No. 828,372. PATENTED AUG. 14, 1906.

J. W. BECKER.

ELLIPSOGRAPH.

APPLICATION FILED FEB. 15, 1906.

4 SHEETS—SHEET 1.

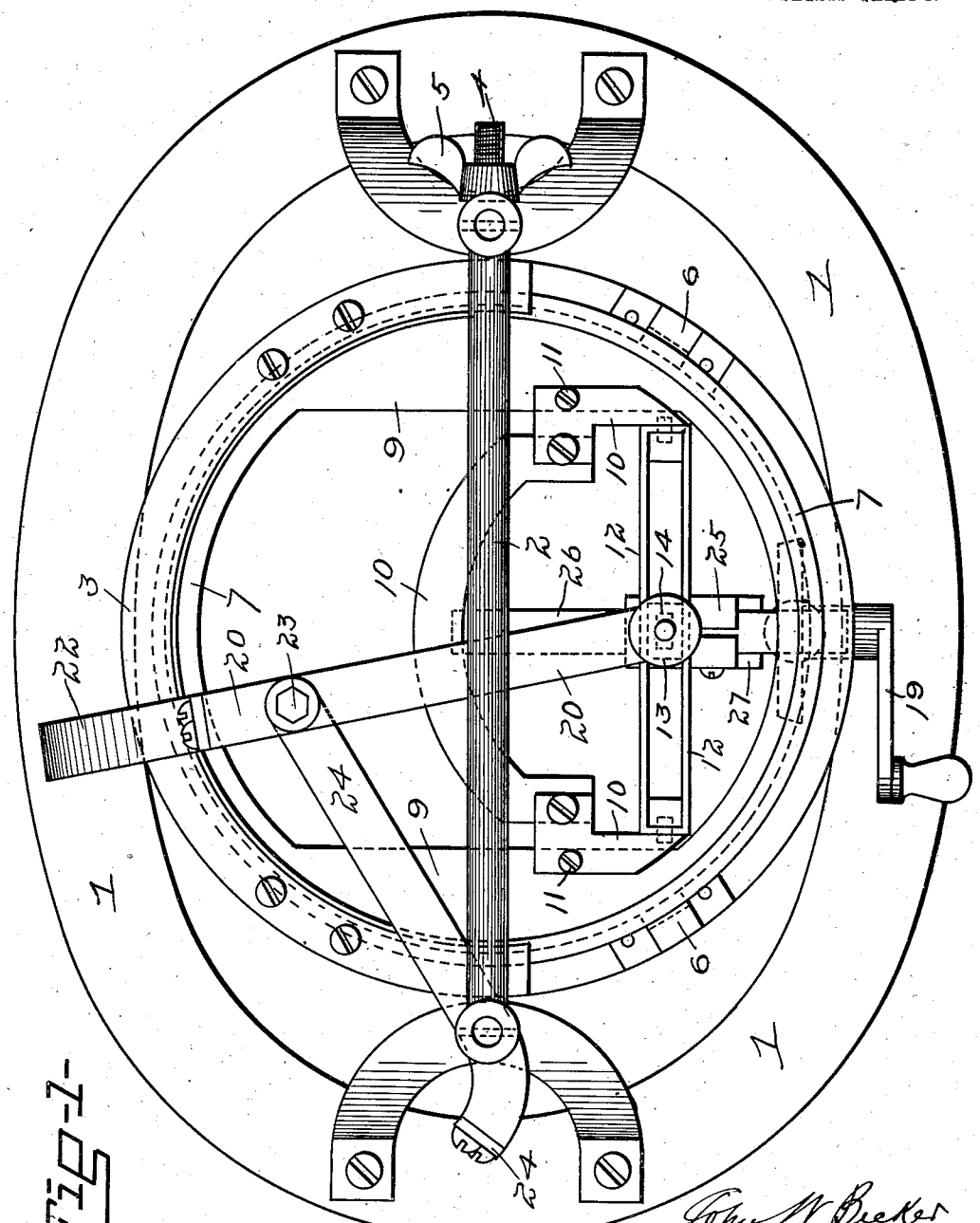


Fig. 1.

Witnesses
Maurice Sibler.
Belle McCarty

John W. Becker
Inventor.

By R. J. McCarty
his Attorney

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4 SHEETS—SHEET 2.

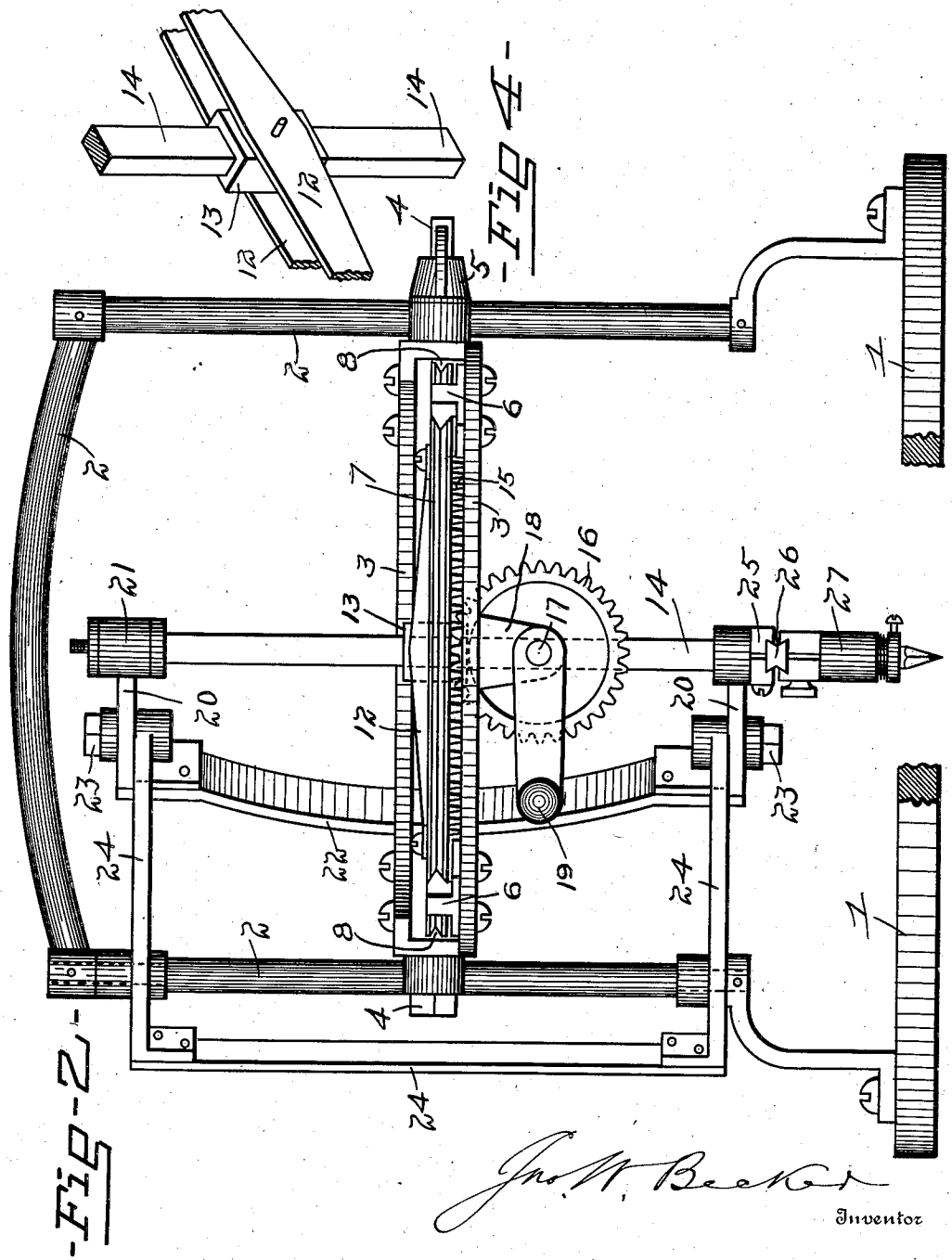


FIG. 2.

FIG. 4.

Witnesses
Matthew Sibler.
Belle McCarty

Inventor
Jno. W. Becker

By R. J. McCarty
Attorney

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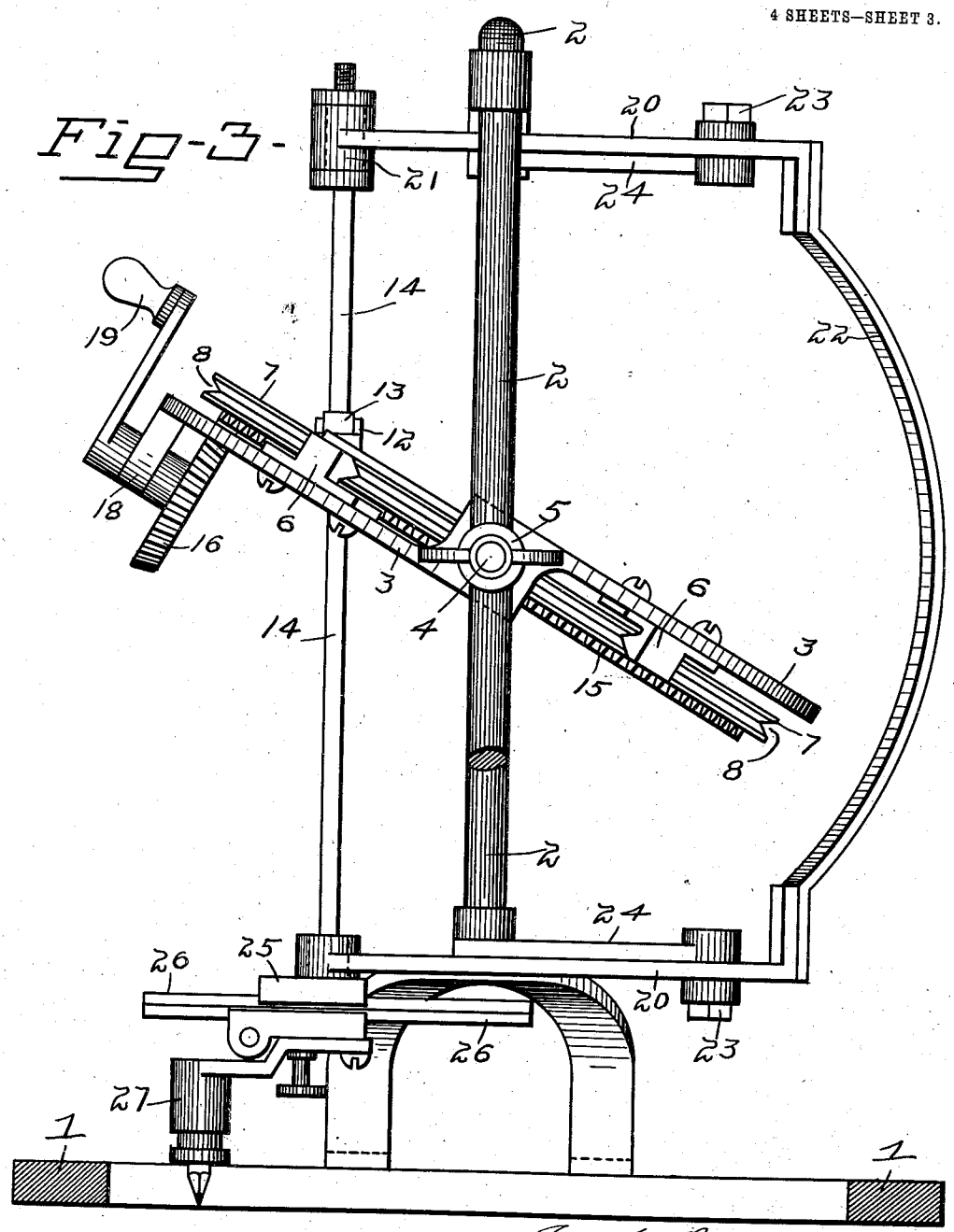
J. W. BECKER.

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4 SHEETS—SHEET 3.

Fig-3-



Witnesses
Matthew Siebler.
Belle McCarty

Jno. W. Becker Inventor

By R. J. McCarty
Attorney

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4 SHEETS—SHEET 4.

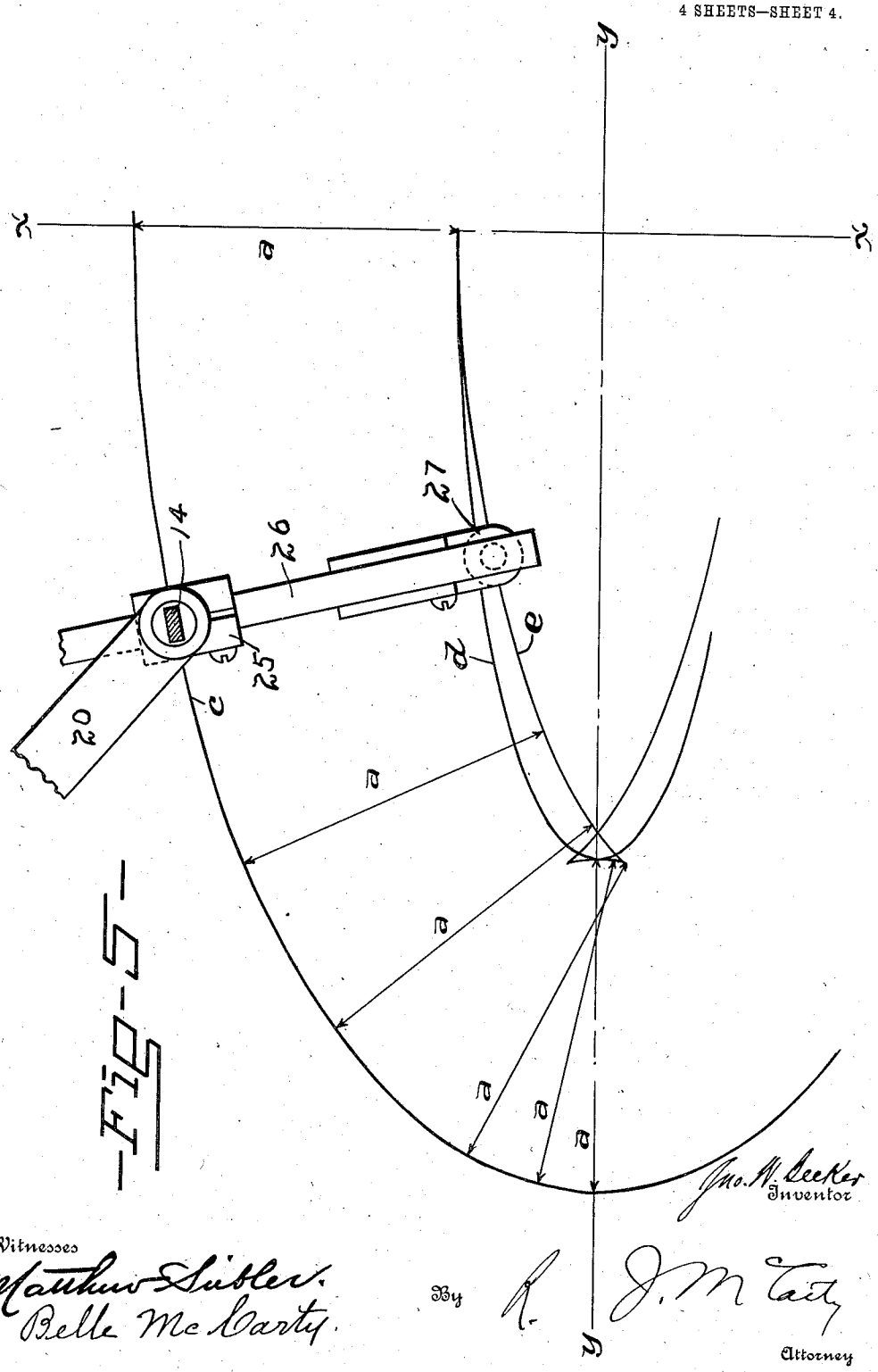


FIG. 5.

Witnesses
Matthew Sibler.
Belle McCarty.

Inventor
Jno. W. Becker

By R. J. M Carty
Attorney

UNITED STATES PATENT OFFICE.

JOHN W. BECKER, OF DAYTON, OHIO

ELLIPSOGRAPH.

No. 828,372. Specification of Letters Patent. Patented Aug. 14, 1906.

Application filed February 15, 1906. Serial No. 301,183.

To all whom it may concern:

Be it known that I, JOHN W. BECKER, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Ellipsographs; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to new and useful improvements in ellipsographs.

The object of the invention is to provide an instrument of the above type by which ellipses of varying diameters may be described, also lines parallel to an ellipse.

Referring to the drawings, Figure 1 is a top plan view of the instrument. Fig. 2 is a side elevation. Fig. 3 is an end elevation. Fig. 4 is a detail of the sliding block. Fig. 5 is a diagram showing the relation of parallel lines and elliptical lines.

In a detail description of the invention similar reference characters indicate the same parts in the several views.

1 designates the base, which is of suitable weight to steady the instrument, and 2 designates the upper framework. Between the two upright posts of said frame there is mounted a swinging ring or frame 3 on pivots 4, one of said pivots having a thumb-nut 5, by which the ring is fastened and held at any angle. Upon the ring or frame 3 there is a suitable number of supporting-lugs 6, which support a revolving ring or frame 7 by projecting the lugs 6 into the peripheral groove of said ring or frame. The ring 7 is provided with parallel webs 9 on opposite sides, which support a sliding frame 10. The connection between the webs 9 and the frame 10 is by means of screws 11, which are loosened when the position of said frame is set to the desired point, as presently more fully described. The ring or frame 7 is rotated in describing lines by means of gear-teeth 15 on the under side thereof, which are engaged by a gear 16 on shaft 17. Said shaft 17 is supported upon the swinging ring or frame 3 by a bracket 18. The shaft 17 and gear 16 are rotated by a crank 19, thereby rotating the ring or frame 7. Pivoted between the ends of the frame 10 is a cross-frame 12, which pivotally supports at its center a block 13.

13′ designates the pivots between the block 13 and frame 12. (See Fig. 4.)

It will be understood that the cross-frame 12 and block 13 have opposite pivotal movements. Passing loosely through the block 13 is a vertical bar 14, upon which said block slides when the ring 7 is rotated, as hereinafter described. The vertical bar 14 is supported above and below by arms 20, to the inner ends of which it has pivotal connections 21. The outer ends of said arms 20 are rigidly secured to a yoke 22, which stiffens or braces said arms. The arms 20 are also pivoted at 23 to a frame 24, which is pivotally mounted on one side of the main frame 2. When the ring 7 is set at the angle shown in Fig. 3 and is rotated, the block 13 will travel in a circle with reference to the center of said ring and will also travel at the same time in an elliptical line with reference to the plane of the table upon which the instrument is placed. The vertical bar 14, passing through said block, is always maintained in a vertical position by the means hereinbefore described. Therefore said bar 14 will always travel in the path of an ellipse. Adjustably or slidably mounted in a box 25 on the lower end of the bar 14 is a horizontal beam 26, and slidingly mounted on the beam 26 is a pencil-holder 27. When this pencil-holder 27 is directly under and in line with the bar 14, a true ellipse will be described when the ring or frame 7 is rotated. The means for describing parallel lines will now be described.

Referring to the diagram shown in Fig. 5, *y y* represent the major axis, and *x x* the minor axis, of an ellipse. *c d* designate true elliptical lines, which are not parallel lines at all points, owing to their being true ellipses, as is well known. The inner line *e* is a true parallel line with the outer line *c*. This is due to the fact that said inner line *e* is not a true elliptical line. Such lines *e* can be drawn by the present instrument as well as the lines *c* and *d*. The lines *a*, it will be observed, are at right angles to the outer ellipse *c* and are also at right angles to the parallel or gage line *e*. The pencil-beam 26, it may be stated, always occupies a position at right angles to the elliptical line being described by the instrument. Therefore a line

parallel to said elliptical line may be drawn, as shown in Fig. 5, by shifting the pencil-holder 27 on the beam 26 to positions on either side of the vertical bar 14. The diagram at *a* illustrates the position of the pencil-beam 26 at any point of its movement, it being always at right angles to the line of the curve. In setting the instrument to describe an ellipse, the pencil-beam 26 is moved on the line of the major axis by rotating the ring or frame 7. The frame 10 is shifted to bring the pencil on the desired point of the major axis and is then tightened by the screws 11. The ring or frame 7 is further revolved to the position of the minor axis, and the ring or frame 3 is tilted to bring the pencil-point in contact with the point of the minor axis. The thumb-nut 5 is tightened to secure the ring 3, and the inner ring or frame 7 is rotated to describe the complete ellipse. In order to obtain parallel lines, the pencil-holder 27 is shifted in or out.

Having described my invention, I claim—

1. In an ellipsograph, a tilting frame, a revolving frame mounted thereon, a slidable frame within said revolving frame, a cross-frame pivotally mounted at its ends in said slidable frame, a hollow block pivoted on said cross-frame, a vertical bar passing through said block and upon which said block slides, and means for supporting said vertical bar.

2. In an ellipsograph, a tilting frame, a revolving frame carried on said tilting frame, a slidable frame within said revolving frame, a cross-frame pivoted on said slidable frame, a vertical bar, means for maintaining said vertical bar at a fixed point from the center of the revolving frame when the latter is rotated, and a cross-beam slidingly mounted on said vertical bar and supporting a pencil.

3. In an ellipsograph, a tilting frame, a revolving frame supported thereon, a vertical bar projected through said revolving frame, and a pencil-beam slidably mounted on said vertical bar at right angles thereto.

4. In an ellipsograph, a tilting frame, a revolving frame supported on said tilting frame, a vertical bar projected through said revolving frame, means for maintaining said vertical bar at a fixed point from the center of the revolving frame when said frame is rotated, a beam adjustably connected to said vertical bar, and a pencil-holder on said beam.

5. In an ellipsograph, a vertical bar, means for maintaining said vertical bar in an upright position, means for compelling said vertical bar to travel in the path of an ellipse, a horizontal cross-beam on the lower end of said vertical bar, and a pencil-holder adjustably mounted on said beam.

6. In an ellipsograph, a tilting frame, a revolving frame within said tilting frame, a sliding frame mounted in said revolving frame, a cross-frame pivoted at its ends in said sliding frame, a vertical bar controlled by said sliding frame, cross-frame, and said revolving frame in the movement of the latter, a cross-beam supporting a pencil at the lower end of said vertical bar.

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

JOHN W. BECKER.

Witnesses:
R. J. McCARTY,
C. M. HEABOLD.