

(No Model)

W. S. EATON & W. T. GOODNOW.
ENGRAVING MACHINE.

No. 585,261.

Patented June 29, 1897.

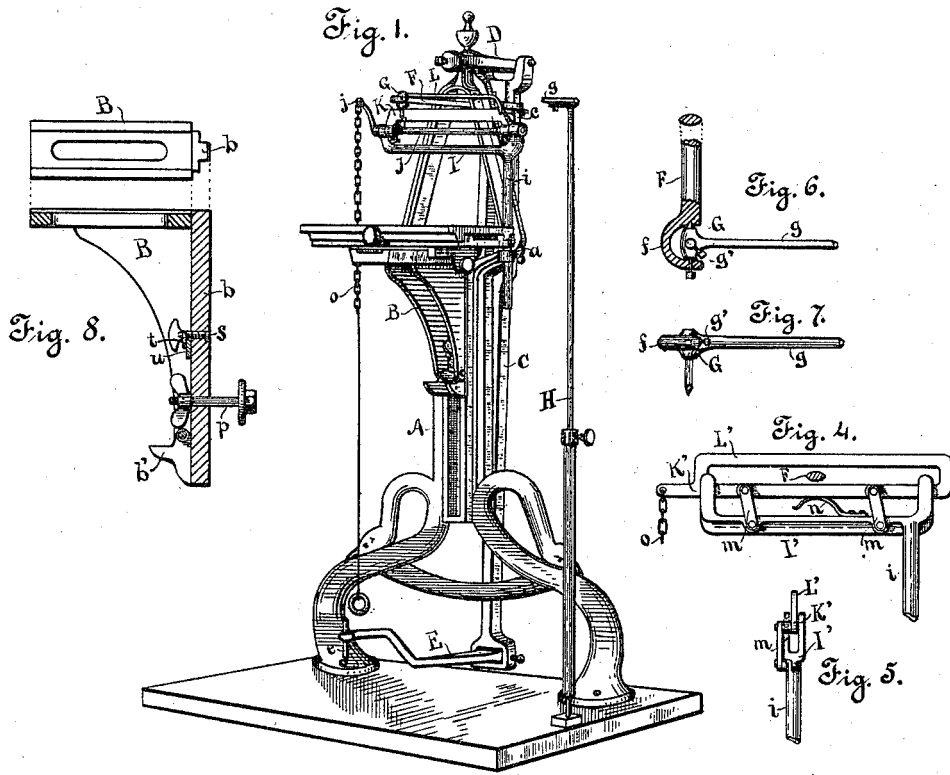


Fig. 8.

Fig. 6.

Fig. 7.

Fig. 4.

Fig. 5.

Fig. 2.

Fig. 3.

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ENGRAVING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 585,261, dated June 29, 1897.

Application filed November 27, 1896. Serial No. 613,634. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM S. EATON, residing at Sag Harbor, in the county of Suffolk and State of New York, and WILLIAM T. GOODNOW, residing at Sayre, in the county of Bradford and State of Pennsylvania, citizens of the United States, have invented certain new and useful Improvements in Engraving-Machines, of which the following is a specification.

Our invention relates to improvements in engraving-machines of the type shown in Letters Patent granted to Stephen D. Engle September 6, 1881, No. 246,737, and April 10, 1883, No. 275,618, and has for its objects to provide the above machine with mechanism whereby the pressure upon the graving-tool both for cutting and shading may be more accurately and evenly controlled, to provide the bracket which supports the work with means for tilting it forward in order that the work may be brought down within the vision of the operator for examination, and, finally, to so arrange and construct the graving-tool and its holder that copper plates, &c., may be engraved in reverse for printing and like purposes. We attain these objects by the mechanisms illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of the complete machine; Fig. 2, a front elevation of the upper portion, showing pressure-regulator and bracket; Fig. 3, a side view of the same; Figs. 4 and 5, details showing a modified form of the pressure-regulator; Figs. 6 and 7, details of the tool arm and holder, and Fig. 8 top and sectional views of the bracket.

Similar letters refer to similar parts throughout the several views.

A is the main standard of the machine, upon the front of which is adjustably clamped the bracket B, carrying a table having forward and side adjustments, to which table appropriate chucks or clamps for holding the work are to be attached.

C is the pantograph-arm, suspended by a gimbal at D from the top of the standard A and fitted at its lower extremity with a pivoted arm E, which carries the tracer *e*.

F is the tool-arm, pivoted to the clamp *c*, which is adjustable vertically in the upper portion of the pantograph-arm C. Upon the forward end of the tool-arm, in the fork *f*, is pivoted the tool-holder G, provided with a lateral arm *g*, which is held at its outer end by a ball-and-socket joint to the adjustable upright H, which in turn is held to the base of the machine by a ball-and-socket joint. This latter arrangement causes the graving-tool to be carried across the work in an approximately-vertical position at all times. These parts are substantially the same as shown in the two Letters Patent above mentioned.

In front of and close to the yoke in the standard A is the support I, held transversely beneath the tool-arm on the post *i*, which can be vertically adjusted in a socket *a*, attached to the standard in a suitable position. The support I is bent up at the ends, and journaled therein is a small shaft J. At one end of this shaft is an arm *j*, from which a chain *o* depends, a wire provided with a ring at its lower extremity being hooked into suitable links of this chain to bring the ring within reach of the operator, according to the adjustment of support I. Between the journals on the shaft is keyed a blade or cross-bar K, to the top ends of which is fastened a parallel bar L. The tool-arm F extends outward from between the bars K and L. Springs *k k*, coiled about the shaft J and having ends attached to pins projecting from support I, press the bar K into an upright position, the stop *k'* being provided to strike one of the pins and prevent the bar from being thrown over backward.

In operation the tool-arm is first set in position to reproduce the design at the desired reduction by properly adjusting the clamp *c* and the post *i*, and the work is then brought up to within a short distance of the engraving-tool by a proper adjustment of the bracket B. The operator takes the tracer in his right hand and causes its point to follow the lines of the design, at the same time with his left hand pulling down on the chain *o* and causing the shaft J to turn forward. The chain *o*

may also run down beneath the table and be operated by the foot. This turning of the shaft tilts the bar K forward and allows the tool to drop upon the work. A further turning of the shaft brings the bar L down on the top of the tool-arm, and the pressure of this bar upon the tool-arm determines the depth of cut made by the tool. By varying the pull on the chain *o* the operator changes the depth of cut to suit the requirements for shading, &c. To remove the tool from the work, in order to begin a new line, &c., the chain is released, allowing the springs *k k* to press the bar K back to vertical position, which lifts the tool-arm and raises the tool. The edges of the bars K and L being horizontal or parallel with the work-table the tool is forced to move in an approximately horizontal plane as it goes from side to side, so that given a constant pressure on the bar L the tool will cut to the same depth in its extreme positions as in its central one, since bar L will be forced upward slightly to compensate for the tendency of the tool to cut deeper when the tool-arm swings out from its central position.

Herein lies our improvement over the prior machines. In these old machines the cutting-pressure is exerted by pressing on the trigger on the tracer-arm with a finger of the hand which guides the tracer. When the tracer-arm is in extreme positions, the relative dropping of the end of the arm increases the angle which it makes with pantograph-arm C and causes the pressure on the trigger to exert a stronger push on the tool-arm than when the tracer is in a central position. This causes the tool to cut in deeper at corresponding positions of the tool-arm, being more apparent when the design is being cut at a greatly-reduced scale. With our improvement the pressure is unaffected by the position of the tracer-arm and is controlled entirely by the left hand, the right being employed solely to move the tracer. In this way the operator has but one hand to think of in regulating the pressure, while in the old machines he was obliged to bear in mind both hands.

The form of our pressure-regulator just described has one objectionable feature, which is, that tilting forward the bars K L causes the vertical space between them to grow narrower until the tool-arm becomes pinched between them. The vertical movement in the tool-arm, is thus somewhat limited. To avoid this and give a greater range of motion to the tool-arm, we have devised the modification shown in Figs. 4 and 5. Here the support I' is provided with bifurcated ends within which the bars K' and L' are guided in a vertical plane. Two parallel links *m m* support the bars and cause them to retain a horizontal position throughout their vertical motions. A spring *n* presses upward on the underside of K'. Fig. 5 is an end view with one of the bifurcations broken away to show how the parallel links are

coupled to bar K'. It will be evident that a pull on the chain *o* causes the bars K and L to move downward and sidewise, the horizontal space between the bars being of such a length that this sidewise movement will not reduce the lateral play of the tool-arm.

In Figs. 6 and 7 is shown an improved manner of arranging the tool-arm and holder. The yoke *f* lies in a horizontal position and the tool-holder is pivoted therein, as shown, and has the hole which received the tool extended clear through it. A tool may thus be held in it, point upward, and an engraving cut in reverse on a plate held in a suitable chuck above the tool. The set-screw *g'* holds the tool in place in either position. The tool-arm has its top and bottom sides rounded off in order that the arm, when tilted by the lateral swing of the pantograph-arm, will not be raised or lowered when in contact with the bars K or L.

Since the operator sits with the pattern he is tracing before him within convenient reach of his hands and eyes, the work is necessarily above his line of vision and he must rise in order to inspect it. To avoid this and bring the work out from under the graving-tool for better inspection, we construct the table so that it may be swung forward, as indicated in Fig. 3. A plate *b* is made to fit the slot in the standard A, and is held in proper position by the clamping-bolt *p*. At the foot of plate *b* small brackets *b' b'* project, and just above them is held by pivot-screws *r r* the lower end of bracket B, which is forked in the manner shown. The sides of bracket B are not connected at the back except by the narrow strip *u*, just above which in plate *b* is a clamping-button *s*. By giving this button a half-turn the projection *t* is brought above *u*, and the bracket may then be swung forward and allowed, if desired, to rest on the small brackets *b' b'*. The threads on *s* cause the projection *t*, when turned down, to be drawn tightly against strip *u*, and thus hold the bracket B firmly against plate *b*.

We do not wish to confine ourselves to the exact arrangement and construction of parts as herein described, as it is evident that various changes may be made in particular details without departing from the spirit of our invention.

The machine as above constructed is very simple and can be held under complete control by the operator. A large range of work can be done very quickly and with a high degree of precision and perfection. It is especially adapted for engraving monograms, crests, coats of arms, copper plates for printing, &c.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. In a pantograph engraving-machine the combination of a tool-arm adjustably attached to the pantograph-arm, a support adapted to follow the adjustment of the tool-arm, a bar held by the support transversely beneath

the tool-arm, and means for raising and lowering the bar in the support substantially as described and for the purpose set forth.

2. In a pantograph engraving-machine the combination of a tool-arm adjustably attached to the pantograph-arm, a support adapted to follow the adjustment of the tool-arm, a bar held by the support transversely above the tool-arm, and means for raising and lowering the bar in the support substantially as described and for the purpose set forth.

3. In an engraving-machine, the combination with the tool-arm, of two parallel bars transversely disposed with relation to the tool-arm, the one below and the other above the arm, an adjustable support therefor, and means for raising and lowering the bars substantially as described and for the purpose set forth.

4. In an engraving-machine, the combination, with the tool-arm, of two parallel bars transversely disposed thereto, the one below and the other above the arm, rigid connections between the bars, an adjustable support therefor, vertical guides for the bars on the support, parallel links connecting the bars with the support, a spring exerting an upward pressure on the bars, and a chain or cord attached to the end of one of the bars, substantially as described and for the purpose set forth.

5. In an engraving-machine, the combination of a tool-arm provided at its end with a horizontal yoke, a tool-holder pivoted in the yoke, a double socket in the holder whereby the graving-tool may be held with its point up or down, a clamping-screw for holding the tool in place, an arm extending laterally outward from the tool-holder, and an adjustable upright connected to the arm and to the base of the machine by swiveled joints.

6. In an engraving-machine, the combination, with the standard, of a plate adapted to slide vertically on the standard and to be held in proper adjustment thereon, a work-table so hinged to the plate as to be dropped down to a vertical position for inspecting the work, and a clamp on the plate for securing the work-table in its normal horizontal position, substantially as described.

In testimony whereof we have affixed our signatures in presence of two witnesses.

WILLIAM S. EATON. [L. S.]

WILLIAM T. GOODNOW.

Witnesses as to signature of William S. Eaton:

FRANK B. GLOVER,

JAS. G. COOPER.

Witnesses as to signature of William T. Goodnow:

GEO. H. MAURICE,

THOS. W. DOWNING.