Feb. 23, 1960 G. W. DE BEEK 2,925,655

ELLIPSOGRAPH

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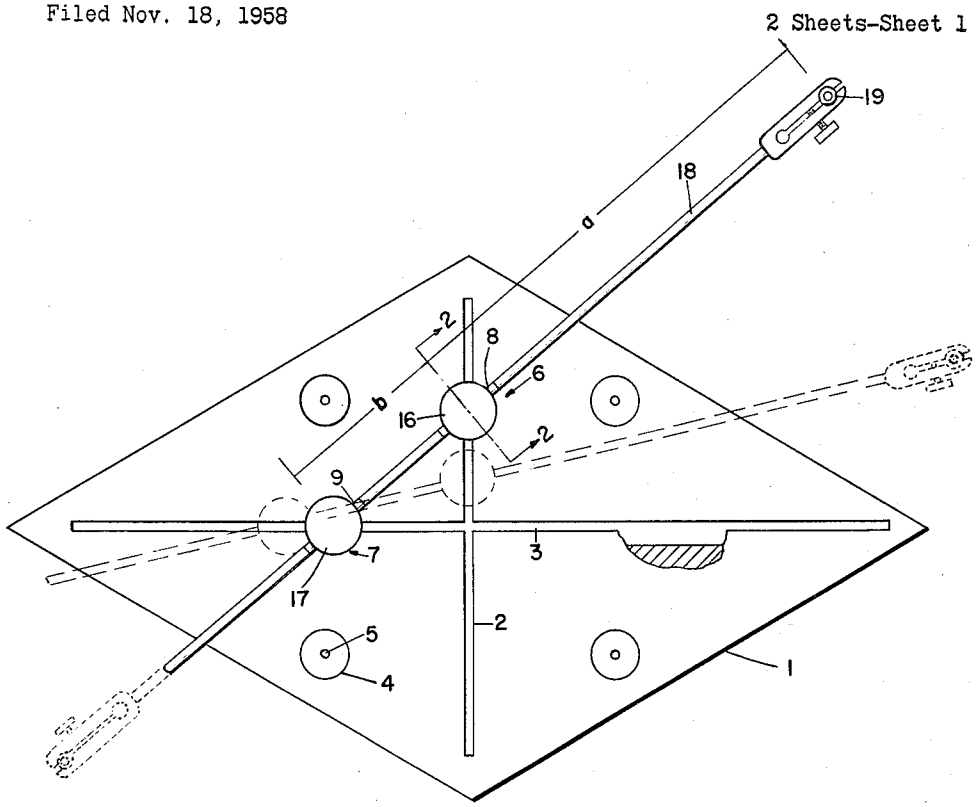



Fig. 1.

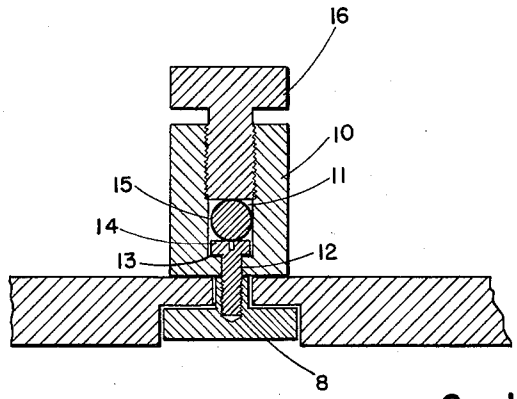



Fig. 2.

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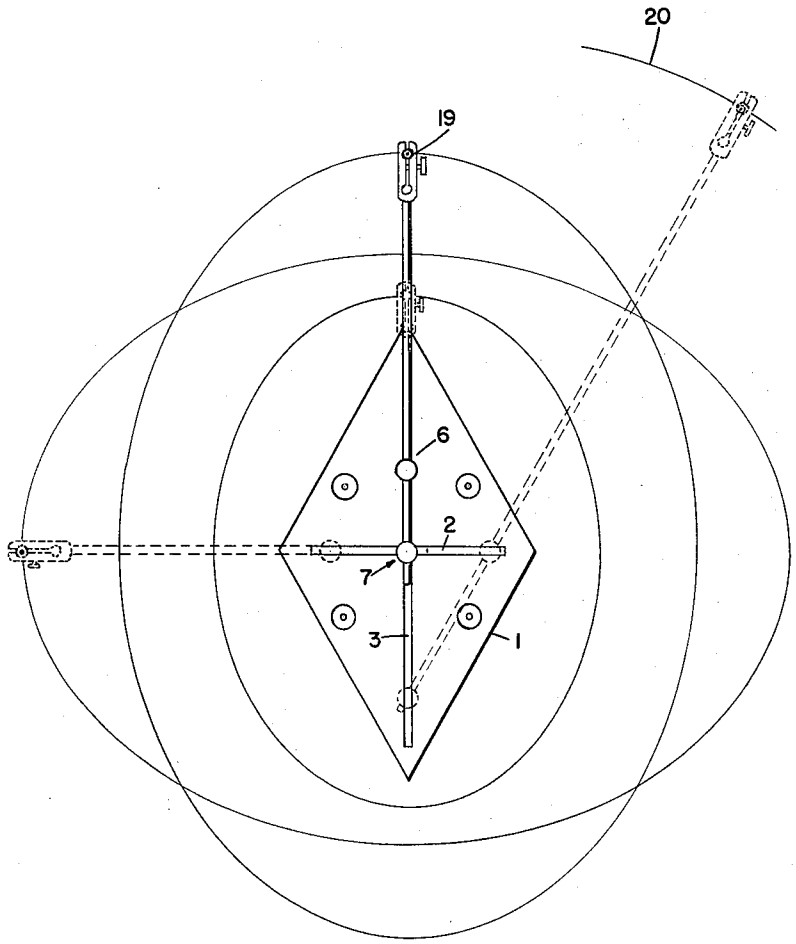



Fig. 3

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2,925,655

# ELLIPSOGRAPH

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1 Claim. (Cl. 33—31)

(Granted under Title 35, U.S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the Government for governmental purposes without the payment of any royalty thereon.

This invention relates to an ellipsograph. Such an ellipsograph or trammel provides means for drawing various sizes of ellipses by a single revolution.

An object of this invention is to provide an ellipsograph that may be easily adjusted relative to a sheet of drawing paper over a drawing board, and easily attached to the drawing board in its adjusted position.

Another object of the invention is to provide an ellipsograph that comprises a stylus-holding beam that may be easily and quickly reversed in position, whereby the perpendicular directions of the major and minor axes may be quickly reversed without change in position of the ellipsograph base or removal of the means for holding the beam in adjusted position relative to the base.

A further object is to provide an ellipsograph that may be securely fixed in position relative to a drawing board and yet may be quickly detached, for insertion of another sheet of drawing paper, or removal of the instrument to another drawing board.

Another object is to provide a compact and easily manufactured ellipsograph.

The foregoing and other objects of this invention will become more fully apparent from the following detailed description of an embodiment of the invention and from the accompanying drawings, in which:

Fig. 1 is a semi-schematic plan view, with part in section, of the ellipsograph.

Fig. 2 is a sectional view taken along line 2—2 of Fig. 1, showing the arrangement of one of the adjusting members.

Fig. 3 is a semi-schematic plan view, indicating various types of ellipses and elliptic arc that can be constructed with the ellipsograph.

In the drawings, wherein for the purpose of illustration there is shown a preferred embodiment of the invention, the numeral 1 designates a base plate having two slots 2 and 3 in substantially the form of a plus sign, and a plurality of attachment holes that comprise recesses 4 and apertures 5 of very small diameter that extend thru the base plate. These recesses and holes are of sizes adapted to receive the head and pin parts respectively, of a thumb tack or similar object, for holding the base plate to a drawing board. It is also possible to make the base plate sufficiently heavy to stay stationary, but such structure is not the preferred form of this invention.

The numerals 6 and 7 designate a pair of slidable adjusting members. Each of the adjusting members has an element or slide, 8 or 9, located in one of the slots. Viewed in cross section, each of the slots is in the shape of an inverted T, and each slide also is in this shape, but is slightly less than the distance between the guiding walls of said slots. Each adjusting member comprises a part or cylinder 10 having a longitudinal bore or hole 11



and a coaxial aperture or bore 12 of smaller diameter aligned with said hole to form a surface or flange 13, which serves as a means for securing the slide in the slot and for fastening a stylus-holding beam to the slide. The cylinder is fixed to the slide by means of screw 14, which has a round head, a shank and a screwdriver-engaging kerf. The cylinder is free to turn relative to the head and slide. Each of the cylinders has a pair of diametrically opposite apertures, 15 (only one of which is shown in Fig. 2) that are perpendicular to the axis of said screw and open into the longitudinal hole 11. The upper part of each hole 11 is screwthreaded for engagement with the screwthreads of a locking screw, 16 or 17.

Thru each pair of holes 15 the stylus-holding beam 18 may be inserted. As indicated in Fig. 1, this beam may be inserted thru both pairs of apertures 15 in adjusting members 6 and 7, with the stylus pointed in one direction, or may be reversed, so that the stylus points in the opposite direction. This reversal, without removal of the instrument or its base, allows the drawing of two sets of ellipses of various sizes and shapes, the two sets having perpendicular major axes.

After insertion of the stylus-holding beam 18 and adjustment of the cylinders and slides into the position required for the particular ellipse to be drawn the locking screws 16 and 17 are screwed down into clamping engagement with the beam, thus holding the beam locked between the respective locking screws and associated slide-holding screws 14. This adjustment is determined by the distance *a* and *b*. In the full-line position indicated in Fig. 1, the major axis of the ellipse provided for by the adjustment indicated is equal to twice the length of *a* and *b;* and the minor axis is equal to twice the length of *a*. The difference between the major and minor axis is always equal to twice the length of *b*.

As indicated in Fig. 3 the device of this invention may be utilized in drawing a part of an ellipse, such as arc 20, said ellipse having very long axes.

The ellipsograph may be made of either plastic or metal. The guide beam could be made of strong plastic but preferably is of metal. If such is desired, calibration of the beam may be effected.

*Operation*

The operation of the ellipsograph is as follows:

The instrument is placed in position on the drawing board, over a sheet of drawing paper and the base plate 1 is secured in place by a plurality of thumb tacks.

The locking screws 16 and 17 are partially unscrewed and guide beam 18 is inserted thru the apertures 15. As indicated above, the holding cylinder that the guide beam is first passed thru is determined by the desired position of the major axis. For example, if the beam is first passed thru the cylinder of member 6, the major axis of the ellipse will be located in the same direction as the axis of the slot 2 in which the element 8 of member 6 slides.

When the guide beam has been placed in position with the screws 16 and 17 still unlocked, and the desired major and minor axes determined, the pen, pencil or other stylus 19 is placed over the major axis. Then the locking screw of the member 7 (that has a slide in the slot 3) is locked, thus fixing the major axis. The beam is then turned and adjusted until the stylus is placed over the end of the minor axis; and the other locking screw is locked, thus fixing the minor axis. The instrument may now be used to construct the desired ellipse, by turning the guide beam thru one revolution.

As pointed out above, if another ellipse with a major axis at right angles to the major axis just described is desired, the beam is withdrawn from the two holding

cylinders, reversed, and relocked in a new position that is appropriate to the desired new ellipse.

It is to be understood that the form of the invention, herein shown and described, is to be taken as a preferred embodiment, and that various changes in the shapes, size and arrangement of parts may be resorted to, without departing from the spirit of the invention, or the scope of the subjoined claim.

The following invention is claimed:

An ellipsograph comprising: a six sided flat base plate having a right-angled pair of slots, said slots having a cross section in the shape of an inverted T, a plurality of recesses in the upper side of said plate, said recesses adapted to completely contain the heads of fastening elements, and a plurality of apertures, each extending downward from the center of the bottom wall of one of said recesses through the base plate; a pair of members slidably mounted on said base plate and each guided by one of said slots, each member comprising an element having a screwthreaded vertical bore, said element having a cross section in the shape of an inverted T with a leg of a thickness slightly less than the distance between the guiding side walls of said slot and a base abutting against said plate, said base having a thickness greater than the slot, a part having a bottom surface abutting against said plate, said part further having a vertical upper bore of one diameter, a vertical lower bore of a smaller diameter, said bores being coaxial and aligned, thus forming



a central opening extending from said part's top to bottom and further forming a surface between said two bores, a screw adapted to be fitted in said opening having a head fitting in said upper bore and abutting against the surface between said two bores and a shank fitting in said lower bore and projecting downward through said bore, said shank having a lower screwthreaded portion fitting in said screwthreaded vertical bore, thereby securing said part, plate and element together, said upper bore being screwthreaded in its upper portion, a locking screw adapted to be fitted in each of said upper portions, and a pair of diametrically opposite apertures perpendicular to said central opening; and a reversible stylus-holding beam adapted to be fitted and adjusted in said pair of opposite apertures of each of the parts, in engagement with said first named screws, and locked in position by said locking screws; and a stylus fastened to one end of said beam.

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