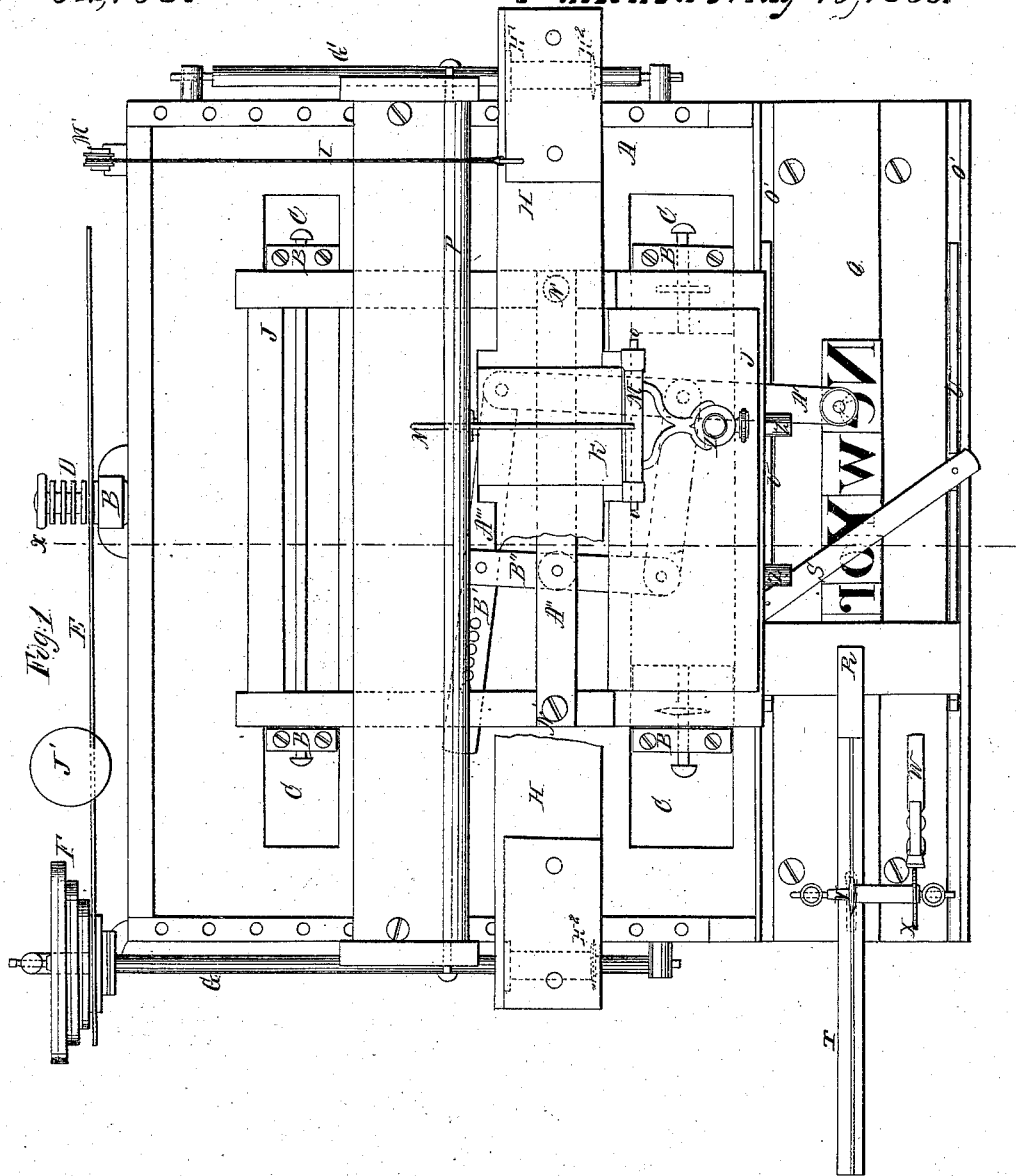


E. Oldham,

Engraving Machine.

N^o 54,759.

Patented May 15, 1866.



Witnesses:
Wm. E. S. Jr.
Geo. C. Busch

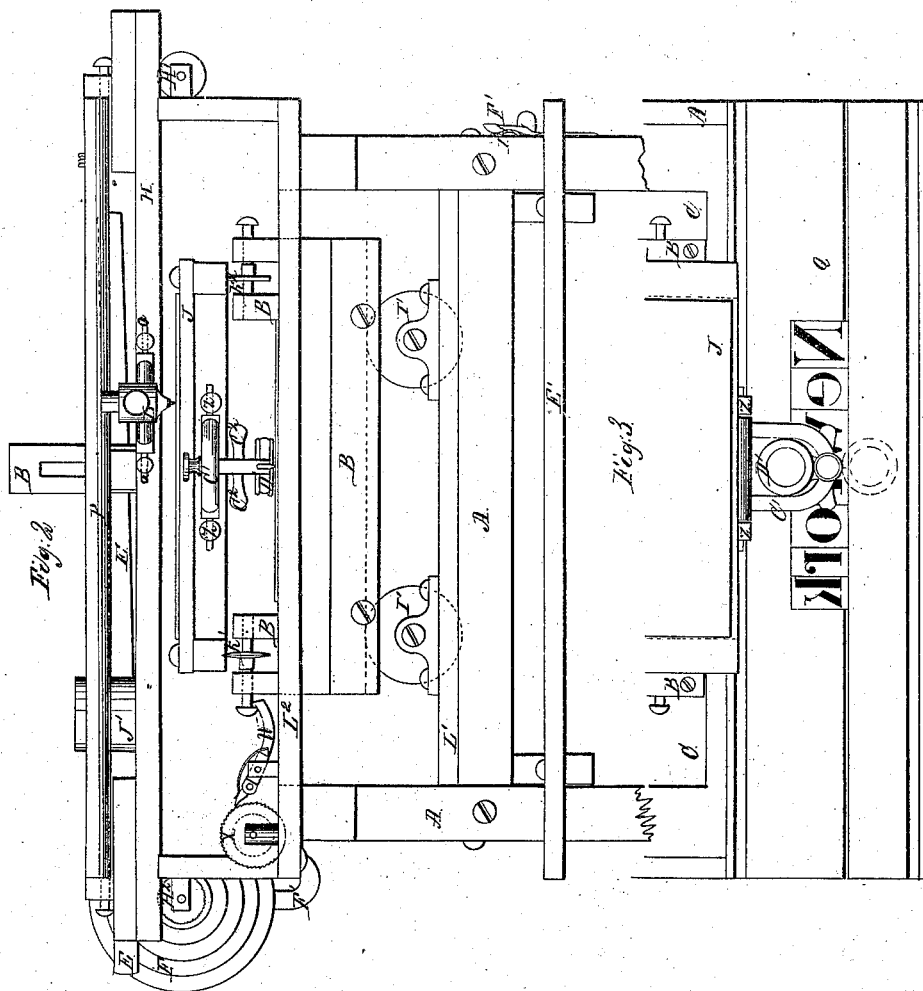
Inventor:
Edmund Oldham
per Wm. S. C.
Attorney

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Wm. C. Smith
Thos. Busch

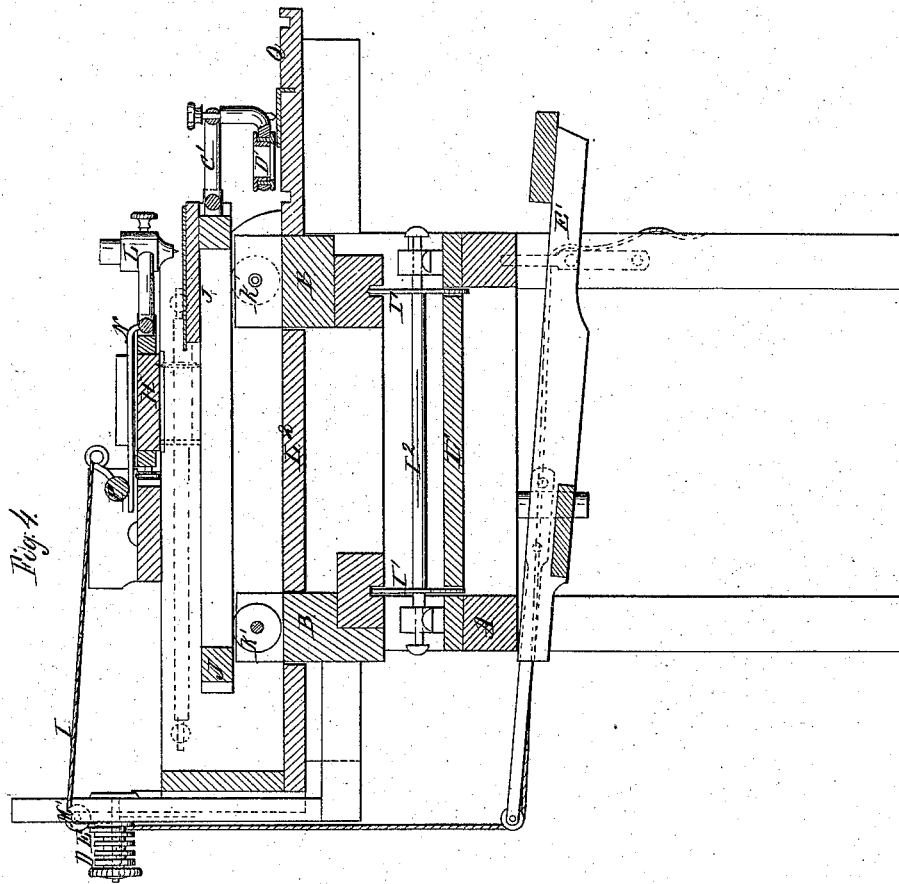
Inventor:
Edmund Oldham
Jas. Munroe
Attorneys.

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Wm. C. Smith
Thos. L. Smith

Inventor:
E. Oldham
For Inventor
Attorneys

UNITED STATES PATENT OFFICE.

EDMUND OLDHAM, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN PANTOGRAPHIC MACHINES.

Specification forming part of Letters Patent No. 54,759, dated May 15, 1866.

To all whom it may concern:

Be it known that I, EDMUND OLDHAM, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Pantograph-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a plan of a machine made according to my invention, the tracer C' being left off. This view also shows a ruler of peculiar construction applied upon the pattern-table. Fig. 2 is a front elevation, the legs of the machine being broken away. Fig. 3 is a top view of the pattern-table and of adjacent portions of the front of the machine, showing, also, the tracer attached to the front of platform J. Fig. 4 is a cross-section taken on the line *x* of Fig. 1.

Similar letters of reference indicate like parts.

This invention relates to pantographic engraving-machines; and it consists in certain novel devices and combinations whereby the machine is made capable of producing copies of the same size as the pattern; also, of producing copies either smaller or larger than the pattern, but preserving the relative proportions; also, of producing copies with any selected part of the outlines out of proportion; also, of producing a series of parallel lines by means of a ruler which is made to advance over the pattern by the action of a pawl and ratchet.

One of said novel devices is a transparent tracer, consisting of a glass with a dot on its surface, to be used instead of a metallic tracer. One advantage of such a tracer is seen in tracing from a paper sketch, where a metallic tracer will obscure a portion of the line to be followed.

The letter A designates the frame of the machine, which is made with a lower floor or table, L', and an upper floor or table, L², the latter being at the same elevation with the pattern-table Q. The table L' has blocks or bolsters which support the journals of two shafts, I², extending transversely of the machine, on which, near their ends, are mounted wheels I', two on each shaft. These wheels sustain a carriage, B, whose front and back

ends are elevated so as to reach upward through slots C C made in the upper floor or table, L². The carriage B is prevented from becoming displaced by reason of grooves on its under side, in which the wheels I' enter. The length of the slots C is determined by the extent of movement required of the carriage, which, in turn, is governed by the length of the pattern. On the ends of those parts of the carriage B which extend up through said slots C are wheels K', (four in number,) which sustain a carriage, J, that moves transversely of the machine, at right angles to the direction of motion of carriage B. The wheels K', that are under one side of the carriage J, run in grooves to prevent the displacement of the carriage.

Below the lower floor or table, L', is a treadle, E, on whose rear end is placed a pulley, over which passes a cord or band, I, that passes thence upward behind the machine and over a pulley, M', fixed on the back part of the frame, and thence above the machine to a cylinder, P, which extends across the machine from side to side. The journals of this cylinder are set eccentrically, and consequently the side of its greatest diameter will be the lowest when in its normal position.

The band I is fastened to an arm that extends from the side of the cylinder, as seen in Fig. 4, the raising of the treadle causing the cylinder to be drawn over backward, and so carrying its largest side upward and off from the lever N of the diamond pointer L. This pointer extends from the point of a plate, K, which is adjustably fixed on a carriage, H, so that it may be placed at different positions lengthwise of that carriage. The pointer itself extends from a bar, M, whose ends are secured between pivots o o, which pass through brackets on the front of the plate K.

The lever N is fixed to the bar M, and when the lever is raised the pointer L is lowered, and when it is lowered the pointer is raised.

The free end of band I is secured at pleasure in a wedge-shaped notch made with the side of the frame by an angular piece, F', so that the band can be taken up more or less, according to the degree of depression to be given to the lever N of the diamond pointer.

The carriage H is mounted on wheels H² H', fixed on shafts G G', which turn on brackets placed outside of the ends of the frame. The

wheels H² on the shaft G are toothed on their peripheries to enable them to take hold of the bottoms of the grooves made for them in the bottom of carriage H, so as to insure that the carriage will always be moved to and fro with the rotation of the said shaft G. That shaft has on its rear end a cone of pulleys, which receive the toothed edge of a bar, E, which extends to or beyond a bracket, D, to which also it is adjustably attached. This bracket is attached to a part of the carriage B which rises up behind the frame, and has a slot in it, so that the bracket, by means of a tightening-nut, can be fixed at different elevations, to bring it level with whatever pulley of the fusee the bar E is to be engaged.

The bracket D has grooves cut circumferentially on it to correspond with the number of pulleys of the fusee, the several grooves and pulleys being respectively in the same plane. In this example I connect the bar E with the bracket by forming a square opening on the under side of the bar and dropping it into any one of the grooves, when the opening will fit over the central part of the bracket and be carried along to and fro with the carriage B.

It is evident that the movements of the carriage B will, by means of the bar E, impart to the shaft G a rotary motion, and that such motion will be more or less rapid according to the position of the toothed bar on the fusee. If the bar is on the largest pulley of the fusee, the shaft G will be rotated at a comparatively slow speed, and since that shaft gives motion to the carriage H, it follows that said carriage will also be moved at a comparatively slow speed, and of course will move a distance proportionately less than when the bar E engages a pulley of less diameter.

Since the carriage H carries the diamond pointer or graver, it follows from this construction that the carriage J, on which is placed the plate to be engraved, and to which carriage the tracer is attached, will be moved in the same direction with the carriage H, which carries the diamond pointer or graving-tool, and that the distance through which the latter carriage moves in the time the carriage J is in motion will depend on the speed of rotation of the shaft G. Both these carriages move in the same direction, and therefore it follows that the figure traced will be reduced in breadth according as the speed of shaft G is diminished.

I have arranged the machine so that it can receive and be operated with an ordinary skeleton pantographic instrument, A', which is seen in Fig. 1, attached to carriage H of the machine, so that it can be used in the place of tracer C'.

In arranging the machine to receive the pantographic instrument A', I have placed a standard, B', on the floor or table L² of the machine, and have made several holes on the top of the side pieces of carriage J, in which holes screws N' are fitted. A bar, A'', is pivoted to that one of the short bars B'' of the

instrument which is parallel with the bar that carries the tracing-point. Said bar A'' extends from side to side of carriage J, and is fixed thereto by means of the set-screws N'.

The long bar A''' has numerous holes which fit a pin on the top of standard B', and enable me to change the center of motion of that part of the instrument nearer to or farther away from the short bar B''. Although the fixed bar A'' is on top of the carriage J, yet the instrument itself is below it and the tracing-point projects over the tracing-table from beneath the said carriage, as seen in Fig. 1.

The tracing-table Q has longitudinal grooves O' O', which receive guiding-arms U U, that extend from the right-hand end of a ruler, which is seen in Fig. 1, placed on said table ready for use.

The body R of the ruler is raised high enough to enable it to move above the tracing-patterns, and a bar, S, is placed diagonally on the arms U to the right of the part R. From the left-hand end of said part R extends a rack, T, whose teeth are sunken in the bottom of a groove.

When the ruler is in proper position on the table Q to be operated, the teeth of its rack are engaged by a toothed wheel, V, on an arbor which is mounted on low standards rising from the left-hand end of the tracing-table. Said arbor carries also a toothed wheel, X, which is turned by means of a spring-pawl, W, which is operated by the finger of the artist in order to rotate the wheel V and so drive the ruler along over the tracing-table as the work progresses. The rack T moves beneath the toothed wheel V, against which it is held by a spring placed on the tracing-table directly beneath said wheel V.

I am aware that in pantographic machines the use of two carriages, one mounted upon the other and moving at right angles therein, while the lower carriage is moved lengthwise of the machine, is not new, and I therefore do not claim such carriages; but my improvement consists, in part, in the way in which I operate them so as to dispense with straps and belts in moving them, such devices being the constant and prolific cause of imperfect work, substituting for them wheels and axles, on which the carriages are severally mounted.

The pattern having been placed on the table Q, the tracer C', which is pivoted to the brackets Z Z, is moved by its handles C² over the figure to be reproduced, and the motions of the carriages are combined so that the plate to be engraved, which is fixed on carriage J, will be moved beneath the diamond pointer L, which, by means of the treadle E, may be raised off or lowered upon the plate at pleasure. The diamond pointer is so attached to the adjustable plate K as to be capable of vibration on pivots O O.

It is often desirable or necessary in engraving bank-notes to expand a letter or figure in width or length in order to occupy a given surface therewith, it being often required, also,

that such letter or figure shall be of the same general character or description as others which are produced on the plate. My invention enables the engraver to accomplish this result by giving to the diamond pointer independent movements while the plate is being moved beneath in obedience to the motions of the tracer.

The carriage H, to which the diamond pointer is attached, is caused to move in like directions with the plate-bearing carriage J, but with a speed which differs from the speed of that carriage, according as it is moved from the smaller or larger end of the fusee-pinion.

The fusee-pinion may be altered in size and in the number of its pulleys to suit the work to be produced.

The ruling device herein shown enables me to produce parallel lines on the plate to be engraved with accuracy and facility, the pawl W being operated by the hand of the operator and its extent of motion being so graduated that the wheel V will be turned the same number of degrees at each movement of the pawl, and consequently the rack T and the ruler will be moved with uniformity. The tracer is moved along the edges of the ruler, and its motions will be reproduced upon the work by the diamond point with the same regularity that distinguishes the advances of the ruler.

When plain work, or work in which the exact proportions of the copy are to be retained, is to be produced, the carriage H is allowed to remain stationary, which is accomplished by removing the bar E from the machine. The said bar is kept in place by a weight, J', which also serves to produce sufficient friction on the pinion F to insure the rotation of the shaft G.

When an engraving is to be produced from a plain or smooth surface, as from a paper sketch, the work has been accomplished here-

tofore by means of a metallic tracing-point, which, when it is moved in a direction away from the operator, obscures and hides from view the lines of the sketch, and makes it uncertain whether the tracing-point is accurately following the outline or not. By my invention I provide for this difficulty by substituting for the metallic tracing-point an eyeglass, D', fixed to the tracer C' in any convenient way, which glass has a black point or dot inscribed on it at its center, as shown in Fig. 2, where the glass and its frame are shown in proper position upon the tracer C'. They are also shown in red outline in the same figure in order to illustrate their construction more clearly. By means of this part of my invention I am able to trace with certainty any line of a sketch, having always a clear and unobstructed view of the lines thereof.

The glass may be convex or plane, as desired, and may be attached to the tracer C' in any convenient way.

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

1. In pantographic machines, the use of an eyeglass with a speck or dot on its surface, for the purpose of tracing outlines of plane or other surfaces, substantially as above set forth.
2. The means above described for giving independent movements to the diamond pointer, to wit, the bar E, the fusee-pinion F and its shaft G, and the toothed wheel H², on which the carriage H rests, substantially as above set forth.
3. The ruling device R S T, constructed and operated substantially as set forth.

EDMUND OLDHAM.

Witnesses:

M. M. LIVINGSTON,
C. L. TOPLIFF.