

(No Model.)

2 Sheets—Sheet 1.

C. W. STICKNEY.

ELLIPSOGRAPH.

No. 274,528.

Patented Mar. 27, 1883.

Fig. 1.

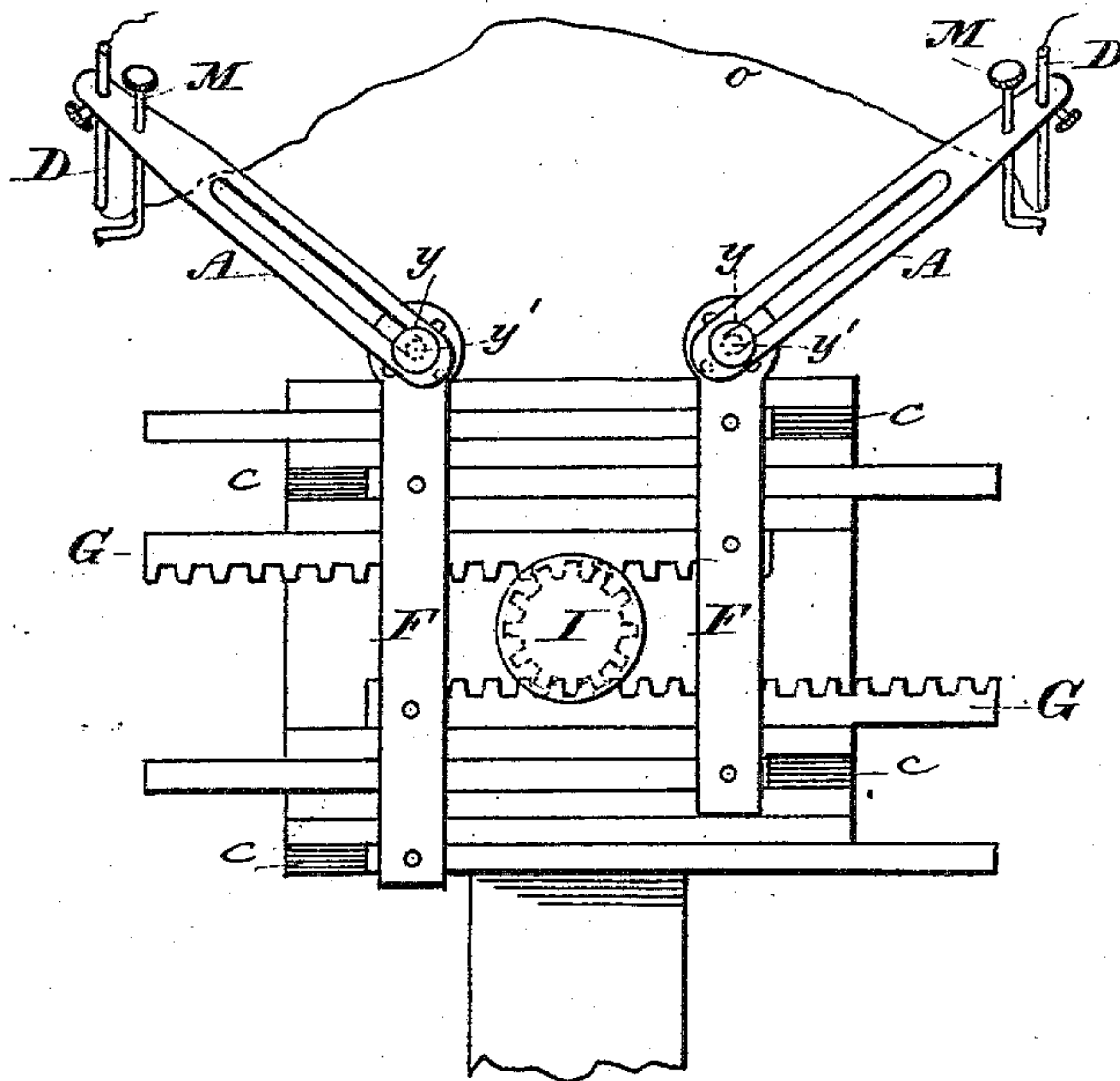


Fig. 2.

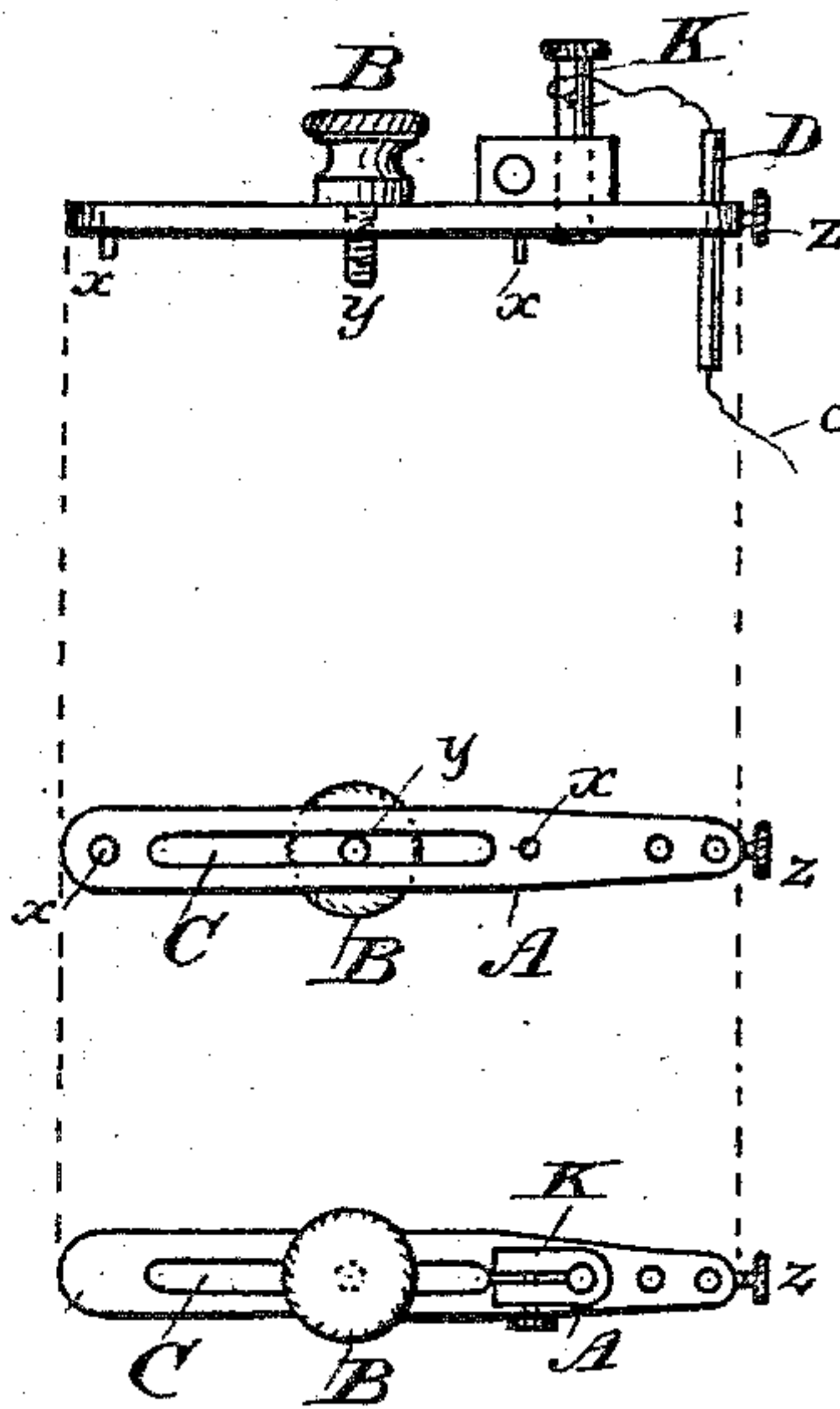


Fig. 3.

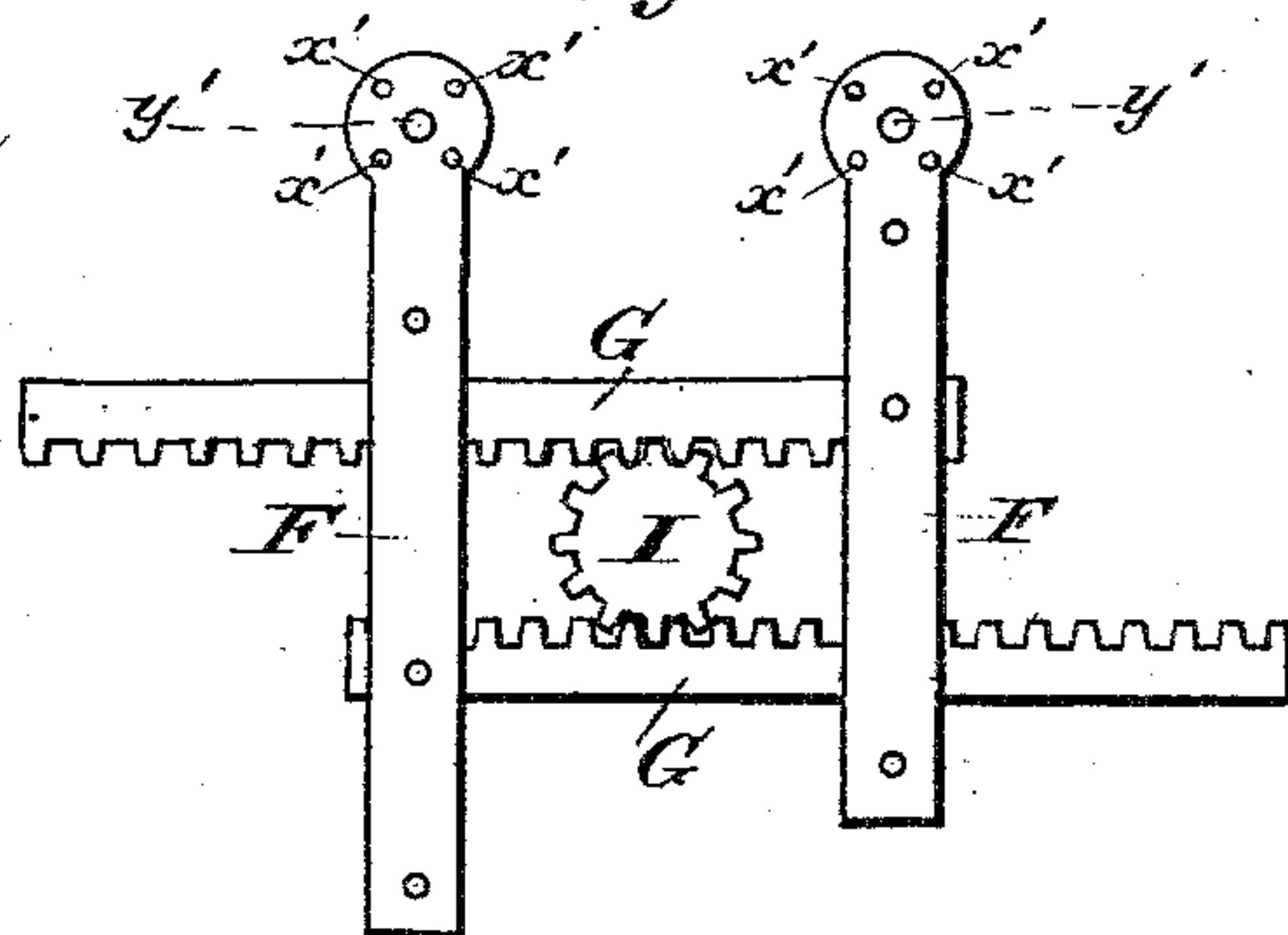


Fig. 5.

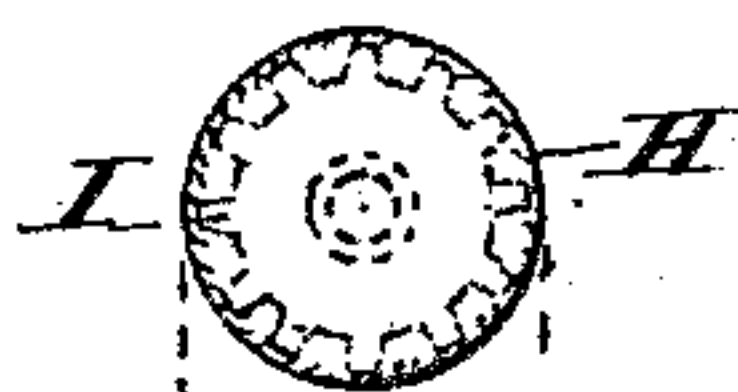
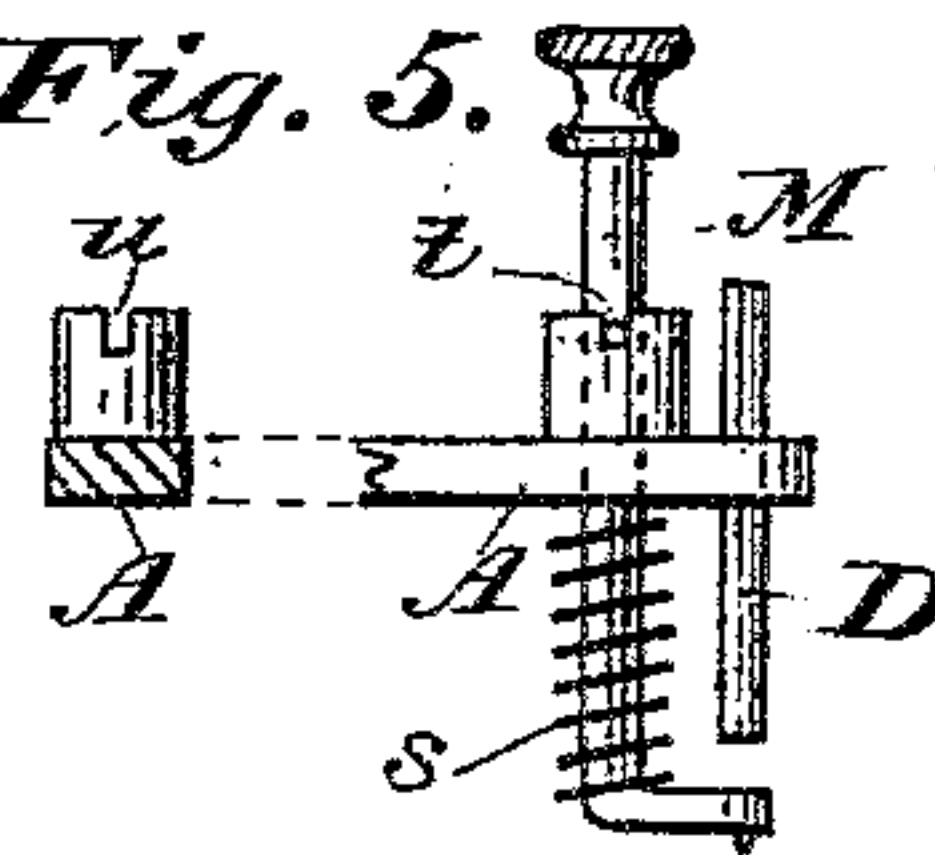


Fig. 4.

Witnesses:

T. C. Brecht.
Chas. D. Paul.

Inventor:

Charles W. Stickney

(No Model.)

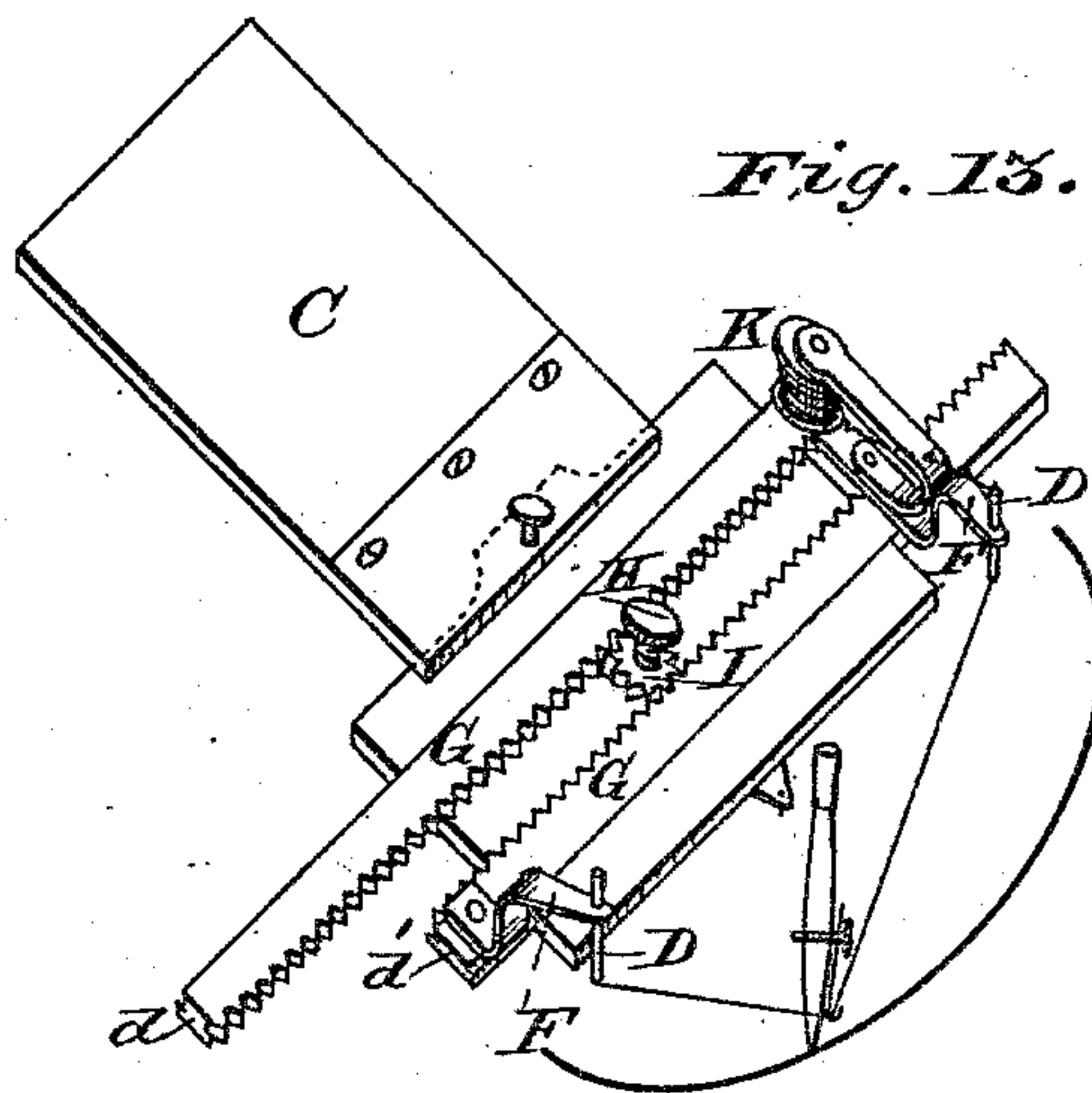
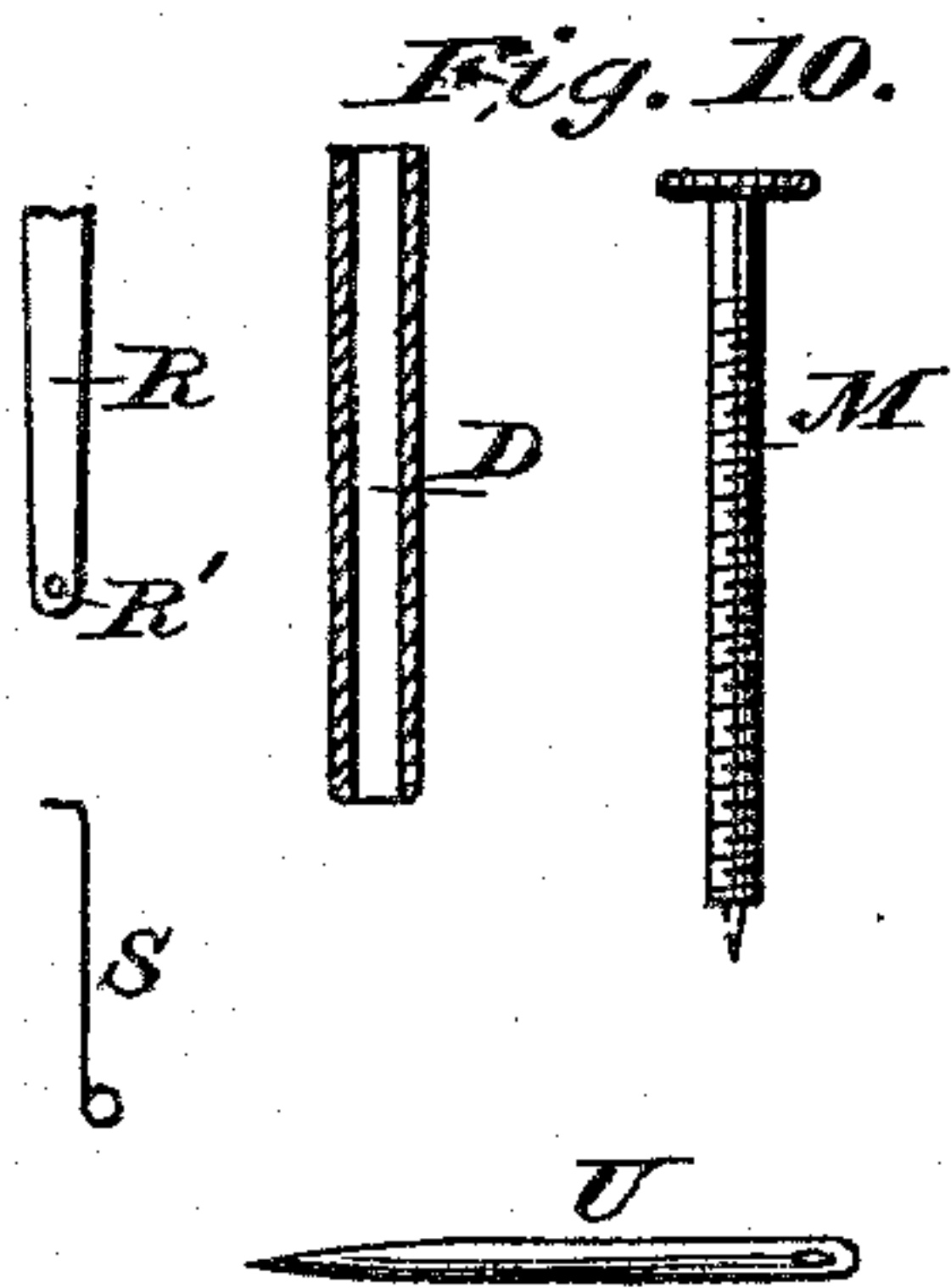
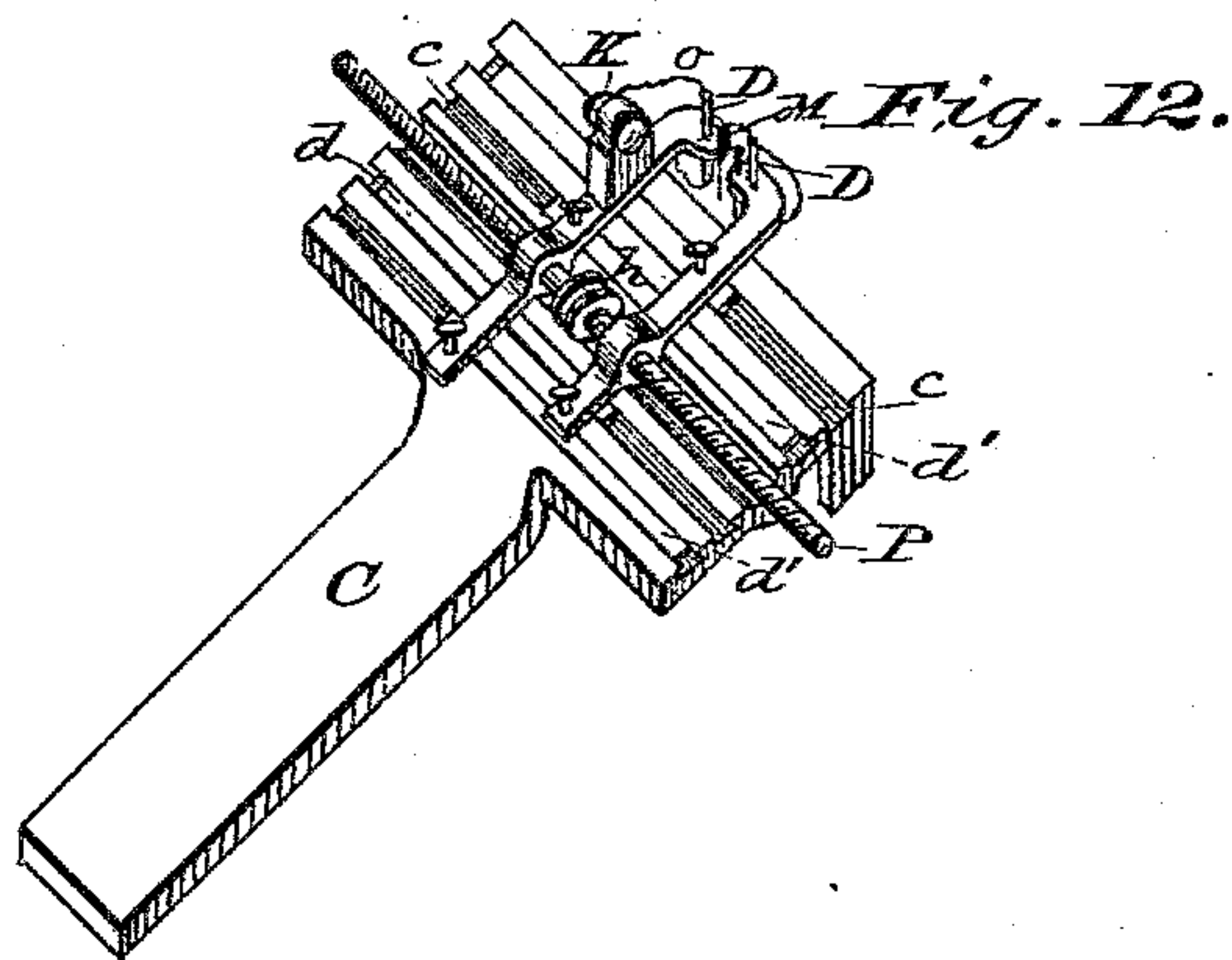
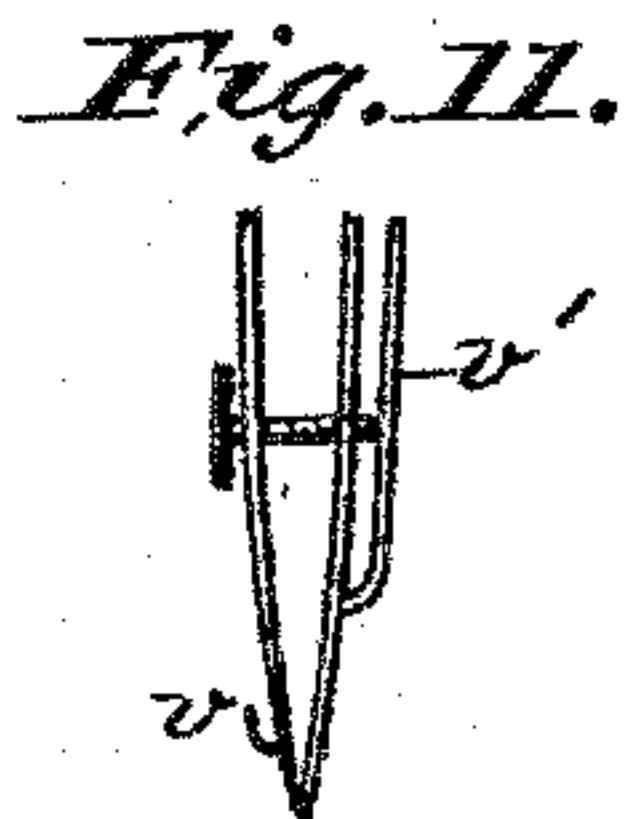
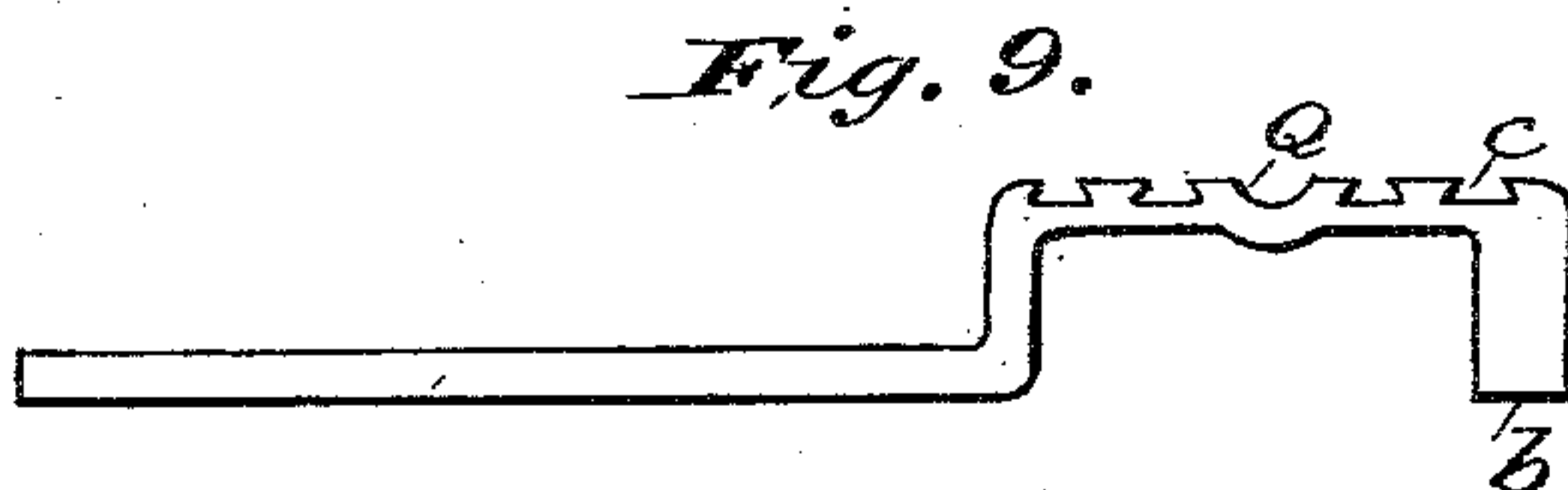
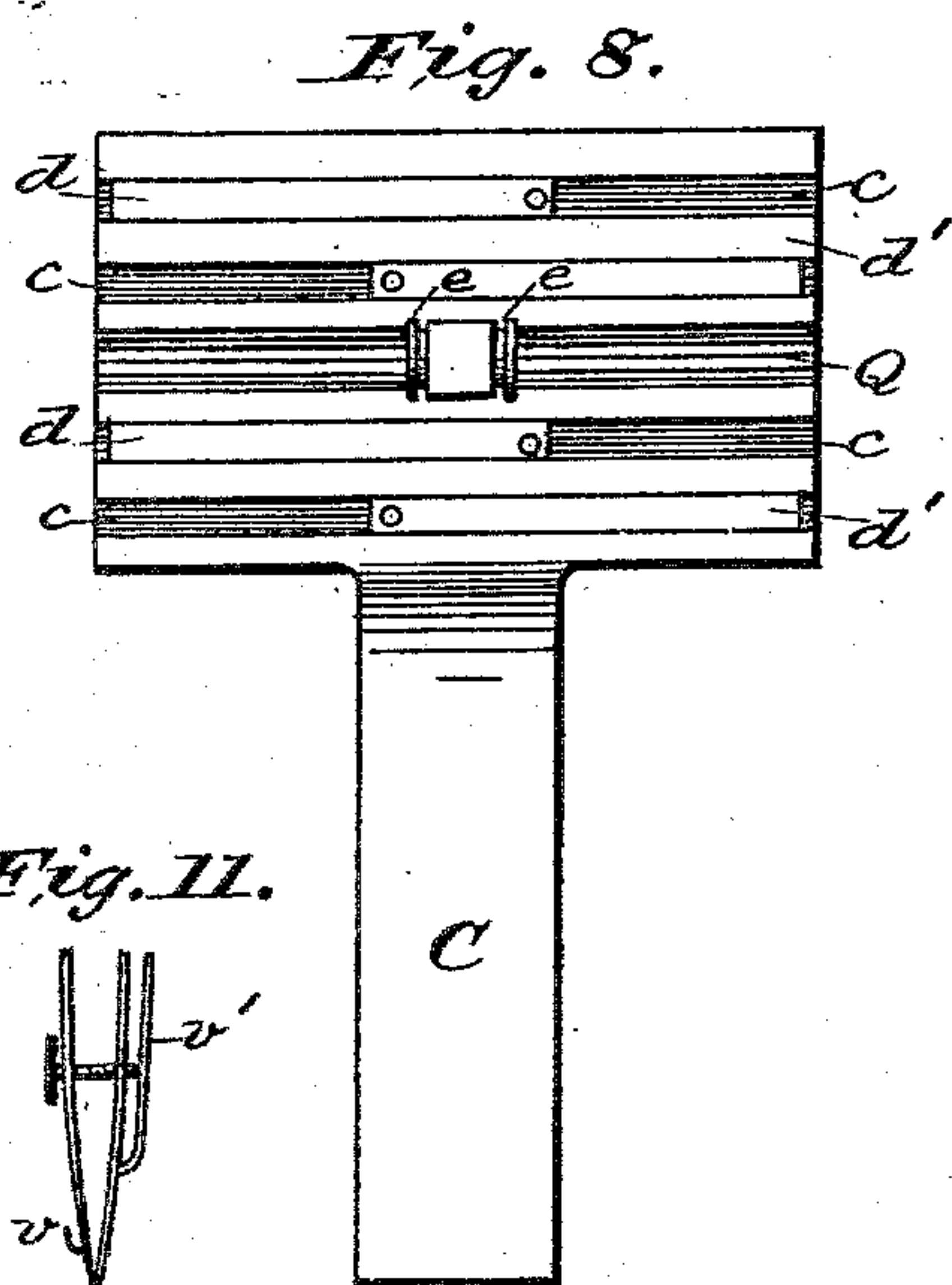
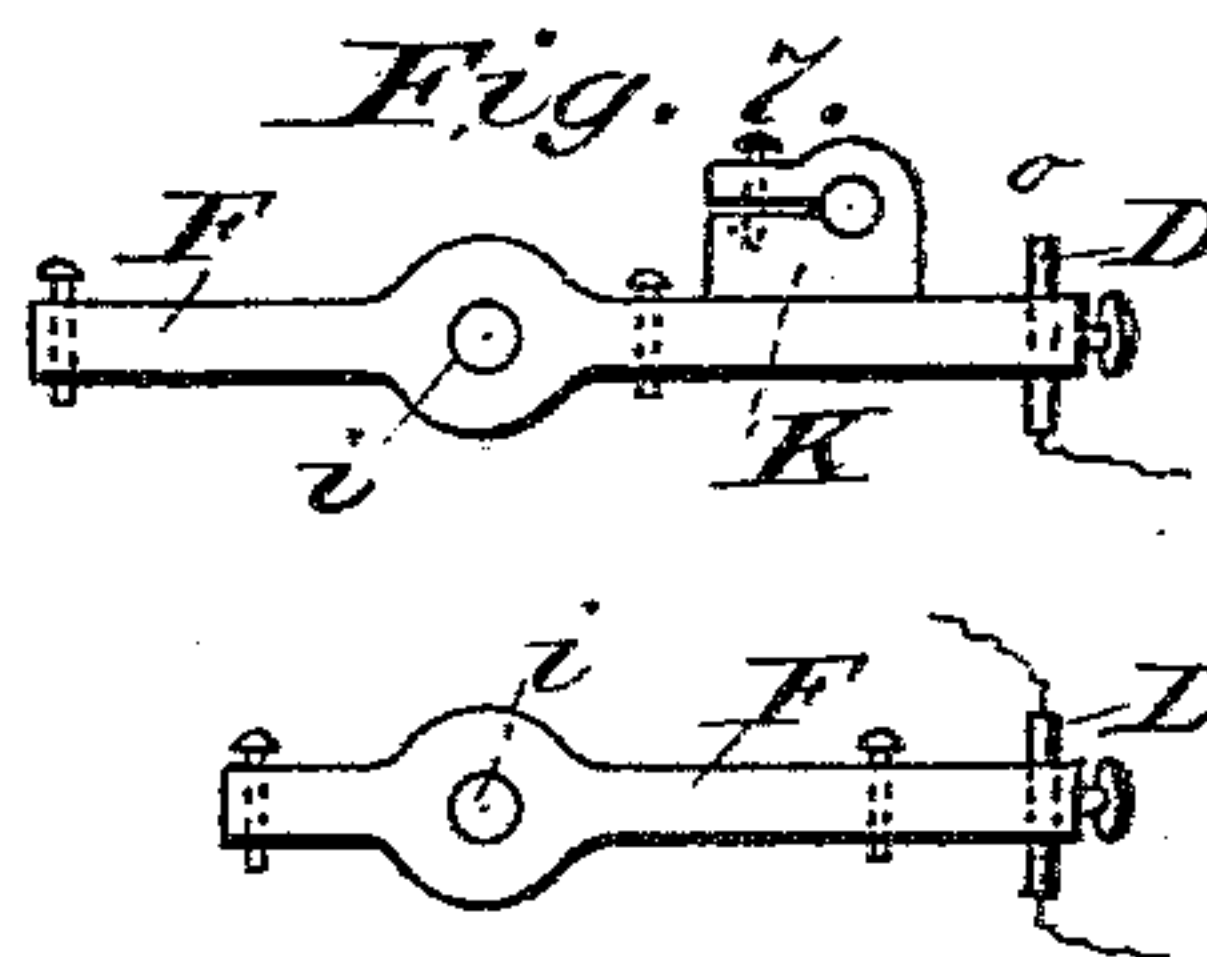
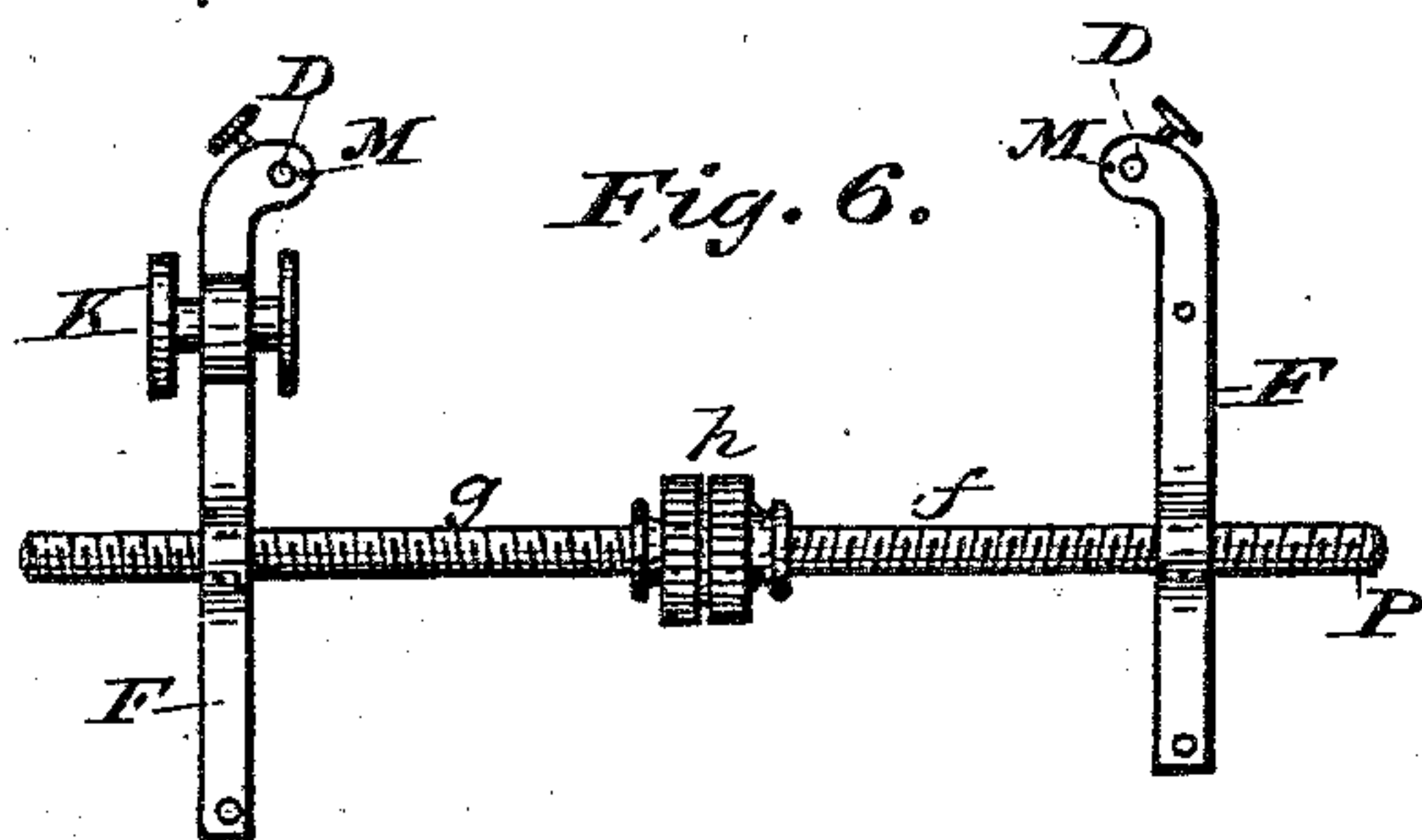
2 Sheets—Sheet 2.

C. W. STICKNEY.

ELLIPSOGRAPH.

No. 274,528.

Patented Mar. 27, 1883.



Witnesses:

J. C. Brecht,

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Inventor:

Charles W. Stickney

UNITED STATES PATENT OFFICE.

CHARLES W. STICKNEY, OF WASHINGTON, DISTRICT OF COLUMBIA.

ELLIPSOGRAPH.

SPECIFICATION forming part of Letters Patent No. 274,528, dated March 27, 1883.

Application filed October 23, 1882. (No model.)

To all whom it may concern:

Be it known that I, CHARLES W. STICKNEY, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Ellipsographs, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention is an ellipsograph. Its main features are a metallic bed with grooves fitted with slides, to which are attached arms projecting beyond the bed and carrying needles, through which passes a cord as guide for a pen, and a milled head whose revolution actuates the needles simultaneously in opposite directions by means of racks and a pinion, (or by a right-and-left-hand screw on one bar,) together with a winding apparatus attached to one arm to control the length of the cord.

Referring to the drawings as a part of this specification, Figure 1 represents the bed, with grooves *c* and slides *d d'*, main arms *F*, extension-arms *A*, foci-needles *D*, and guide-needles *M*. Fig. 2 shows side, top, and bottom views of one extension-arm. Fig. 3 shows the main arms *F*, with racks *G* and pinion *I*. Fig. 4 shows side elevation and top view of milled head *H* and pinion *I*. Fig. 5 shows a side view of a foci-needle *D* and guide-needle *M*, with method of attachment to the extremity of extension-arm *A*. Fig. 6 shows a modification of the main arms *F*, in which they are actuated by right-and-left-hand screws *g f* on one bar, *P*, and the foci-needles *D* are placed directly in them, instead of in the extension-arms, and the guide-needles are made straight and placed beside the foci-needles, in a direct line with them, *h* being the milled head, corresponding to *H*, Fig. 4, and *K* being the winding apparatus in a horizontal position. Fig. 7 shows the side view of the arms *F* of Fig. 6. Fig. 8 shows another view of the bed shown in Fig. 1, with a depression, *Q*, to allow room for the screw-bar *P*. Fig. 9 shows a side view of the bed shown in Fig. 8. Fig. 10 shows a sectional view of a foci-needle *D* and the straight modification of the guide-needles *M*. Instead of the hollow foci-needles, may be used any convenient device, as a hook, loop, or eye, or common needles projecting horizontally, *R*, *S*, and *U* showing such equivalents. Fig. 11 shows a ruling-pen furnished with a hook, two

forms of which are shown, as *V* and *V'*. This hook may be made permanent or detachable. Fig. 12 shows the complete instrument in a modified form. Fig. 13 shows the simplest and probably most practical form of the instrument.

To construct the instrument I make use of a flat piece of brass, about two and one-half inches long, one and one-half broad, and one-eighth inch thick. This is the bed, Figs. 1 and 8. In this I plane grooves with dovetail or beveled sides *c*. In these grooves I fit slides *d d'*. I may make the instrument with two or four slides. I prefer two, as simpler, though four give greater steadiness. To the slides alternately I attach arms *F*, Figs. 1 and 6, transverse to the slides and slightly projecting beyond the bed. To the arms *F*, I attach rack-bars *G*, two in number, the teeth of both facing each other, running parallel with the slides *d d'*, and separated by a slight interval. Between the rack-bars, and in the center of the bed, I place a pinion, *I*, attached to a shank and milled head *H*, the pinion, shank, and milled head turning on a pivot fastened into the bed and running up through the pinion and shank, as shown in Figs. 3 and 4. Instead, however, of the rack-bars and pinion attached to the arms, I may use the construction shown in Figs. 6, 7, 8, 9 of right-and-left-hand screws on one bar, *P*, working in nuts *i i*, forming parts of the arms *F*. The bar *P* is supported on two stanchions, *e e*, erected in the center of the bed, turns in a longitudinal recess, *Q*, made in the bed, and is rotated by the milled head *h*. In this construction there are needles made hollow longitudinally, *D*, Figs. 1, 6, and 10, called "foci-needles," and set on the arms so as to project downward transverse to the arm; or they may be set in extension-arms *A*, Fig. 1, which are made of strips of brass slotted and secured to the main arms *F* by screws *y* and milled heads *B*. The screws *y* are made to fit into the screw-holes *y'* in the main arms, whose ends have holes or depressions *x'* made in them adapted to receive pins *x* on the extension-arms *A* to make a rigid connection. The slots are made in order to allow short or long arms, and the pins *x* and depressions *x'* are to allow of the ends of the extension-arms *A* being fastened rigidly in two positions—namely, pointing inward or

pointing outward. Whether the arms be made with extensions A, Fig. 1, or without, as in Fig. 6, there are guide-needles made having a bend in the bottom, as M, Fig. 5, and a point which is adapted to prick the paper in use directly beneath the foci points or needles, and to be kept down by a spring, (shown on the needle, Fig. 5,) and to be kept in the proper lateral position by a pin, which is made on the needle to slip down into a socket on the arm, but can be raised, and by thus disengaging the pin allow the point of the guide-needle to be swung around out of the way of the foci-point. In neither foci-needles nor guide-needles do I confine myself to one form. R, S, and U of Fig. 10 show other forms of foci-points, as a brass bar, R, with an eye, R', a hook or loop, S, or a common needle, U, and these may be attached to the arms, so as to project vertically or horizontally. Likewise, the guide-needles may be made bent, as described, or straight, as M, Fig. 10.

I make a milled head with shank for winding up the thread *o*, and attach it in any convenient way to either arm of the instrument, as shown at K, Figs. 6, 12, and 2, in such manner that it may be turned, like a capstan or a windlass.

I make a hook of metal and attach it to a drafting-pen. Two forms are shown in Fig. 11, as *v* and *v'*. This hook may be made either permanent or detachable. I pass a cord, *o*, Figs. 1, 7, and 12, through one foci-needle or point and then through the other. At the first point I confine one end of the string by a knot, and carry the other around the winding apparatus, and confine that end to the shank by any convenient means, such as a hole through the shank and a knot in the string. I wind up the slack of the string and am ready to operate it thus: Place the instrument on the paper with the handle to the left, on which place the outer edge of the left hand, with the left thumb and finger on the milled head of the winding apparatus. Take an ordinary draftsman's ruling-pen, with my hook attachment upon it, with the right hand and hook up the string. Having placed the foci-points over the longer axis of the desired ellipse, shorten or lengthen the string by the winding apparatus till the pen-point is where you desire the end of the ellipse to be. Now slide the pen on the string around to the shorter axis, and with the left thumb and finger on the central milled head diverge or converge the foci until the pen-point is over the place you desire to be the side of the ellipse. Put down the pen-point and run it around on the string and one-half the desired ellipse is drawn. I have supposed the guide-needles to be up off the paper. Now swing these guide-needles around and let them down, pricking the paper. Reverse the positions of the foci-points by taking up and turning the instrument, and without altering

adjustments draw the other half of the ellipse as the first.

I may use a screw, spring, or any other convenient device to keep the winding apparatus from turning too easily. I may use one guide-needle at the center of the instrument, attached directly to the bed, instead of two attached to the arms, to insure getting the reversed position of the foci correct; but these are mere modifications which I have not deemed important enough to exhibit in the drawings, further than to give a general view of the instrument in its simplest form, as Fig. 13.

A cheap adaptation of my invention may be made by attaching the foci-points to the legs of a compass, and the winding apparatus to one leg, with or without suitable means for regulating the spread of the legs by screws or racks. This modification is intended to be covered by the sixth claim. Another modification to adjust the simultaneous movement of the foci-points is a triangle with flexible joints having two angles attached to slides, (which may be as represented in the drawings, or may slide on a round bar,) the foci-points being attached to these angles, while the third angle moves in a slide at right angles to the line of motion of the foci-points, the last-named slide actuated by a single rack and pinion, or a screw. This modification may also be adapted to the compasses. These modifications are intended to be covered by the first and second claims, arms being used to include legs.

I claim—

1. In an ellipsograph, two foci-points carrying between them a cord, and moved simultaneously in opposite directions by suitable means, substantially as herein described.

2. Two arms bearing foci-points, and moved in opposite directions by means of one or more racks and pinions in an ellipsograph, substantially as described.

3. In an ellipsograph, in combination with two movable foci-points and the arms carrying them, one or more guide-needles which are adapted to prick the paper as a guide to the reversed position described.

4. In an ellipsograph, a hook attached to a pen, and adapted to receive and guide a cord, in combination with the cord and the foci-points, substantially as described.

5. Two or more slides in an ellipsograph, in combination with arms bearing foci-points, substantially as described.

6. A winding apparatus adapted by rotation to wind up a cord, in combination with and moving with an arm bearing a focus-point, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES W. STICKNEY.

Witnesses:

LLOYD F. KELEHER,
CHAS. I. BAUR.