

**No. 684,994.**

**Patented Oct. 22, 1901.**

**H. S. LYDICK.**

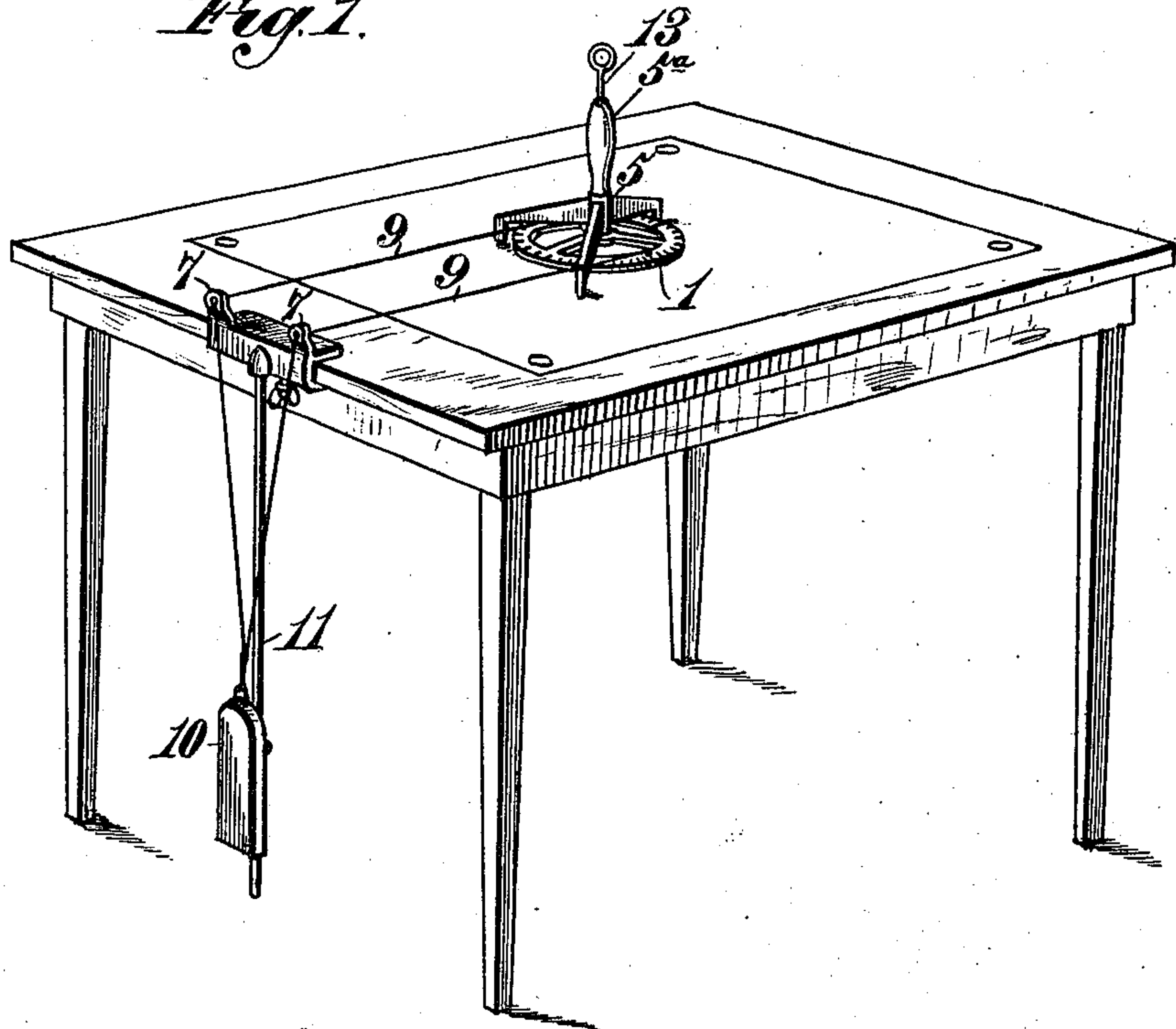
### PLOTTING OR PROTRACTING APPARATUS.

(Application filed July 25, 1900.)

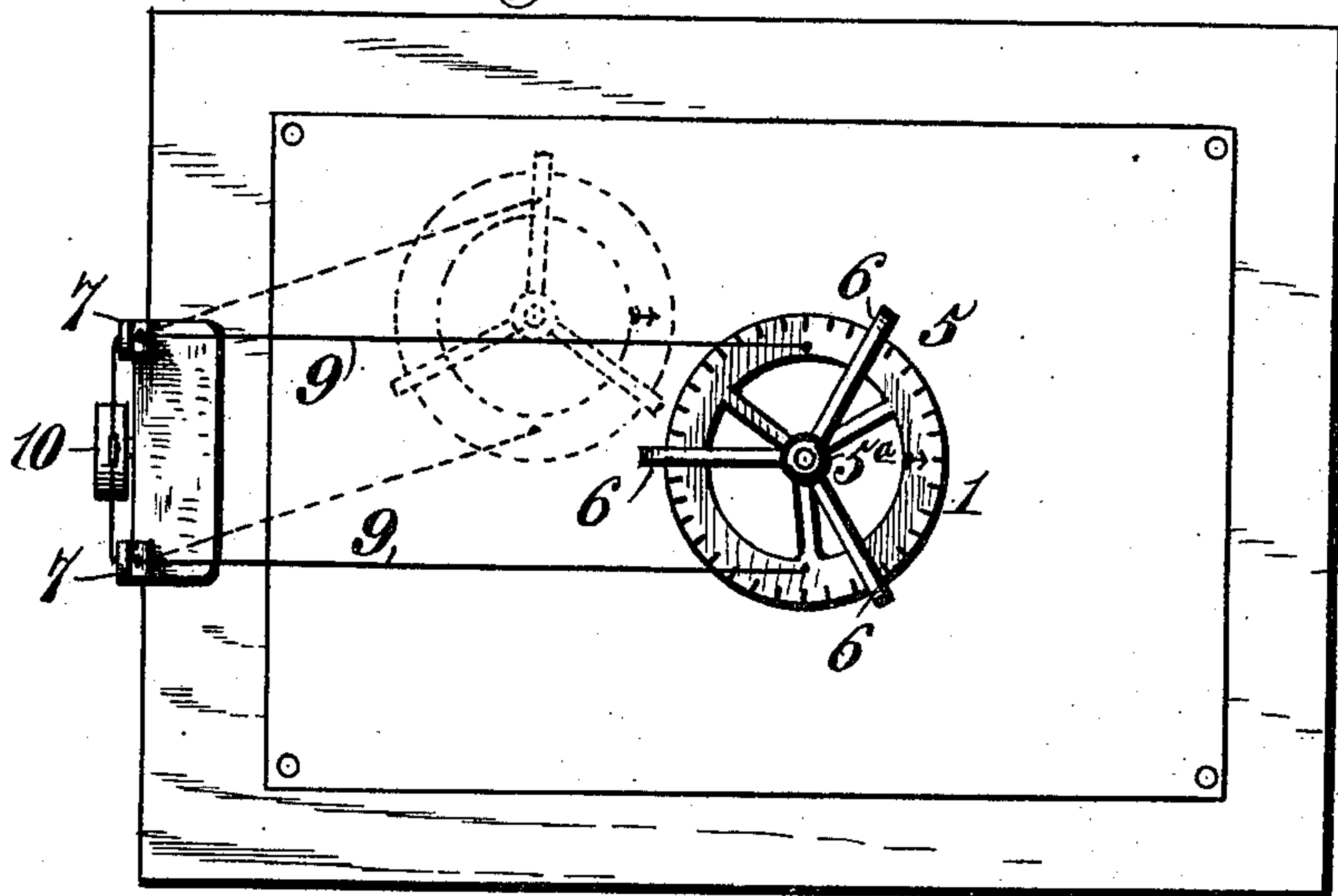
(No Model.)

**2 Sheets—Sheet 1.**

*Fig. 1.*



*Fig. 2.*



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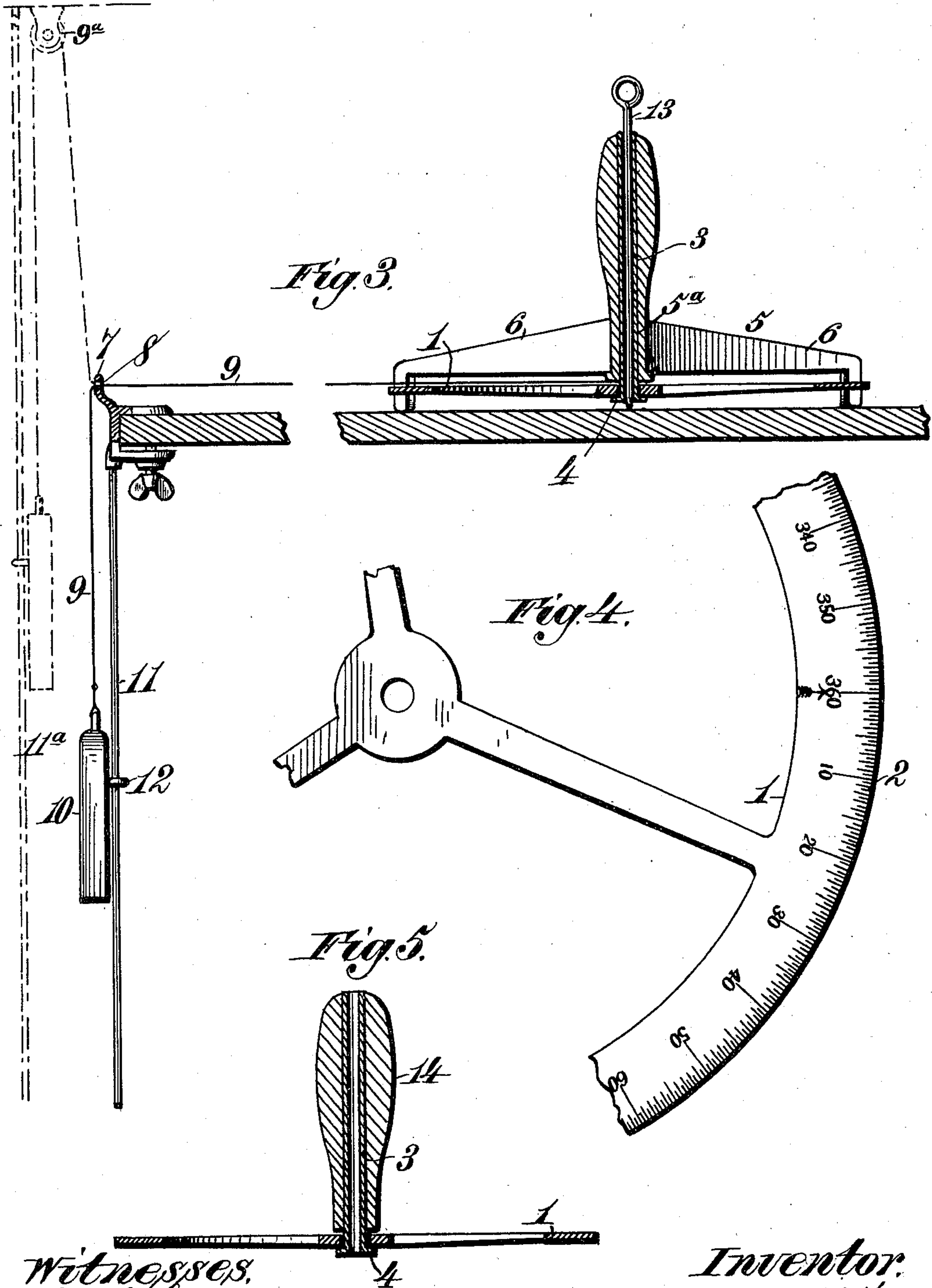
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2 Sheets—Sheet 2.

(No Model.)



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# UNITED STATES PATENT OFFICE.

HENRY S. LYDICK, OF PITTSBURG, PENNSYLVANIA.

## PLOTTING OR PROTRACTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 684,994, dated October 22, 1901.

Application filed July 25, 1900. Serial No. 24,838. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY S. LYDICK, a citizen of the United States of America, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Plotting or Protracting Apparatus, of which the following is a specification.

My invention relates to improvements in plotting or protracting apparatus, and has for its object to provide a novel and simple means or mechanism to facilitate the preparation of plots or diagrams of land from surveyors' notes, to which purpose it is particularly adapted, although useful in various other classes of plotting as well as in protracting.

To the end stated my invention consists in the novel construction, combination, arrangement, and mode of operation hereinafter described and claimed, reference being had to the accompanying drawings, illustrating the preferred embodiment of my invention, and in which—

Figure 1 is a perspective view; Fig. 2, a top plan; Fig. 3, a detail view in section and elevation; Fig. 4, an enlarged detail of a portion of the protractor disk or wheel, and Fig. 5 a sectional view of a modification.

In the said drawings the reference-numeral 1 indicates a portable protractor disk or wheel provided with a peripheral scale 2, that shown in the drawings being of the degrees of a circle. Obviously this is merely illustrative, and the scale may be of the major and minor points of the compass or of other character, according to the particular use of the apparatus for the time being. The form of the disk is not material as to whether it be skeleton, as illustrated, or a solid disk, though the skeleton form is preferred by reason of its light weight.

The protractor disk or wheel 1 is loosely mounted or swiveled on a tubular support 3, having a base 4 beneath the protractor disk or wheel, whereby the latter is held out of contact with the drawing-table.

The reference-numeral 5 designates a tripod-brace, which is preferably employed to impart steadiness to the disk or wheel and its support when the latter are at rest, and, furthermore, to insure that the disk or wheel will not come in contact with the drawing-table

when it is being shifted about the table in use. This brace has a central hub or sleeve 5<sup>a</sup>, removably, but snugly, fitting over the tubular support 3, the legs 6 thereof spanning the disk or wheel and resting upon the surface of the drawing-table. The tripod-brace or other suitable form of brace I consider desirable and as adding to the more satisfactory operation of the apparatus, as it insures stability of position of the protractor wheel or disk and prevents contact thereof with the table. I do not consider it absolutely essential, however, as the apparatus will operate in its absence.

The disk or wheel 1, as described or otherwise suitably supported upon the drawing-table, has imposed upon it a certain or definite position in which a given point of its periphery, which I have arbitrarily designated by an arrow, will when the disk or wheel is at rest invariably maintain the same position with relation to the surface of the drawing table or board, and which in the illustrative example of the use of the apparatus hereinafter given I will term "North." This position is imposed by an automatic controller. That in the preferred form shown consists of a weight connected to the disk or wheel by flexible elements, which between the controller and disk or wheel sustain an operative parallel relation to each other. This parallel relation in the illustrated and preferred embodiment of my invention exists throughout a part only of the length of the connections adjacent the disk or wheel; but I do not confine my invention to this particular arrangement. The controller acting through the medium of the flexible elements or connections prevents rotation of the disk or wheel or restores the same to its definite position referred to should it by accident or contact with any object deviate therefrom, and the best form and arrangement of controller and connections now known to me are shown in the drawings and herein described.

Suitable means are provided for maintaining an operative parallelism of the flexible elements or connections 9, such means consisting of separated elements, preferably of separated eyes 8. In the example illustrated the eyes 8 are provided in the arms 7 of a guide suitably connected to the table, as by a



clamp engaging the edge of the latter in such manner that the guide is held from unintentional movement during use, and to the disk or wheel at opposite sides of its center and at points distant apart equal to the distance between the eyes or perforations 8 of the guide and so positioned that a line connecting the points of attachment will be parallel to a similar line passing through the eyes 8 are secured the flexible elements or connections 9, which pass through said eyes 8. These connections are of precisely equal length and parallel between the guide-eyes 8 and points of attachment to the protractor-wheel and are attached at their opposite ends to a sliding weight 10, which places each under equal tension and moves during the manipulation of the apparatus upon a vertical weight-directing rod 11, connected to the guide equidistant the eyes 8 thereof and passing through a slip in the form of a ring 12, secured to or formed with the weight. This guide-rod is preferably connected detachably to the guide by having its free end loosely fitted in the socket formed on said guide, as shown by Fig. 1 of the drawings.

The arrangement described enables the support and the protractor disk or wheel swiveled thereon to be shifted bodily or moved to different positions upon the surface of the table and in the example of my invention shown in the drawings also with relation to the controller, one instance of such shifted position being illustrated in dotted lines, Fig. 2, and in shifting the apparatus about the table the tubular support is free to turn or swivel in the disk or wheel; but the latter is prevented from rotating upon the support by the action of the weight transmitted through the flexible connection to the disk or wheel. The flexible connections held taut or under tension by the weight and being attached to the disk or wheel at separated points, as described, a line connecting the points of attachment will always be parallel with a similar line passing through the guide-eyes, and hence rotation of the disk or wheel is prohibited and a given point of its circumference will always point in the same direction with reference to the surface of the drawing-table.

The support 3 is preferably made tubular to receive the centering-pin 13, by means of which the center of the disk or wheel is accurately positioned at different points of the surface of the drawing-table—as, for instance, various points from which a new line is to take its start.

The hub of the tripod-brace, while removable, fits the tubular support sufficiently snugly to serve as a handle by which the apparatus may be lifted and shifted upon the table, and in apparatus according to my invention where such brace is dispensed with it may be replaced by a suitable removable snugly-fitting handle 14, although such a handle is not essential, as the apparatus may be lifted and moved by grasping the tubular sup-

port, which would in that case serve as a handle.

To make plain the operation of my improved apparatus, I will describe its use in plotting a piece of land from surveyors' notes, an understanding of which will make obvious its manner of use in other characters of plotting or protracting. The guide being suitably clamped to the table and the weight-director connected thereto, with the weight in sliding position thereon, the protractor disk or wheel is set so that its centering-pin is at the point of beginning of the diagram. The weight, acting through the flexible connections, compels the peripheral point of the disk or wheel designated by the arrow, and which I term "North," to point to the arbitrary North. Suppose, then, the notes call for a line on a reduced scale corresponding to ten feet running due north. The plotter draws the line of designated length radially outward from the point. The notes next call for a line east fifty degrees from north of a designated length. The wheel is moved to the end of the first line with its center at the termination thereof, which is readily accomplished by the use of the centering-pin. The weight acting on the flexible connections prevents rotation of the wheel and maintains the pointing of the arrow to arbitrary north and the second line is drawn out from the fifty-degree mark on the peripheral scale. Now a line south is to be drawn. The wheel is shifted to the termination of the east line, centered thereat, and the north position of the arrow maintained by the weight and the line made. Then a line west is called for. The process is repeated and the line drawn, thus completing a simple plot. More intricate plotting is carried out in the same manner.

It will be apparent that, broadly considered, my invention consists in a plotting or protracting apparatus having in combination a portable protractor disk or wheel swiveled on a support and means operatively connected thereto by flexible elements for controlling the position of a peripheral point thereof by preventing its rotation, the particular supporting of the wheel and the particular controlling means being valuable auxiliaries in which many changes in detail of construction and arrangement may be made without departing from the essence of my invention, as set out in the following clauses of the claim.

Where the drawing-table is large and the area over which the protractor disk or wheel may have to be moved is consequently quite extended, it may be found desirable to train the flexible connections over pulleys 9<sup>a</sup>, suitably attached to the ceiling or other support adjacent the drawing-table, and provide the weight-directing rod 11<sup>a</sup> of extended length, all as shown in dotted lines in the drawings, Fig. 3.

In the event that the protractor disk or wheel should come in contact with any object while being moved about the table, so as to



cause it to rotate on the tabular-support, and thus disturb the proper relative position of the arbitrary north point the weight attached to the flexible connections will immediately restore the normal position.

Having thus described my invention, what I claim is—

1. In plotting or protracting apparatus, the combination with a shiftable support, of a protractor disk or wheel swiveled thereon, a controller, flexible elements connected to said controller and with opposite sides of the center of the disk or wheel, and means for maintaining an operative parallelism of said flexible elements, substantially as described.

2. In plotting or protracting apparatus, the combination with a shiftable support, of a protractor disk or wheel swiveled thereon, a weight, flexible elements connected to said weight and with opposite sides of the center of said disk or wheel, and means for maintaining an operative parallelism of said flexible elements, substantially as described.

3. In plotting or protracting apparatus, the combination of a swiveled protractor disk or wheel, a guide, a weight, and flexible connections passing through the guide and connected to said protractor wheel or disk and weight, substantially as described.

4. In plotting or protracting apparatus, the combination of a swiveled protractor disk or wheel, a guide provided with separated eyes or perforations, flexible connections attached at one end to said disk or wheel at separated points and passing through said eyes or perforations and a weight connected to the opposite ends of said connections, substantially as described.

5. In plotting or protracting apparatus, the combination of a swiveled protractor disk or wheel, a guide provided with means by which it is secured to a drawing-table, and having separated guiding eyes or perforations, a weight-directing rod connected to said guide, a weight slidable on said rod, and flexible connections attached to said weight and disk or wheel and passing through said eyes or perforations substantially as described.

6. In plotting or protracting apparatus, the combination with a tubular support, a protractor disk or wheel swiveled thereon, a cen-

tering-pin adapted to be received in said support, and means for controlling the position of a peripheral point of said wheel or disk, substantially as described.

7. In plotting or protracting apparatus, the combination with a tubular support, a protractor disk or wheel swiveled thereon, a centering-pin adapted to be received in said support, a weight, flexible elements connected to said weight and with opposite sides of the center of said disk or wheel, and means for maintaining an operative parallelism of said flexible elements, substantially as described.

8. In a plotting or protracting apparatus, the combination with a swiveled protractor disk or wheel, a centering-pin therefor, means for automatically controlling the position of a peripheral point of said disk or wheel, flexible elements connected to said means and with opposite sides of the center of said disk or wheel, and means for maintaining an operative parallelism of said flexible elements, substantially as described.

9. In plotting or protracting apparatus, the combination with a swiveled protractor disk or wheel, a centering-pin therefor, a weight, flexible elements connected to said weight and with opposite sides of the center of said disk or wheel and means for maintaining an operative parallelism of said flexible elements, substantially as described.

10. In plotting or protracting apparatus, the combination of a tubular support, a protractor disk or wheel swiveled thereon, a centering-pin for said wheel, adapted to enter the tubular support, a tripod-brace fitted on the support and spanning the disk or wheel, a guide having means by which it is clamped to a drawing-table, a movable weight, means for directing the movement thereof, and flexible connections between said weight and protractor disk or wheel, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

HENRY S. LYDICK.

Witnesses:

JAMES L. COURTER,  
J. M. CARBOY.