April 26, 1949. A. W. ARNEMANN 2,468,320

ELLIPSOGRAPH

Filed Oct. 24, 1946 2 Sheets-Sheet 1

FIG. 1

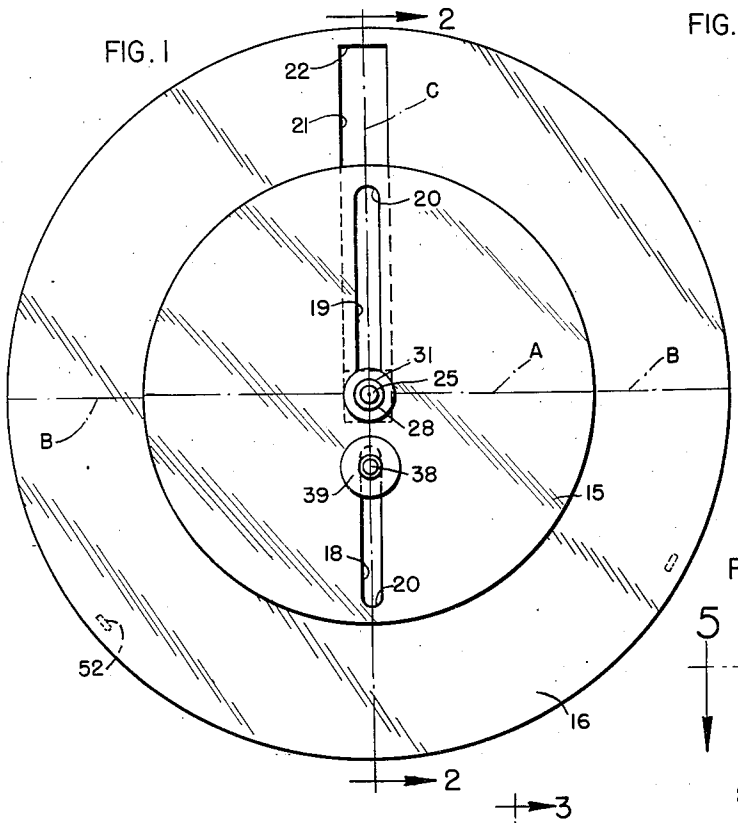


FIG. 3

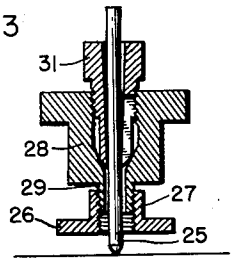


FIG. 5

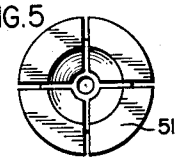
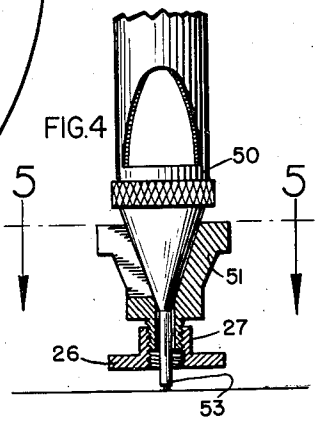


FIG. 4



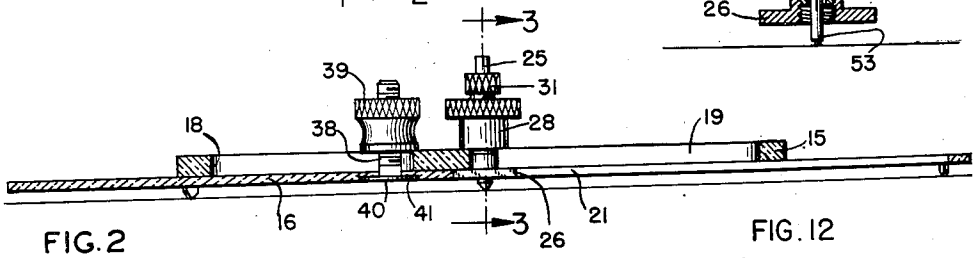


FIG. 2

FIG. 12

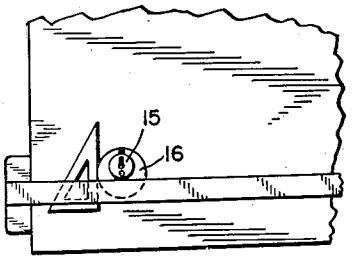
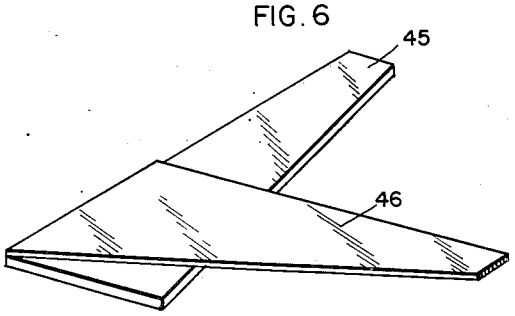


FIG. 6



INVENTOR:
ARTHUR W. ARNEMANN
BY Mills B. Stevens & Co.
ATTORNEYS.

April 26, 1949. A. W. ARNEMANN 2,468,320

ELLIPSOGRAPH

Filed Oct. 24, 1946 2 Sheets-Sheet 2

FIG. 8

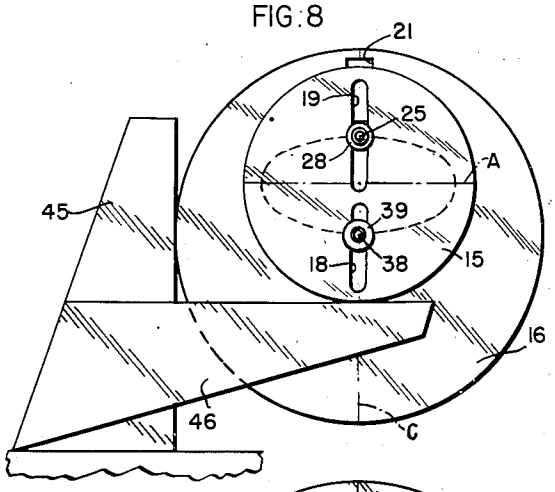


FIG. 9

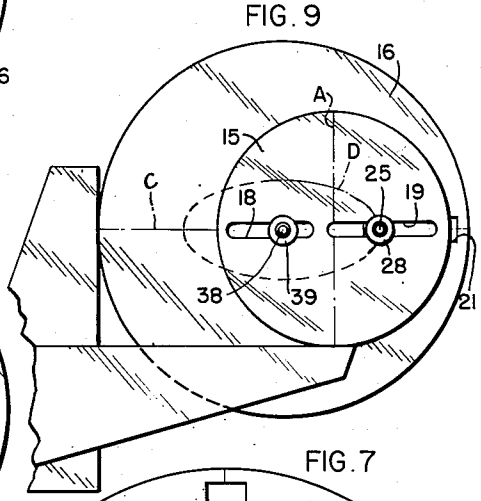


FIG. 10

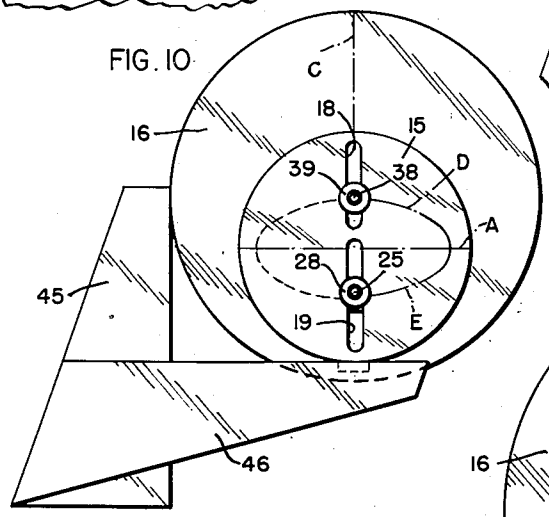


FIG. 7

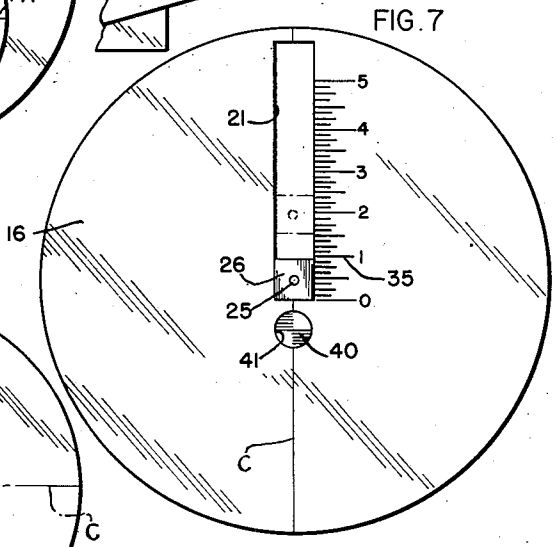
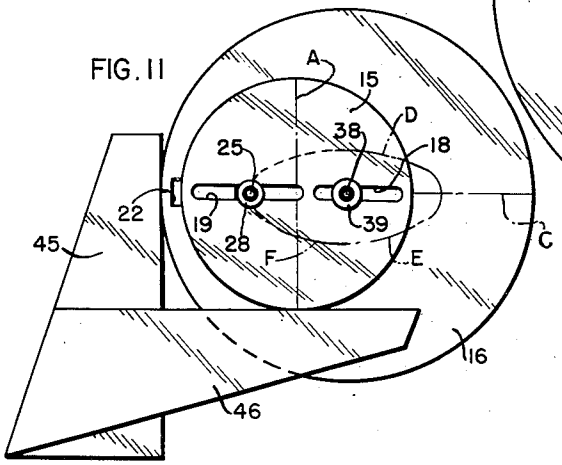


FIG. 11



INVENTOR:
ARTHUR W. ARNEMANN
BY Miles B. Stevens & Co.
ATTORNEYS.

Patented Apr. 26, 1949 2,468,320

UNITED STATES PATENT OFFICE

2,468,320

ELLIPSOGRAPH

Arthur W. Arnemann, Chicago, Ill.

Application October 24, 1946, Serial No. 705,425

8 Claims. (Cl. 33—31)

1

My invention relates to ellipsographs, and more preferably to the type designed to be laid flat on the work and manipulated to describe the ellipse, and one object is to provide an instrument which can be adjusted with ease and to an infinite number of proportions.

A further object is to provide an instrument of the above character which utilizes the rotation of a pair of circular discs grouped in eccentric relation to draw a stylus in the desired course.

Another object is to provide an instrument which operates along its own guide or may employ a standard T-square and triangle as a guide.

An important object is to design the novel instrument along lines of simplicity and compactness.

With the above objects in view, and any other which may suggest themselves from the description to follow, a better understanding of the invention may be had by reference to the accompanying drawings, in which—

Fig. 1 is a top plan view of the instrument set at the point of origin;

Fig. 2 is a section with line 2—2 of Fig. 1;

Fig. 3 is a section of a scribing unit taken on the line 3—3 of Fig. 2;

Fig. 4 is a similar view showing an inking unit;

Fig. 5 is a section on the line 5—5 of Fig. 4 minus the pen;

Fig. 6 is a perspective view of a guide for the instrument;

Fig. 7 is a bottom plan view of Fig. 1 on a smaller scale;

Figs. 8 to 11 are views similar to Fig. 1 showing the guide applied and progressive changes in the position of the instrument to form the ellipse; and

Fig. 12 is a top plan view showing a modified guiding arrangement for the instrument.

In the construction of the instrument, the main working parts are a minor disc 15 and a major disc 16, both discs being circular. The minor disc is employed for setting the instrument to the minor axis dimension for the contemplated ellipse, while the major disc functions similarly in respect to the major axis thereof. The discs are shown full size in Figs. 1 and 2 for a conventional model of the instrument; and it is understood that they may be made in different sizes or proportions according to the sizes of work the instrument is to serve. The discs are preferably made of sheets of transparent plastic material; and the disc 15 is approximately twice the thickness of the disc 16.

The disc 15 is marked with a diametrical line A and formed with a pair of narrow, alined slots 18 and 19 centered along an imaginary diametrical line occurring at right-angles to the line A. The slot 18 is relatively short and spaced from the line A, while the slot 19 begins slightly to one side of the said line and ends near the rim of the disc. The ends of the slots 18 and 19 are round, as indicated at 20.

2

The disc 16 is marked with a diametrical line B and formed with a slot 21 centered along a diametrical line C occurring at right-angles to the line B. The slot is considerably longer and wider than the slot 19 of the disc 15; and the ends of the slot 21 are square, as indicated at 22.

The line A of disc 15 is employed as the origin from which to space a vertical scriber 25 of pencil lead along the slot 19. The scriber depends from a square block 26 whose position is under the disc 15. The block has a neck 27 rising freely into the slot 19 to a point short of the upper surface of the disc, as shown in Fig. 2. The scriber 25 rises into a cup 28 formed with a pendent central screw 29 threaded into the neck 27 as shown in Fig. 3. The scriber is tightened in the cup 28 by a split cone 31 threaded with a taper into the upper end of the cup and constituting a familiar type of clutch. Thus, when the scriber assembly has been slid to the desired point along the slot 19, a slight turn of the cup in the threading direction will tighten the assembly in place. As the point of the scriber is distinct when the disc 15 is inverted, its distance from the origin line A may be easily set with a rule; and such distance is the given length of the minor axis of the ellipse intended to be drawn.

As to the disc 16, the inner end of the slot 21 is spaced from the diametrical line B a distance equal to half of the width of the square scriber block 26. Thus, when the latter seats in the inner end of the slot, the scriber is in the center of the disc. When the disc 15 is laid on the disc 16 as shown in Figs. 1 and 2, the block 26 depends into the slot 21; and a scale 35 is printed or stamped on the under side of the disc 16 along one side of the slot 21. Dotted lines in Fig. 1 and full ones in Fig. 7 show that the block 26 seats against the inner end of the slot 21. The origin of the scale 35 is at such end, and the scale therefore reads in relation to the seating edge of the block. Assuming the scale to represent inches, dotted lines in Fig. 7 show that the block has been set at 1½ inches. This setting is made for the given major axis of the contemplated ellipse.

To fix the discs in the assembled and set relation just described, a conventional clamping device employing the slot 18 of the disc 15 is used. Thus, the disc 16 carries a screw-post 38 rising through the slot 18, and a knurled nut 39 is applied to the post to exert the clamping action. Fig. 2 shows that the head 40 of the post seats flush with the under side of the disc 16 by being sunk in a counterbore 41. The fit of the post in the disc 16 is necessarily tight to prevent the post from turning.

With the discs secured together at the proper settings as described, the instrument is ready for application with the assistance of the guide shown in Fig. 6. This guide is essentially a square composed of a lower strip 45 of a thickness the same as the disc 15, and an upper strip 46 of a thickness the same as the disc 16. Only the square inner formation of the guide and the relative thickness of its sections are of importance, the tapered form of these being merely to save room and material.

In the application of the instrument, it is set on the sheet on which the ellipse is to be drawn in a manner to register the diametrical lines A and C with corresponding lines originally drawn on the sheet in representation of the axes of the contemplated ellipse. The guide is now applied at the left to seat the rim of the disc 15 against the section 46 and of the disc 16 against the section 45 of the guide, as shown in Fig. 8. The section 46 extends over the disc 16 because such section is in elevated position, as previously described.

The contemplated ellipse is shown by means of dotted lines in Fig. 8, and it is noted that the scriber 25 is located at the top center of the dotted oval. In order to start describing the ellipse, the disc assembly is rotated in a clockwise direction in relation to the guide, the latter being held down in fixed position with the left hand, while the right hand is applied to the rim of the disc 15 with pressure toward the corner of the guide. Fig. 9 shows the position of the instrument after it has been given a quarter-turn, the line D indicating the course taken and drawn by the scriber 25 on the sheet during the movement of the instrument. The progress of the instrument and a continuation E of the line D on the next quarter-turn are indicated in Fig. 10, while the third movement and continuation of the line D is indicated at F in Fig. 11. It follows that the final movement of the instrument brings it to the position of Fig. 8, where the completing portion of the line would occur to form the desired ellipse.

The principle on which the instrument operates is based primarily on the rotation of the disc 15 along the guide section 46. While the rim of the disc 15 is circular, the rotation of the disc is coupled with a revolving movement thereof controlled by the rim of the disc 16 along the section 45 of the guide. Since the scriber 25 is eccentric relative to the disc 16 to the extent of the major axis dimension, while the scriber is at a radius within the disc 15 the distance of the minor axis, it will be evident that the joint rotation of the discs as set will carry the scriber in a path common to both settings of the discs, so that it describes the ellipse corresponding to such settings.

Fig. 4 shows the scriber replaced by a reservoir type pen 50 which is fitted in a spring chuck 51 replacing the cup 28. In order to keep the disc 16 from touching and smearing freshly inked lines, it is preferable to form the disc with two feet 52 at points diverging from the scriber 25 or pen tip 53 so that the disc 16 may thus rest on three points over the sheet on which the instrument is laid.

In the event that the guide has been mislaid or lost, it is possible to use an ordinary T-square and triangle as a substitute guide. This expedient is illustrated in Fig. 12, the triangle serving as the guide section 45 and the T-square as the section 46.

It will be evident that the novel instrument is an accessory which may be given an infinite number of settings within prescribed limits to form ellipses of all corresponding dimensions, so that all guesswork in this respect is eliminated. Further, the instrument is of a practically flat type, lending itself readily to be positioned over a sheet or drawing board or to be slid into a handy drawer or envelope when its use is not needed. The guide is of similar construction, and will slide compactly alongside the instrument wherever the same is stored. Further, the instrument is made up of parts which are firm and easy to handle, so that it can always be secured together or properly set even if some parts have come loose. Finally, it is apparent that with simple instructions, any person having some drafting knowledge can easily plan and plot accurate elliptical figures by means of the instrument.

While I have described the invention along specific lines, various minor changes or refinements may be made therein without departing from its principle, and I reserve the right to employ all such changes and refinements as may come within the scope and spirit of the appended claims.

I claim:

1. An ellipsograph comprising a pair of circular discs designed to be superimposed on each other over the sheet on which the ellipse is to be inscribed, a scriber adjustable from the center of one disc to distances representing the length of the minor axis of the desired ellipse, said disc being movable to space the scriber a distance from the center of the other disc representing the length of the major axis of the desired ellipse, means for securing the discs together in the adjusted relation, and a guide having edges parallel to the ellipse axes and opposite the peripheries of the discs, the rotation of the latter relative to said edges causing the scriber to trace an ellipse on said sheet having said minor and major axis lengths.

2. The structure of claim 1, said guide being in the form of a right-angle with one arm opposite the periphery of one disc and the other arm opposite the periphery of the other disc, and the disc group being held with the disc peripheries in engagement with the related arms of the guide during rotation.

3. The structure of claim 1, said guide being in the form of a pair of overlapping strips combining to form a right-angle with their inner edges, the disc relating to the minor axis being smaller than the other, the guide being applied with one edge of the right-angle to the periphery of one disc and the other edge thereof to the periphery of the other disc with the guide in interfitting relation with the disc group, and the latter being held with the disc peripheries in engagement with the related edges of the right-angle during rotation.

4. The structure of claim 1, the disc relating to said minor axis having a radial slot, said scriber being a clamp adjustable along said slot, and a stylus carried by said clamp.

5. The structure of claim 1, said scriber including a stylus projected from the disc relating to said minor axis, and the other disc having a slot extending radially from its center, said stylus extending through said slot to a point engaging said sheet.

6. The structure of claim 1, said scriber including a stylus projected from the disc relating to said minor axis, the other disc having a slot extending radially from its center, said stylus extending through said slot to a point engaging said sheet, and a scale along the slot measuring said second-mentioned distance.

7. The structure of claim 1, said scriber including a stylus projected from the disc relating to said minor axis, the other disc having a slot extending radially from its center, a holder for said stylus acting as a slide in said slot, and

the stylus projecting from the holder to a point engaging said sheet.

8. The structure of claim 1, said scriber including a stylus projected from the disc relating to said minor axis, the other disc having a slot extending radially from its center, a square holder for said stylus acting as a slide in said slot, the inner end of the latter being extended back of center a distance half the width of the holder, the stylus projecting from the latter to a point engaging said sheet, and a scale starting from said inner end and readable against the contiguous edge of the holder during said scriber spacing movement.

ARTHUR W. ARNEMANN.

No references cited.