported on the standard  $b$  at a point just above the base  $a$  is a lever  $e$ , this lever being fulcrumed by the devices which support it on the standard and such devices constituting a gimbal-joint, as indicated at the point  $e'$  in the drawings. The upper end of the lever  $e$  is curved horizontally and carries a tracer  $e^2$ , which is adapted to work over the pattern held by the table  $b'$ . The table is set at an angle facing the operator and may, if desired, be curved or bent to facilitate the work. The tracer  $e$  is provided with a handle  $e^3$  for facilitating its manipulation.

Fulcrumed to the standard  $c$  by gimbal-joint devices  $f'$  is a lever  $f$ , which is connected to the lever  $e$  by a link  $g$ , arranged at the lower ends of the levers and universally attached to the lever  $e$ , as indicated, at the point  $g'$ . The upper end of the lever  $f$  carries a rod  $h$ , which is provided with two downwardly-projecting lugs  $h'$ , pivoted to a gimbal-ring  $h^2$ , mounted on the upper end of the lever  $f$ . A spring  $h^3$  is connected to the gimbal-ring to hold the same normally in the position shown. The rod  $h$  is rockable on the gimbal-ring and has attached thereto an arm  $i$ , to the outer end of which is connected a rod  $i'$ , extending downward to a treadle  $i^2$ , mounted on the base  $a$ . A lock  $i^3$  is provided for holding the treadle in fixed position, this lock being pivotally mounted on the base and movable into and out of engagement with the treadle. The lower end of the rod  $i'$  is universally connected with the treadle, as shown in Fig. 2.

The rod  $h$  carries fast a vertically-disposed sleeve  $k$ , in which is fitted to turn the graver  $k'$ . This graver is provided with a V-point, (see Fig. 5,) and, as here shown, the graver is pointed at each end and is adapted to be revolvably carried in the sleeve  $k$ . Also the form of graver here illustrated has its working V-point turned or bent slightly sidewise, as best illustrated in Fig. 6; but this construction is not essential, nor does it affect the proper operation of the apparatus, as will hereinafter appear. Attached to the upper

end of the graver is a hand-wheel  $k^2$ , which is removably held in place by a nut  $k^3$ , threaded on a contractible boss formed on the wheel  $k^2$  and surrounding the graver. When the nut  $k^3$  is tightened, the said boss of the wheel  $k^2$  rigidly embraces the graver  $k'$  to hold it. A thumb-knob  $k^4$  is attached to the wheel  $k^2$  to permit the manual operation thereof, and by means of this thumb-knob  $k^4$  the graver may be turned in the sleeve  $k$  around the longitudinal axis of the graver to any position necessary to facilitate the operation thereof. In operation the graver should be adjusted vertically in the sleeve  $k$ , so that when the graver-point faces straight away from the pivots connecting the lugs  $h'$  with the gimbaling  $h^2$  the working point of the graver lies in alinement with said pivots, as shown in Fig. 1. Owing to the mechanism described, upon pressing down on the graver it may be moved vertically toward or from the work. By turning the graver around its longitudinal axis it may be moved out of the position shown in Fig. 6 and presented sidewise or edgewise to the work, as desired, so as to suit the peculiarities of the work or the judgment of the workman. When the graver is in the position shown in Fig. 6, by rocking the arm  $h$  around the pivots of its lugs  $h'$  (which action is effected by means of the treadle  $i^2$ ) the graver may be rocked on its very point from side to side, thus presenting the apex of its V-point to the work (see Fig. 7) or tilting the graver sidewise, so as to present one of the diagonal sides of said V-point to the work, (see Fig. 8,) thus producing a fine line or a broad shade-line, as desired. When these latter operations are being performed, the graver should be turned to and held at the relative position shown in Figs. 6, 7, and 8—i. e., facing straight away from the pivots  $h'$ —and therefore the sidewise bend of the point of the graver does not affect the operation described. This arrangement is very useful in working on curved and other uneven surfaces, when it will become necessary to adjust the graver with respect to the surface on which it works. In short, by means of the multiplicity of positions which the graver may be made to assume work of any character may be inscribed on surfaces of greatly-varying form. Owing to the capability of adjusting the graver with the point of its V-shaped edge in alinement with the pivot of the lugs  $h'$ , very delicate work may be effected, enabling lines of any desired character to be engraved. The graver is pressed by hand upon the work and its various adjustments are effected either manually or through the action of the treadle  $i^2$ .

If desired, a wire or the like may be passed between the part  $g$  and the table to support the former when the parts are being adjusted; also, a lock may be used to hold the tracer rigid with the lever  $e$  when adjusting the device.

A pan or like receptacle  $l$  may be connect-

ed to the standard  $c$  by a bracket  $l'$ , as shown in Fig. 1.

By adjusting the parts as shown in Fig. 1 and moving the tracer  $e^2$  over the copy held by the table  $b'$  the engraving-tool  $k'$  will be caused to move, following the outlines of the copy, and this copy will therefore be impressed upon the work held in the vise  $d$ . By operating the treadle  $i^2$  the arm  $h$  may be rocked and the work shaded as desired. The arrangement of the parts capable of adjustment described enables me to fit the apparatus to engraving work of any nature desired.

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

1. In an engraving-machine, the combination of a base, standards mounted thereon, means carried by one standard for holding a pattern, means carried by the other standard for holding the work, a lever mounted on each standard, a tracer carried by one lever, a graver carried by the other, and a connection between the two levers.

2. In an engraving-machine, the combination of a base, standards mounted thereon, means carried by one standard for holding the pattern, means carried by the other standard for holding the work, a lever mounted on each standard, said levers being capable of respectively carrying the tracer and the graver, and a connection between the two levers.

3. In an engraving-machine, the combination of a base, standards mounted thereon, means carried by one standard for holding the pattern, means carried by the other standard for holding the work, a lever mounted on each standard, one of said levers carrying the tracer, a graver rockably carried by the other lever, and means including a treadle mounted on the base, said means being connected with the graver to facilitate rocking the same independently of its other actions.

4. In an engraving-machine, the combination with the base, of means carried on the base for holding the pattern, means also on the base for holding the work, levers, means sustaining the levers on the base, a connection between said levers, a tracer carried by one lever, a rod rockably mounted on the other lever, a treadle in connection with the rod to actuate it, and a graver carried by the rod transversely thereto, the graver being adjustable around its longitudinal axis independently of the position of the said rod.

5. In an engraving-machine, the combination of a base, means for holding the pattern, means for holding the work, two levers, means on the base for independently fulcruming said levers, a connection between the levers at one end thereof to cause them to move simultaneously, a tracer carried by and located at the opposite end of one lever, and a graver carried by and located at the opposite end of the other lever, both tracer and lever being mount-

ed independently of the said connection between the levers.

6. In an engraving-machine, the combination with a base, of means carried on the base for holding the pattern, means also on the base for holding the work, two levers, means on the base for independently fulcruming the levers, a connection between said levers to cause them to move simultaneously, one of said levers serving to carry a tracer, a rod mounted on the other lever to rock independently thereof around an axis parallel to the longitudinal axis of the rod, and means for carrying a graver on the rod transversely thereof.

7. In an engraving-machine, the combination with a base, of means carried on the base for holding the pattern, means also on the base for holding the work, two levers, means on the base for independently fulcruming the levers, a connection between said levers, one of the levers serving to carry a tracer, a rod mounted on the other lever to rock independently thereof around an axis parallel to the longitudinal axis of the rod, and means for carrying a graver on the rod transversely thereto, said means including a member revolvably holding the graver to permit its adjustment around the longitudinal axis of the graver independently of the rocking of the said rod.

8. In an engraving-machine, the combination with a support, of a gimbal-ring mounted on the upper end thereof, a rod lying above the gimbal-ring and rauging diametrically across the same, lugs projecting downward laterally from the rod and pivoted at their ends to the gimbal-ring rockably to mount the rod, the rocking axis of the rod ranging across the axis of the pivots of the gimbal-ring, and means for carrying a graving-tool on the rod in position transverse to the longitudinal axis thereof.

9. In an engraving-machine, the combination of a support, a rod mounted to rock thereon, the axis of the rocking movement of the rod lying at one side of the rod and parallel with the longitudinal axis of the rod, for the purpose specified, a graver extending transversely of the rod, and means for mounting the graver on the rod, said means for mounting the graver on the rod permitting the graver to turn around the longitudinal axis of the graver, the graver having at one end a V-point offset laterally of the graver, and the graver being capable, by its aforesaid turning movement, of placing the said V-point in line with the said axis of the rocking movement of the rod.

10. In an engraving-machine, the combination of a support, a rod mounted to rock thereon, the axis of the rocking movement of the rod lying at one side of the rod and parallel with the longitudinal axis of the rod, for

the purpose specified, a graver extending transversely of the rod, means for mounting the graver on the rod, said means for mounting the graver on the rod permitting the graver to turn around the longitudinal axis of the graver, the graver having at one end a V-point offset laterally of the graver, and the graver being capable, by its aforesaid turning movement, of placing the said V-point in line with the said axis of the rocking movement of the rod, and a hand-wheel attached to the graver to facilitate its manual operation.

11. In an engraving-machine, the combination with a base, of means carried on the base for holding the pattern, means also on the base for holding the work, two levers, means on the base for independently fulcruming the levers, a connection between said levers to cause them to move in unison, one of said levers serving to carry a tracer, a rod mounted on the other lever to rock around an axis parallel to the longitudinal axis of the rod and transverse to the said levers, and a graver carried by the rod transversely to the longitudinal axis thereof, said graver having a V-point in the plane of the pivot around which the said rod rocks.

12. In an engraving-machine, the combination with a supporting part, of a gimbal-ring mounted thereon, a rod, lugs laterally projected from the rod, said lugs being pivoted at their ends on the gimbal-ring, the rocking axis of the rod ranging across the axis of the pivots of the gimbal-ring, and a graving-tool carried by the rod, transversely thereof, said tool having a V-point in the plane of the pivots of the said lugs, for the purpose specified.

13. In an engraving-machine, the combination with the framing including a supporting member, of a graver having a V-point at one end, and means for mounting said graver on the support with the said point of the graver exposed, the said means for mounting the graver permitting the graver to rock and the axis of such rocking movement ranging transversely of the graver, and the said exposed V-point of the graver lying in line with the said axis of the rocking movement of the graver, whereby to permit rocking the side edges of the said V-point toward and from the surface on which the graver rocks to engrave lines of varying breadth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

IRA R. BEAM.

Witnesses:

ADA BEAM,  
FRANCES BEAM.