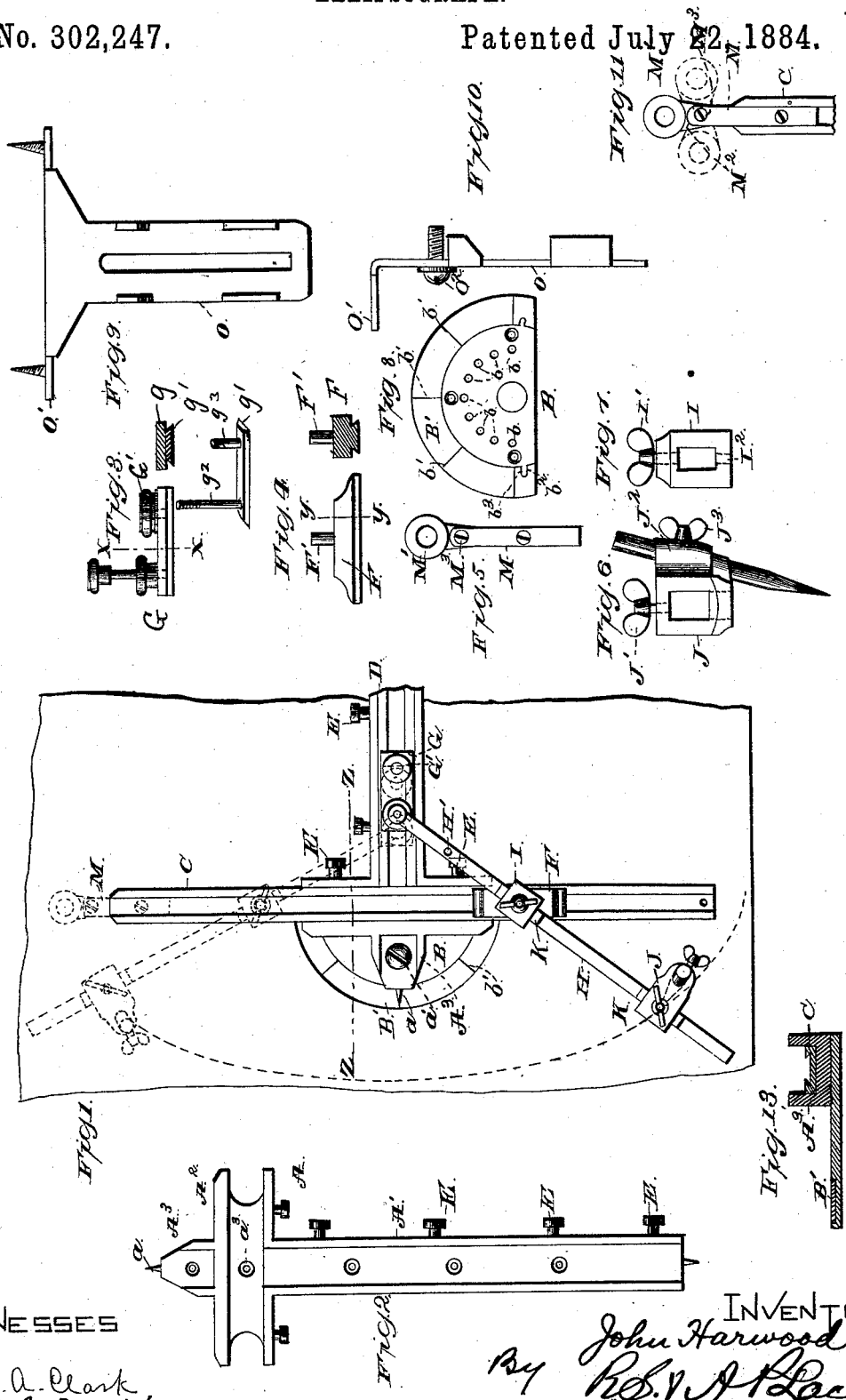
(No Model.) 2 Sheets—Sheet 1.

J. HARWOOD.

ELLIPSOGRAPH.

No. 302,247. Patented July 22, 1884.



WITNESSES

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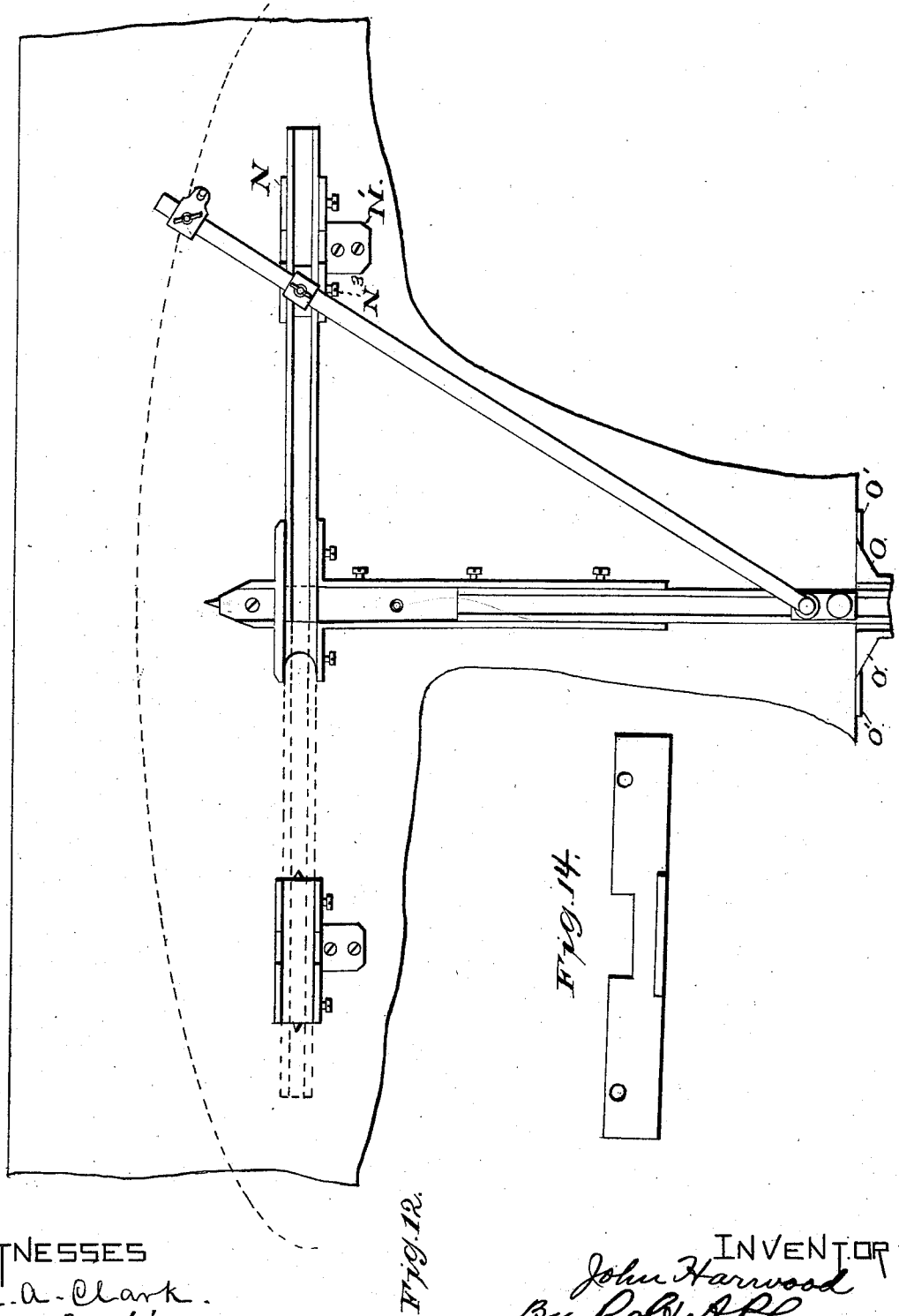

Fig. 1.

Fig. 1A.

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UNITED STATES PATENT OFFICE.

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ELLIPSOGRAPH.

SPECIFICATION forming part of Letters Patent No. 302,247, dated July 22, 1884.

Application filed April 1, 1884. (No model.)

To all whom it may concern:

Be it known that I, JOHN HARWOOD, a citizen of the United States, residing at Oshkosh, in the county of Winnebago and State of Wisconsin, 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.

My invention relates to devices for describing ellipses, circles, parallel lines, &c.; and it consists in the construction, combination, and arrangement of several parts, as will be hereinafter described and claimed.

In the drawings, Figure 1 is a plan view of my invention. Fig. 2 is a detail view of my T-frame. Fig. 3 is a detail of the sliding plate. Fig. 4 is a detail view of the sliding center. Fig. 5 is a detail view of the swiveled pencil-holder. Fig. 6 is a detail view of the pencil-carrier. Fig. 7 is a detail of the pivot-block. Fig. 8 shows the disk and graduated plate. Figs. 9 and 10 are detail views of the edge guide or support. Fig. 11 is a detail of the swiveled pencil and its supports. Fig. 12 is a plan view of the device with the trams extended. Fig. 13 is a section on line *z z*, Fig. 1. Fig. 14 is a detailed side view of the extension.

The T-bar A, forming the main or supporting frame, is composed of the arms A′ A^2, the latter being secured midway its ends on one end of arm A′, and at right angles thereto. A short bar, A^3, projects from the outer side of the arm A^2, and in line with the arm A′. This short arm is provided at its outer end with a point or indicator, *a*. A clamping-screw, *a′*, turns through the shaft-arm A^2 and binds against the base-plate presently described. The arms A′ A^2 have longitudinal mortises formed in their upper faces, which mortises intersect, as clearly shown in Fig. 2. An opening, a^3, formed through the center of arm A^2, serves to permit passage of the screw or bolt that serves as a pivot for the T-bar. This T-bar may be pivoted by a screw or pin directly on the card-board or sheet on which it is desired to make the lines; or it may be pivotally secured on a plate, B, as shown. This plate is preferably made in the form of a quadrant, and is provided in its upper face with a series of indentations, *b*, to receive the point of screw *a′*, when the bar A has been adjusted to the desired position. A segmental plate, B′, has its inner edge fitted to the outer or curved edge of plate B, and is provided with a series of graduating lines, *b′*, radial to the pivot of the T-bar, and in position to register with the pointer *a*, so that the bar A may be set at any desired angle, and brought back again to any given point when moved therefrom, as will be presently described. The plate B′ is secured to quadrant B, preferably by means of ears b^2, projected from the quadrant into slots b^3 in the plate B′, as most clearly shown in Fig. 8. Tram-bars C D are placed in the mortises of the arms of bar A, and are secured in place by screws E, turned through the sides of the bar and binding against the tram-bars. These trams are provided in their upper sides with dovetail grooves, in which slide the traveling blocks. The tram D is so arranged that the base of its groove comes flush with the top of tram C, so that the block sliding on tram D may be drawn over tram C, when it is desired to strike a circle from the pivot of the T-bar, as will be presently described. Block F slides on tram C, and block G on tram D. For convenience of reference, I will denominate the former the traveling "guide-block," and the latter the traveling "pivot-block." These blocks are provided on their under side with dovetail ribs fitted to the grooves in the trams. The pivot-block is composed of upper plate, *g*, and lower or dovetail plate, *g′*, which latter has pins g^2 g^3 projected from its opposite ends up through the upper plate. The pin g^2 serves as a pivot for the pencil-bar, and the pin g^3 is threaded on its upper end to receive nut G′, which, when turned tightly down on said pin, draws the plate *g′* against the walls of dovetail slot in the trams, and secures the block immovably thereto, as will be understood.

The block F is provided with an upwardly-extended stud, F′, which enters the block on the pencil-bar H. This pencil-bar has its

inner end pivoted on the inner end of block G, and is provided with block I, and a pencil-holder, J. The block I is slotted and slipped over the pencil-bar. It has a clamping-screw, I′, whereby it may be secured at any desired point along the bar H, and a socket, I², in its under side to fit on stud F′ of the guide-block. The pencil-holder J is perforated and slipped on the pencil-bar, and has a set-screw, J′, which enables the securing of the holder to the bar in any desired position. This holder also has a socket, J², for the pencil, and a set-screw, J³, for retaining the pencil therein. It will be noticed that plates K are interposed between the points of screws I′ and J′ and the pencil-bar, to receive the bearing of said screws and prevent damage to the pencil-bar.

A short bar, M, is fitted to be inserted in the end of the trams, and is secured thereto when desired, as shown in Fig. 11, and indicated in Fig. 1. A pencil-holder, M′, has a lateral wing, M², which is pivoted by screw M³ on the outer end of the bar M, so that said holder may be swung from side to side to any desired point, and held thereat by tightening its pivot-bolt. By loosening the screws E the tram may be moved back and forth in the slot of its supporting-arm, so as to draw lines parallel to each other and to the line of motion of the tram.

It will be understood that when one line is drawn the screw M³ is loosened, the holder M′ swung to its desired position, as indicated in Fig. 11, and then securely clamped by said screw M³, and another line drawn. By turning the T-bar on its pivot, lines may be drawn parallel to any given radii of said bar.

In operation, when the parts are as shown in Fig. 1, it will be seen by swinging the pencil-bar from side to side one half an ellipse will be described by the pencil. The screw *a′* is then loosened and the frame turned halfway around, and the remaining half of the ellipse will be described, as before. If it be desired to increase the transverse diameter of the ellipse, the screw I should be loosened and the guide-block slipped back in the pencil-bar, and secured at a point nearer the pivot-block. To decrease the transverse diameter the guide-block should be moved to and secured nearer the pencil-block, as will be appreciated.

By adjusting the pencil-block and guide-block on the pencil-bar, and the point of pivoting the bar on the pivot-block the longitudinal axis of the ellipse may be varied, as desired. The pencil-bar is usually supplied with a series of holes, H′, near its inner end, so that its point of pivot may be varied as desired. Now, by removing block I from the guide-block, and moving the pivot-block in its slot up, so that pivot of pencil-bar will coincide with that of the main frame, and securing it at such point by nut G′, or in other suitable manner, the pencil-bar is so arranged as to strike by revolving it on its pivot. In Fig. 12, I have shown the manner of using my extension guide and supporting frames, the detail construction of which parts is shown in Figs. 9 and 10.

The guide extension-frames N are provided with ears N′, or other suitable means whereby they may be attached to the board, and longitudinal mortises N² in their upper sides, corresponding to the mortises in bar A. Screws N³ are also provided whereby to clamp the trams in said frames N. These frames, it will be seen, are arranged in line with one of the arms of the main frame, so as to support the trams when it is desired to form larger ellipses than can be described by means of the devices before described. The uses and operation of these extension-supports N are clearly shown in Fig. 12. The tram may be arranged as shown in full lines, said figure, and one quarter the ellipse struck. It is then adjusted to the position indicated in dotted lines, same figure, and another quarter struck, when, by reversing the T-bar, as before described, the other half of the ellipse can be described in a similar manner.

It is sometimes desirable to support the T-frame beyond the edge of the board. In this case I employ extension guide-supporting frames O. These frames have a depending plate or flange, O′, which, in operation, are screwed or otherwise secured to the edge of the board or table, as will be understood from Fig. 12. This frame is adapted to support the T-frame A, which is secured thereto by means of a screw, O², or in other suitable manner desired. By this means the said frame may be supported beyond the edge of the board or table to enable the forming of elliptical curves near said edge, or for any other desired purpose.

It is manifest that many modifications might be made in the form of the detail of my device without departing from the broad principles of my invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. An ellipsograph comprising a supporting-frame having right-angled arms, bars, or trams removably and adjustably secured to the arms of said frame, and adapted to support the traveling blocks and the guide and pivot blocks supported on the bars or trams and the pencil-bar, substantially as set forth.

2. The herein-described ellipsograph, consisting of the base-plate provided with indentations, the graduated plate, the pivot-supporting frame having grooved arms, and an extension, A³, registering with the graduated plate, the clamping-screw whereby the frame may be secured at any desired point, the trams secured in the arms of the supporting-frame, the pivot and guide block, and the pencil-bar, all substantially as and for the purposes set forth.

3. The combination of the trams C D, suitably supported and provided on their upper faces with grooves, the groove of tram D being formed with its base flush with the intersecting surface of tram C, the traveling pivot-block operating on tram D and movable over tram C, pencil-bar pivoted to the pivot-block, and means for securing said block at any desired point, substantially as set forth.

4. The combination, with a suitable guide-support, of a bar movable longitudinally therein and a pencil-carrier secured to the outer end of the bar and capable of adjustment from side to side in a plane with its supporting-bar, whereby lines may be drawn parallel to said bar and to each other and any suitable desired distance apart, substantially as set forth.

5. The combination of the supporting-frame having an arm, A^3, the trams, the traveling blocks, the pencil-bar, the quadrant having a series of indentations, and a screw turning through the supporting-frame and engaging said indentations, substantially as set forth.

6. The combination of the quadrant provided with indentations, the segmental graduated plate, the pivoted supporting-frame provided with a screw arranged to engage the indentations in the quadrant, and a pointer adapted to register with the graduations on the segmental plate, the trams, the traveling pivot and guide blocks, and the pencil-bar, substantially as set forth.

7. The combination, with the double-armed supporting-frame having grooved arms, and the trams, traveling blocks, and pencil-bar, of the guide extension-frame adapted to support the trams and to be secured in line with the arms of the supporting-frame, substantially as set forth.

8. The combination of the double-armed supporting-frame, the trams, the traveling blocks, the pencil-bar, the guide-extensions, and the edge extension-frame, substantially as set forth.

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

JOHN HARWOOD.

Witnesses:
GEO. F. WRIGHT,
A. E. BIRNBAUM.