E. WARE.

PANTOGRAPHS.

No. 190,797. Patented May 15, 1877.

Fig. 1

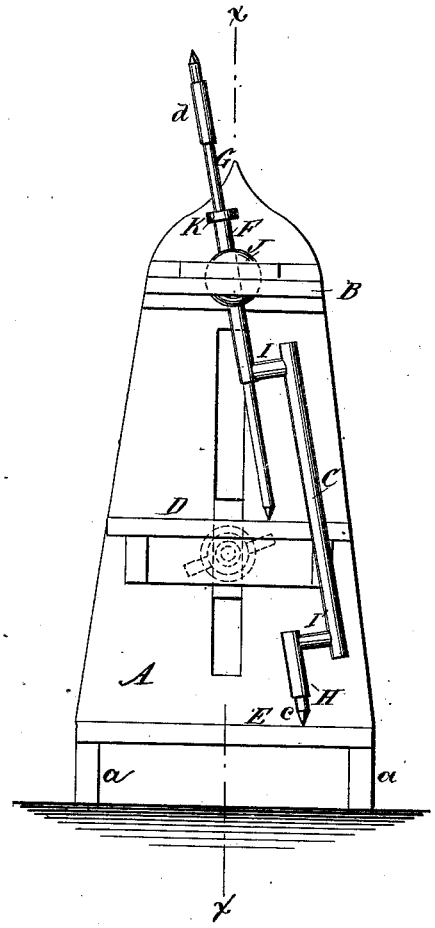
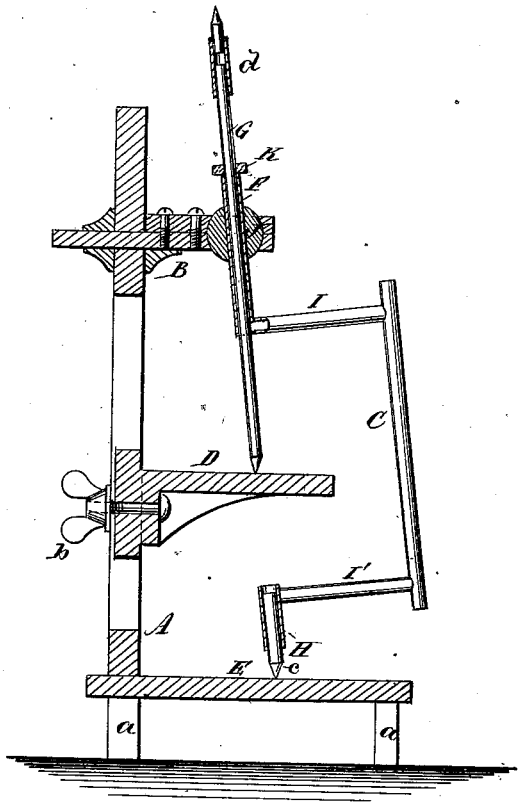


Fig. 2



WITNESSES:

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ELIJAH WARE, OF OMAHA, NEBRASKA.

IMPROVEMENT IN PANTOGRAPHS.

Specification forming part of Letters Patent No. **190,797**, dated May 15, 1877; application filed March 19, 1877.

To all whom it may concern:

Be it known that I, ELIJAH WARE, of Omaha, in the county of Douglas and State of Nebraska, have invented a new and Improved Pantograph, of which the following is a specification:

In the accompanying drawing, Figure 1 is a front elevation of my improved pantograph. Fig. 2 is a vertical section of the same on line *x x* in Fig. 1.

Similar letters of reference indicate corresponding parts.

My invention relates to pantographs for enlarging and reducing drawings; and it consists of a bent lever capable of universal motion, and carrying a tracing-point and a pencil, both of which are arranged in the same axial line and work upon separate tables placed one above the other.

In the drawing, A is a slotted standard supported by the table E having legs *a'*, and B is a bracket projecting at right angles from the upper end of the standard A, and having a socket in which the ball J is placed. This ball is bored axially to receive the tube F, in which is placed the rod G. Upon the upper end of the tube F there is a collar, K, which keeps it from slipping through the ball, and a tubular arm, I, is attached at right angles to the lower end of the said tube, and is connected with the bar C, which extends downward parallel to the line of the tube F. The bar C is connected by the bar I' with a short tube or pencil-holder, H, which is arranged upon the same axial line as the tube F. A table, D, supported by a bracket, which is adjustable in the slot of the standard A, is clamped in any desired position by the thumb-screw *b*.

The lower end of the rod G is pointed for the purpose of tracing any design that may be placed on the table D, and a pencil, *c*, is placed in the holder H for making an enlarged copy of the design on the table D upon a piece of paper secured to the table E.

The tube F is free to slide through the ball J, and the rod G slides freely in the tube F, so that the point of the rod G and the pencil *c* may always move in contact with their respective tables, or with the paper that may be placed thereon.

The relative size of the copy and tracing may be varied by moving the table D. Moving it up makes the tracing larger, and moving it down smaller.

It is obvious that a tracing-point may be used in connection with the rod G. When it is desired to arrange the instrument in this way the rod G is inverted, and the pencil connected with it by means of a short piece of tube, as shown at *d*.

The advantages claimed for my improved pantograph are simplicity and compactness, as compared with other kinds now in use.

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

1. The combination, in a pantograph, of the bar C having horizontal arms I I' and vertical tubes or point-holders F H', with the frame A, supporting-bracket B, ball J, and tables E D, arranged one above the other, substantially as and for the purpose set forth.

2. The combination of the table E, slotted standard A, adjustable table D, bracket B, ball J, lever consisting of the tube F, bar C, arms I I', and holder H, and the pointed rod G, substantially as herein shown and described.

ELIJAH WARE.

Witnesses:
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