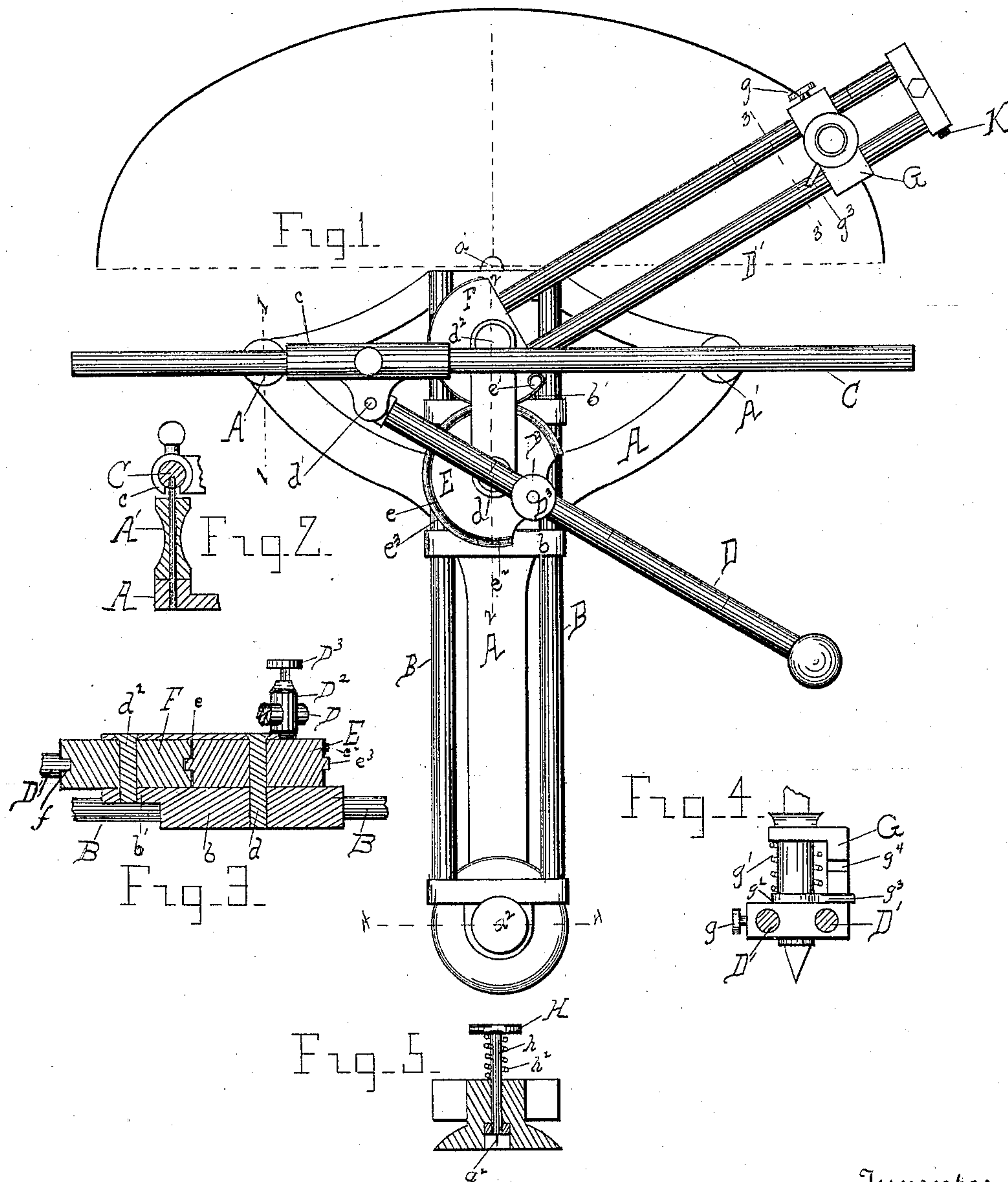


(No Model.)

A. E. RAWSON.
ELLIPSOGRAPH.

No. 422,252.

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UNITED STATES PATENT OFFICE.

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ELLIPSOGRAPH.

SPECIFICATION forming part of Letters Patent No. 422,252, dated February 25, 1890.

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To all whom it may concern:

Be it known that I, ALBERT E. RAWSON, a citizen of the United States of America, and a resident of the city of Chicago, in the county of Cook and State of Illinois, have invented a new and Improved Ellipsograph, of which the following is a description.

My invention relates to that class of ellipsographs which utilize the principle that if two fixed points in a rod be made to slide along two fixed straight lines at right angles to each other any other fixed point in the rod will describe an ellipse.

I am aware that numerous instruments have been constructed upon this principle with which an ellipse can be drawn with more or less accuracy; but the object of my invention is to construct an ellipsograph which will not only draw an ellipse of any given proportions with perfect accuracy, but which will also be compact and easy to handle, and which can be furnished at a price within the means of any draftsman.

To this end my invention consists in so combining and arranging the parts of the ellipsograph proper that they may work within the greatest possible limits without interfering with one another; and, further, in adding a supplementary arm so geared to the rod containing the two fixed points above mentioned that it shall have a motion exactly similar to that of said rod, while swinging entirely free from all other parts of the instrument.

My invention is illustrated in the drawings presented herewith, in which—

Figure 1 is a projection of my improved ellipsograph upon the plane upon which it rests, and Figs. 2, 3, 4, and 5 are detail vertical sections of Fig. 1 in the lines 1 1, 2 2, 3 3, and 4 4, respectively.

To simplify the instrument, I limit it to the construction of half of an ellipse at a time, and by means of suitable gearing transfer all portions except the arm which carries the pen or pencil to the other half of the ellipse, where they are entirely out of the way.

Referring to the drawings, A is the frame of the instrument, resting upon the paper and held in place by needle-points, preferably located at a' and a'' ; B and C, guiding-rods at right angles to each other, upon which slides

b and c travel; D, a rod pivotally attached to the slides b and c at d and d' , respectively. These parts in themselves form what may be called an "ellipsograph," inasmuch as any movement of the rod D, the points d and d' therein being guided in straight lines at right angles to each other, will cause any other point in said rod to describe an ellipse; but the rod D is not adapted to carry a pen or pencil, for the reason that the same would be obstructed by the guide B in the construction of all small ellipses. To overcome this difficulty I transfer the exact motion of the rod D to a supplementary rod or arm D' , arranged to swing on the opposite side of the guide C from B. To do this I extend the slide b , as shown at b' , and pivot the arm D' thereon at a point d^2 far enough from d to allow said arm to lie parallel to the guide C when the rod D is parallel thereto. Upon the pivots d and d^2 , I mount wheels or drums E and F, or their equivalents, so proportioned and connected that the rotation of one will cause an equal rotation of the other. Of these wheels I connect E with the rod D, so that it will be rotated thereby, and F with the arm D' , so that it will carry said arm with it around the center d^2 . Any form of gearing or other connection which will transmit equal rotation may be used to connect the rod D and arm D' ; but I prefer to use the wheels or drums E F, leaving between them just space enough to allow a steel ribbon e , attached to the drum F at e' , to be passed around F, between F and E, and fastened to E at e^2 upon the opposite side. Upon the lower portions of the drums I place a similar ribbon, running in the opposite direction. I have also found that a flange e^3 upon one of these drums fitting into a groove f in the other assists in supporting the arm D' .

To prevent the guide C from obstructing the marking-arm or the one carrying the pencil, I mount it upon standards A' , so as to allow said arm to move beneath it, and a further improvement consists in attaching the rod D to the pivot d by means of standards D^2 at one side of said pivot. The latter device enables the pivots d and d' , which locate the two fixed points in the rod D, to be brought into the same vertical line, in which position the pencil will describe an arc of a circle.

The standard D^2 is arranged to slide upon the rod D and be clamped thereto by means of a thumb-screw D^3 .

The pencil-carrier G is adjustably fastened
5 to the arm D' by means of the screw g .

The pencil or pen is held upon the drawing-surface by means of a light spring g' , and is provided with a collar g^2 and pin g^3 , which may be engaged with a stop g^4 in the carrier
10 to hold the pencil or pen off the surface when desired.

To adjust the instrument to an ellipse of any given axes, place the needle-point a' (which is preferably located directly beneath the pivot d^2 when the arm D' is parallel to the guide C , and must be so located for this purpose) upon the intersection of the given axes and the point a^2 in the line of the minor axis. Bring the arm D' over the major axis
20 and slide the carrier G along said arm until the pencil-point is over the extremity of the major axis. Clamp it here, and then bring the arm D' over the minor axis and adjust the pencil to this by means of the screw D^3 .
25 Now swing the rod D from the limit of its motion in one direction to its limit in the other, and the pencil will mark half of the desired ellipse. If an entire ellipse be desired, the instrument may be swung around
30 upon the point a' , and the other half marked in the same manner.

It will be noticed that the peculiar arrangement of the parts of the instrument enables it to construct an ellipse of any size within
35 the limits marked by the pivot d^2 and the extremity of the arm D' , and of any degree of eccentricity from a circle to a straight line.

A minor improvement is made by attaching the needle-point a^2 to a movable rod h , provided with a button H and spring h^2 , strong
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enough to support the weight of the rod, but not pull the point out of the paper when thrust thereinto. This device is of special use in this instrument, as it keeps the point a^2 out of the way while the instrument is swung
45 upon the point a' to mark the second half of an ellipse.

In using a pen in an instrument of the larger sizes it is best to provide some support for the outer extremity of the arm D' . In the
50 drawings I have shown a small caster-wheel K , which answers this purpose. For a great many uses it is also convenient to have a scale marked on the arms D' and D , as represented, the former showing the distance from the point
55 d^2 and the latter from the point d .

I claim as new and desire to secure by Letters Patent—

1. The combination of the guides B and C , at right angles to each other, slides b and c ,
60 and bar D , pivotally connected thereto, with a supplementary arm D' , turning upon a different pivot from those of the bar D and provided with means for transmitting the motion of the bar D thereto, as and for the purpose
65 stated.

2. The combination of the guides B and C , bar D , slides b c , and arm D' , pivotally connected to the slide b , with the gear-wheels E and F , as and for the purpose stated.
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3. The combination of the frame A with the two needle-points a' and a^2 , the latter being provided with a spring h^2 , tending to hold it away from the surface of the drawing, as and for the purpose stated.

ALBERT E. RAWSON.

In presence of—

W. M. HILL,
HARRY BITNER.