

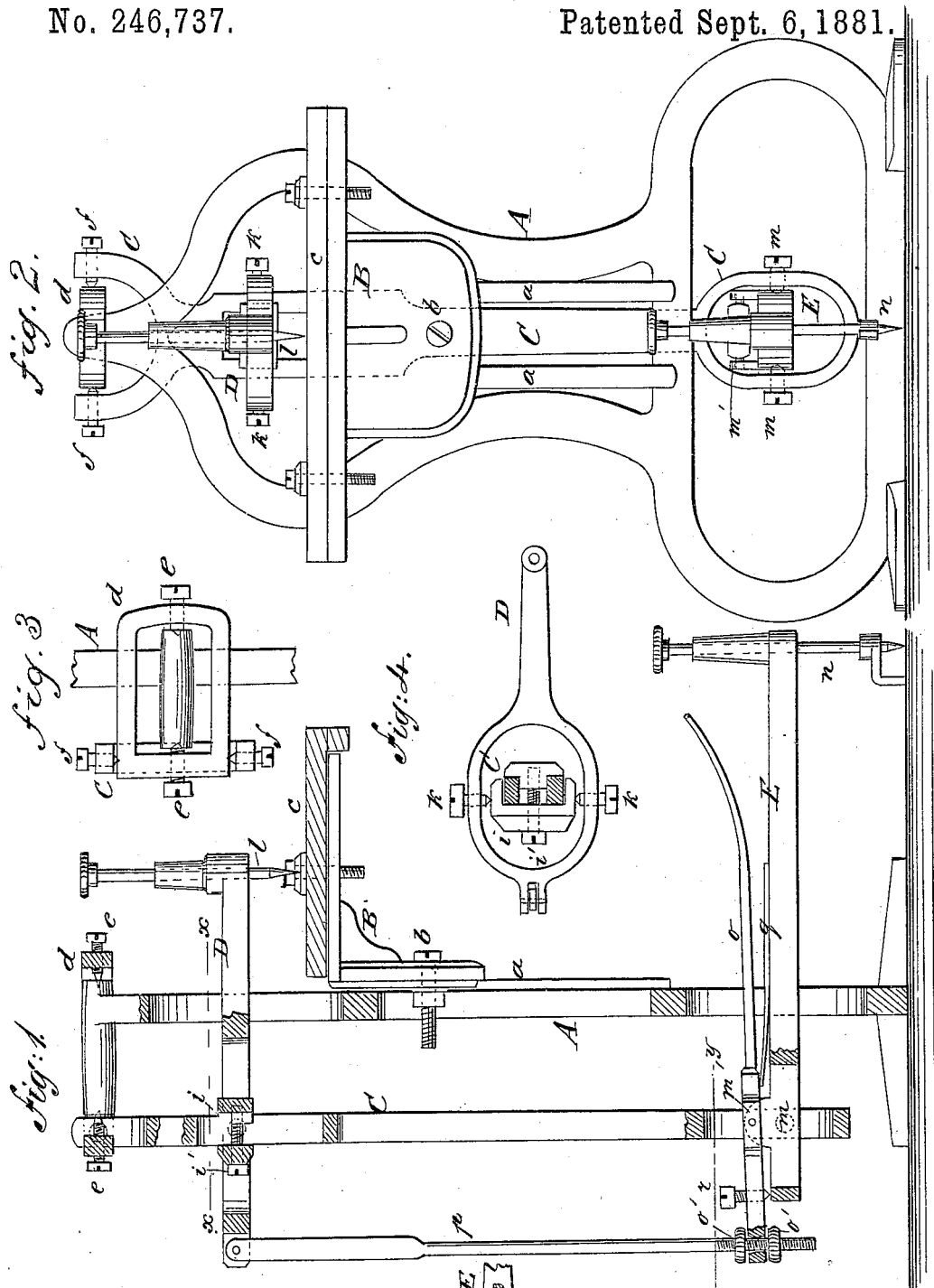
(No Model.)

S. D. ENGLE.

PANTOGRAPH ENGRAVING MACHINE.

No. 246,737.

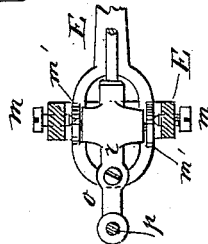
Patented Sept. 6, 1881.



WITNESSES:

*Chas. Nida*  
*C. Sedgwick*

*Fig. 5.*



INVENTOR:

*S. D. Engle*  
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ATTORNEYS.

# UNITED STATES PATENT OFFICE.

STEPHEN D. ENGLE, OF HAZLETON, PENNSYLVANIA.

## PANTOGRAPH ENGRAVING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 246,737, dated September 6, 1881.

Application filed April 22, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, STEPHEN D. ENGLE, of Hazleton, in the county of Luzerne and State of Pennsylvania, have invented a new and Improved Pantograph, of which the following is a full, clear, and exact description.

My invention relates to pantographs for use in engraving on metal, for reducing maps and drawings, and similar work.

The object of the improvements is to furnish a simple, light, and convenient apparatus for the purpose stated, which by a change of the tool is adapted for the special work required.

The invention consists in certain novel features of construction in the pantograph proper, and also in devices for regulating the pressure of the tool, as hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a vertical section of the pantograph. Fig. 2 is a front elevation of the same. Fig. 3 is a plan view showing the suspension-joints of the main arm. Fig. 4 is a horizontal section on line *xx* of Fig. 1, and Fig. 5 is a horizontal section on line *yy* of Fig. 1.

Similar letters of reference indicate corresponding parts.

A is an upright frame or standard, which will be rigidly sustained on a suitable bed for the work.

B is a bracket, sustained between guides *aa* on the standard A by a clamping-screw, *b*, that passes between the guides, and has a nut or washer taking behind them, so that the bracket is vertically adjustable on the standard.

*c* is a table, attached upon brackets B by screws passing into the bracket through slots in the table, to allow lengthwise adjustment of the table.

C is the main arm of the pantograph, suspended from the upper end of standard A. On the upper end of the standard a yoke, *d*, is hung by pointed screws *e*, tapped through opposite ends of the yoke, and the upper end of arm C is forked to pass at opposite sides of the yoke, to which the forks are pivoted by pointed screws *f*. These connections constitute a gimbal or universal joint that permits free movement of the arm. The arm C is slotted in its upper portion, and in the slot is a slide, *i*, made of two parts clamped upon opposite sides of the arm by a screw, *i'*, passing

through the slot, so that the slide is adjustably held.

D is the tool-arm, apertured, as shown in Fig. 4, to surround the arm C and slide *i*, and attached to the slide by pointed screws *k*, which permit the arm to swing in a vertical plane. In the forward end of arm D, and above table *c*, is fitted the graving or other tool or pencil *l*.

The tracer-arm E is hung at the lower end of the main arm by screws *m*, that pass through the forks of the arm C into the arm E. At the forward end of arm E is fitted the tracer *n*, and at its rear end the tracer-arm is formed with lugs or flanges *m' m'*, between which is hung a lever, *o*, that extends to a point near the tracer *n* so that it may be operated with the hand holding the tracer. A rod, *p*, extends from the back end of lever *o* to the back of the tool-arm D, where it is attached by a pivot-pin. This rod *p* passes through lever *o*, and is held thereto by nuts *o'* at opposite sides of the lever, so that the rod connects the lever *o* and arm D rigidly, and by adjustment of the nuts the length between the two arms can be varied. A spring, *q*, on the arm E acts to press the forward end of lever *o* upward, and consequently raise the tool *l* from table *c*. The movement is limited by a screw, *r*, tapped through the lever and bearing on the arm E.

The operation is as follows: The pattern is laid on the bed beneath the tracer *n*. The tool-arm D is adjusted in the standard A by moving slide *i* up or down according to the reduction required. The operator then, holding the tracer end of arm E, guides the tracer on the lines of the pattern, at the same time presses down the lever *o*, and thus brings the tool or pencil *l* down upon the work on table *c* with the required pressure.

The pantograph will do the finest work with great perfection in copying, map-reducing, engraving on metal, and similar work.

The apparatus is simple, easily adjusted, and convenient for use. When used for engraving metal surfaces, the tool and tracer will be retained with their faces corresponding by an endless chain running over spiked pulleys. The pulleys will have spikes corresponding in number, so that the tool and tracer shall always hold the same relative position.

Having thus described my invention, what

I claim as new, and desire to secure by Letters Patent, is—

1. The combination of standard A, arm C, suspended from the standard by double-jointed connections, pivoted tool-arm D, pivoted tracer-arm E, and work-table *e*, substantially as shown and described, and arranged for operation as set forth.
2. The combination of the adjustable slide *i*, pivoted tool-arm D, and slotted pantograph-

arm C, substantially as and for the purposes set forth.

3. The combination of lever *o*, rod *p*, tool-arm D, tracer-arm E, and suspended arm C, substantially as shown and described, and arranged for operation as set forth.

STEPHEN D. ENGLE.

Witnesses:

JOHN A. BARTON,  
C. BACHMAN.