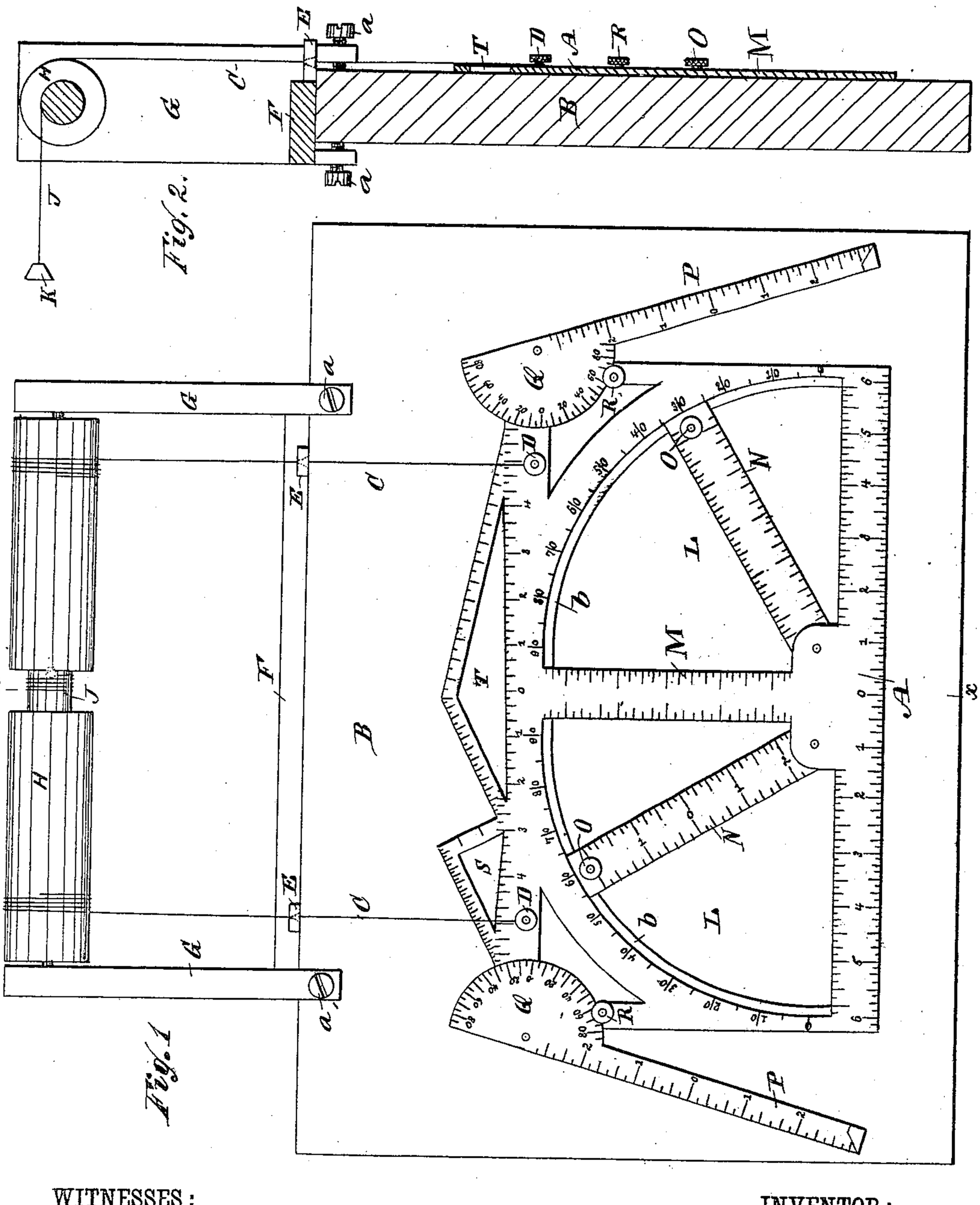
(No Model.)

J. M. SILLIMAN.

INSTRUMENT FOR PROJECTION DRAWING.

No. 262,137. Patented Aug. 1, 1882.



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JUSTUS M. SILLIMAN, OF EASTON, PENNSYLVANIA.

INSTRUMENT FOR PROJECTION-DRAWING.

SPECIFICATION forming part of Letters Patent No. 262,137, dated August 1, 1882.

Application filed December 30, 1881. (No model.)

To all whom it may concern:

Be it known that I, JUSTUS M. SILLIMAN, of Easton, in the county of Northampton and State of Pennsylvania, have invented a new and Improved Instrument for Projection-Drawing, of which the following is a full, clear, and exact description.

The object of my invention is to provide a new and improved instrument for facilitating drawing projections.

The invention consists in a drawing-frame provided with two wires attached to and passing around a roller or shaft reduced to a smaller diameter at the center, on which a wire having a weight or tension-spring at its lower end is wound in the inverse direction of the wires of the drawing-frame, whereby the wires of the drawing-frame will always be held taut, and will always bring the the upper and lower edges of the drawing-frame parallel with the shaft.

The invention further consists in a drawing-frame provided with pivoted graduated arms, with quadrants, and with graduated triangular frames for making crystallographic drawings, as will be set forth hereinafter.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in both the figures.

Figure 1 is a plan view of my improved instrument for projection-drawing, showing it attached on a drawing-board. Fig. 2 is a cross-sectional elevation of the instrument and the board on the line *x x*, Fig. 1.

A quadrilateral frame, A, made of wood or metal, and adapted to rest flat upon a drawing-board, B, is provided with graduations or scales and pivoted arms, as will be fully described hereinafter.

To the frame A two wires, cords, or equivalents, C, are attached by means of binding-screws D, or equivalent devices, which wires each pass through an apertured guide-block, E, projecting upward above the top surface of the board at the upper edge of this board, which blocks E are preferably attached to and project from a bar, F, resting against the upper edge of the board and connecting two arms, G, clamped on the board B by screws *a*, and projecting from the upper edge of the board at right angles to this edge, as shown.

A roller, H, or a pulley-shaft or equivalent is journaled in the outer ends of the arms G, and to this roller the wires or cords C are fastened in such a manner as to wind on the roller (or pulleys) when the frame A is moved toward the upper edge of the board B.

A cord or wire, J, is attached to and wound on the shaft or roller H at or near the middle of the same, and has a weight, K, or equivalent device attached to its lower free end, this cord or wire J being wound on the roller or shaft H in the inverse direction of the windings of the cords or wires C, so that when the wires C are wound on this shaft or roller H the cord or wire J will be unwound.

The blocks E are provided with apertures, which are beveled upward from the outer toward the inner surfaces of the blocks E on a quadrant-line, as is shown in dotted lines, so that when the frame A is moved sidewise the wires C will not be kinked by the edges of the apertures in the blocks E. These blocks are provided with apertures increasing in a curved line from the outer toward the inner surface.

The frame A is provided with graduated scales at the top and bottom edges, and has two quadrant-shaped recesses, L, the rounded edges of which are divided into degrees. The middle transverse strip, M, of the frame A is provided with a different scale on each edge. Arms N, provided with graduated scales along the edges, are pivoted to the lower part of the frame A, so as to swing in the quadrant-recesses L, the outer ends of these arms resting on a projection, *b*, along the curved edge of the recess, as shown. At the outer or free ends these arms N are provided with binding-screws O, for locking them in position at any desired angle to the lower edge of the frame A. Arms P P are pivoted to the upper corners of the frame A, and these arms are provided at their pivoted ends and at their inner edges with semicircular projections Q Q, having the semicircular edge subdivided into degrees. The arms P are provided with graduated scales on the outer edges, and can be held at any desired inclination by means of binding-screws R, acting on the rounded edges of the projections Q Q, as shown. The upper part of the frame A is provided with edges S and T, having the directions of the projected axes in the rectangular and hexagonal systems

in crystallographic projections, each edge being graduated in accordance with the lengths of the projections of equal axes.

The operation is as follows: The wires C are so adjusted that they will be taut when the longitudinal edges of the frame A are parallel with the edges of the board B and with the shaft or roller H. If the frame A is moved toward the upper edge of the board B, the wires C will be wound upon the roller H by the action of the weight K on the cord or wire J, for by this movement of the frame A the wires C C are slackened, and the weight, drawing downward, necessarily causes a rotation of the roller H, whereby the wires C will be wound on the roller. The same length of each wire C is wound on the roller, for both ends of the roller rotate with the same rapidity, and consequently the two ends of the frame A will move with the same rapidity, and in all positions the straight upper and lower edges of the frame A will be parallel with the corresponding edges of the board B. If the frame A is moved toward the lower edge of the board B, the wires C will be unwound from the roller H, and the wire or cord J will be wound on the roller. If the frame A is moved sidewise, the wires C C will bend at the blocks E. In whatever direction the frame A has been moved, it can always be placed parallel with the edges of the board B by pulling the wires C taut—that is to say, there must not be any slack in either wire. Parallel and rectangular lines can thus be drawn very easily on the board by drawing the pen or pencil along the longitudinal edges or ends of the frame A, and lines of any desired inclination can be drawn by drawing the pen or pencil along the arms N N and P P, which can be inclined as desired and locked in position.

The arms P P will be found to be of special service in constructing the outlines of shadows.

The triangle S is to be used for making crystallographic drawings of all the systems but the hexagonal, and the frame T is to be used for making crystallographic drawings of the hexagonal system.

By the use of this instrument all isometrical drawings and cabinet and crystallographic projections can be very easily drawn to any desired scale. It is also designed for the construction of stress diagrams in graphical statics. If one of the movable arms is adjusted in the direction of a represented ray of light and the other three arms are adjusted in directions of projections of rays on the three coordinate planes, the outline of the shadows in isometrical drawing and cabinet projections can be rapidly constructed.

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

1. The combination, with the drawing-frame A, of the wires C, the roller or shaft H on which these wires are wound, the wire J, wound on the roller or shaft H in the inverse direction of the wires C, and of the weight K, attached to the lower end of the wire J, substantially as herein shown and described.

2. The combination, with the drawing-frame A, of the wires C, the guide-blocks E, the shaft or roller H, the wire J, and the weight K, substantially as herein shown and described, and for the purpose set forth.

3. The combination, with the drawing frame A, of the wires C, the guide-blocks E, provided with apertures increasing in size on a curved line from the outer toward the inner surface, the wire J, and the weight K, substantially as herein shown and described, and for the purpose set forth.

4. The combination, with the drawing-board B, of the drawing-frame A, the arms G G, the guide-blocks E, the roller H, the wires C and J, and the weight K, substantially as herein shown and described, and for the purpose set forth.

5. The combination, with the drawing-frame A, of one or more triangles projecting from its upper edge, which triangles have their legs or shanks inclined differently and provided with different graduated scales, whereby crystallographic drawings can be made, substantially as herein shown and described, and for the purpose set forth.

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Witnesses:

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