J. L. MATSON.

DRAWING INSTRUMENT.

APPLICATION FILED OCT. 12, 1911.

1,170,174.

Patented Feb. 1, 1916.

2 SHEETS—SHEET 1.

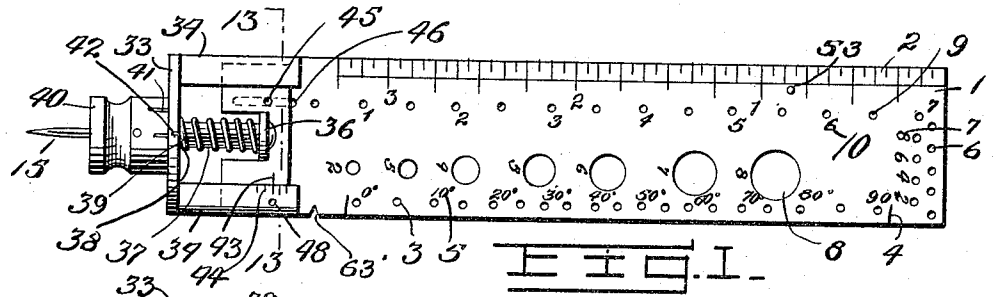


FIG. 1.

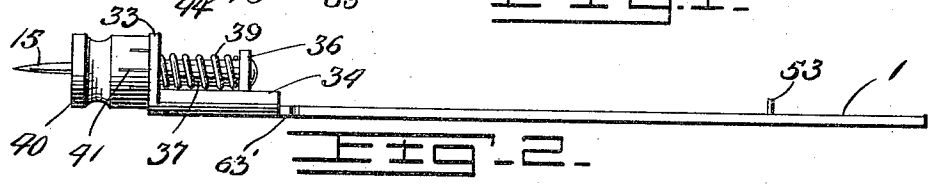


FIG. 2.

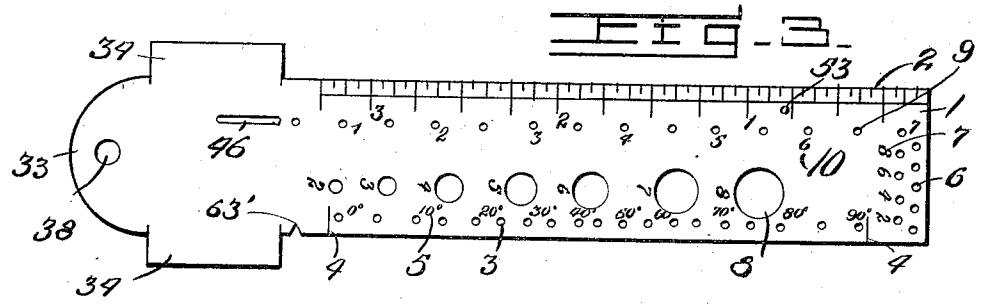


FIG. 3.

Witnesses

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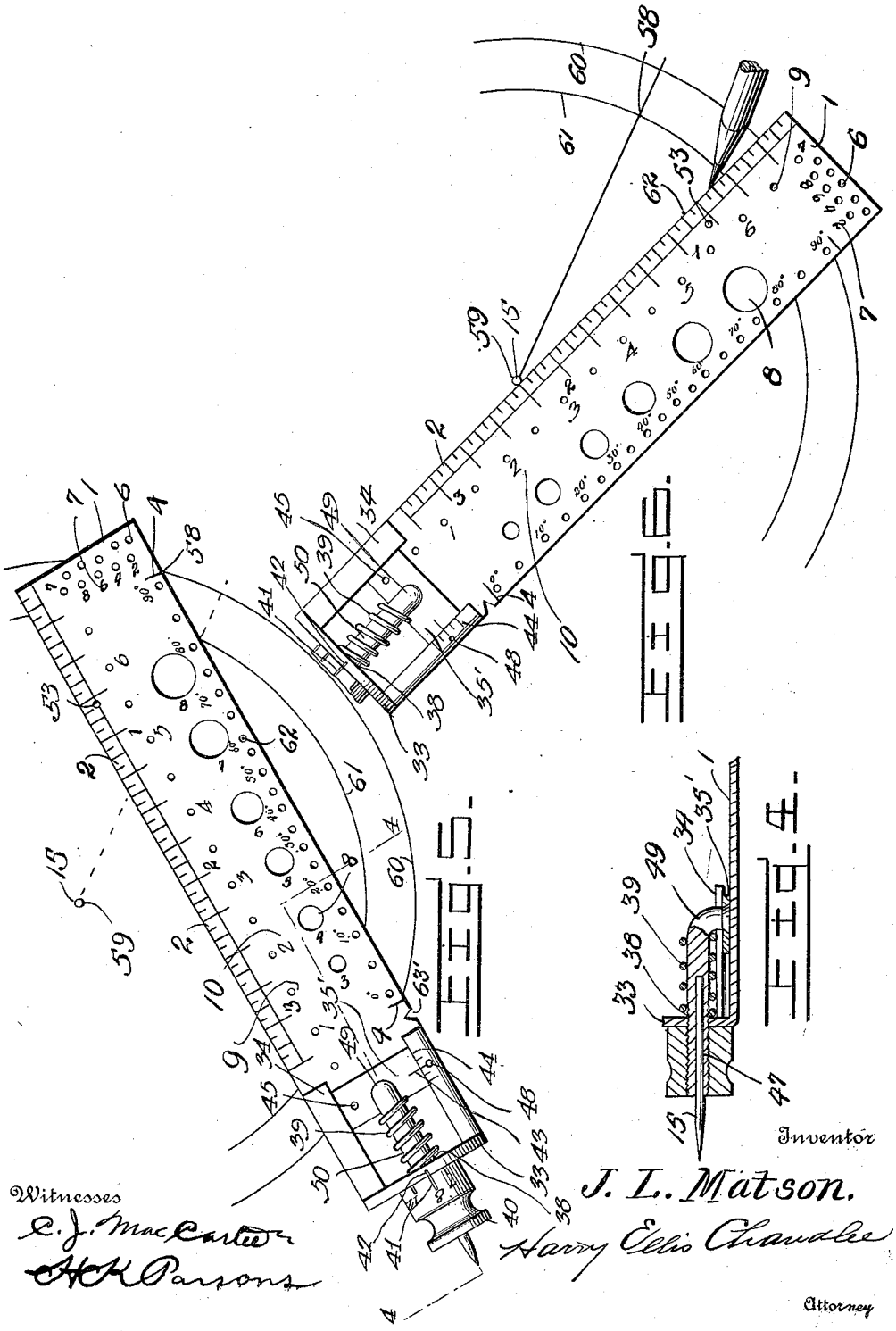


FIG. 3.

FIG. 4.

FIG. 5.

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UNITED STATES PATENT OFFICE.

JEPTHA L. MATSON, OF DUNBARTON, WISCONSIN.

DRAWING INSTRUMENT.

1,170,174. Specification of Letters Patent. Patented Feb. 1, 1916.

Application filed October 12, 1911. Serial No. 654,363.

To all whom it may concern:

Be it known that I, JEPTHA L. MATSON, a citizen of the United States, residing at Dunbarton, in the county of Lafayette and State of Wisconsin, have invented certain new and useful Improvements in Drawing Instruments, of which the following is a specification.

My invention relates to improvements in drawing instruments, and has for its leading object the provision of an improved type of instrument particularly adapted for use in describing circles or for determining and laying out different angles or dividing given angles as desired.

The further object of my invention is the provision of an improved device which may be quickly and accurately adjusted to describe circles of various diameters and which will serve to form said circles much more accurately and permit of the changing of the diameter of different concentric circles with much greater ease than is possible by the use of a compass.

Another object of my invention is the provision of an improved device which may be employed both to describe or lay out circles and also to cut the arc of the circle into segments of any desired degrees or to cut sectors having any desired angle.

Another object of my invention is the provision of an improved center or pivot on which my tool may be swung and of improved means for holding the pivot and for forcing the same into a drawing board.

Other objects and advantages of my improved drawing instrument will be readily apparent by reference to the following description taken in connection with the accompanying drawings, and it will be understood that I may make any modifications in the specific structure shown and described within the scope of my claim without departing from or exceeding the spirit of my invention.

Figure 1 represents a plan view of my device. Fig. 2 represents a side elevation of the device. Fig. 3 represents a plan view of the blank from which the base plate is formed. Fig. 4 represents a sectional view of a modified form of the device on the line 4—4 of Fig. 5. Fig. 5 represents a view of a modified form of my instrument in use in dividing a circle, illustrating the first step in the division of the circle. Fig. 6 represents a view of the same form as shown in Figs. 4 and 5 showing the device in position for completion of the dividing of the circle.

In the drawings, in which similar characters of reference are employed to denote corresponding parts throughout the several views, the numeral 1 designates the rectangular base portion of my invention having one edge marked with the graduations 2 providing a scale or ruler and having adjacent the opposite edge the small apertures 3 disposed between the graduations or marks 4, the apertures 3 being designated by numerals 5 marking the same from zero to ninety by tens, there being nineteen of the said apertures. One end of the plate is further formed with a set of staggered apertures 6 equidistantly spaced from each other, said apertures being designated by the numerals 7. The plate is also formed with a row of circular apertures 8 of gradually increasing size which extend along the plate and also with another series of small apertures 9 extending therealong and designated by the numerals 10, said apertures 9 being spaced one-quarter inch apart in the finished article.

I form on one end of the plate 1 the semicircular extension 33 bent upward at right angles to the plate, while bent upward at the sides of the plate and turned inward to provide guides are the ears 34. Sliding beneath the guide ears 34 is a plate 35 having the tongue 36 cut and bent upward therefrom, a screw 37 having its end rotatably engaged in the tongue 36 and having its other end extending outward through the aperture 38 in the portion 33 of the plate 1. A spring 39 is mounted on the screw and has its ends bearing against the tongues 33 and 36 to force the same apart, while a milled adjusting nut 40 engaged on the outer end of the screw and bearing against the extension 33 serves to draw the screw outward and thus to shift the plate 35 against the pressure of the spring. Said screw has preferably a pitch of thirty-two threads to the inch, whereby a complete rotation of the nut 40 will shift the plate 35 one thirty-second of an inch. The base of the nut has graved thereon a mark 41 adapted to serve in conjunction with a mark 42 on the extension 33 to indicate the amount of turn which is given to the nut and thus to show the amount of adjustment of the plate, there preferably being enough of these marks 41 to indicate

when the plate 35 is adjusted one two-hundred and fifty-sixth of an inch, this adjustment tending to vary the diameter of circles made by my instrument one one-hundred and twenty-eighth of an inch, this necessitating eight divisions on the nut 40. The plate has thereon the mark 43 adapted to coincide with one of the marks 44 to indicate when the plate 35 is in its normal position or with its pivot receiving aperture 45 spaced one-quarter of an inch from the first aperture 9 of the plate, or to indicate the adjustment of the plate for each complete revolution of the nut 40.

The aperture 45 in the plate 35 rides above the usual longitudinally extending slot 46 in the plate 1, and is adapted to receive the pivot pin 15 which is normally contained in a socket 47 formed centrally in the adjusting screw 37. To insert the pin 15 in a drawing board when using my instrument, it is merely necessary to press the instrument downward and force the projecting point of the pin into the board, while to facilitate removal of the pin from the drawing board, I form in the plate 35 and one of the ears 34 the apertures 48 disposed in alinement with each other when the plate 35 is in its normal or unadjusted position. It is merely necessary to pass the instrument downward with the pin engaged in the apertures 48 when a slight turning of the nut 40 will slightly shift the apertures out of alinement and cause the edges of the plate and ear to bind against and clampingly engage the pin when upward movement of the instrument will readily withdraw the pin from the drawing board.

In Figs. 5 and 6, I have illustrated the method of using my instrument for dividing a circle into any desired sector. The main use of my instrument is shown in Fig. 5. To divide a circle I employ the set of apertures 3 designated by the numerals 5 for indicating the number of degrees. To use the invention, however, it is necessary to have a circle with a two-inch radius and if the circle which it is desired to divide has a radius either greater or less than two inches, I either circumscribe it with a circle having a two inch radius or circumscribe said circle, assuming the circle to be divided has a radius less than two inches. I then mark on the periphery of the two-inch circle one of the points as at 58 where I wish to cut the circumference of the two-inch circle, said point lying on the common radius of the two concentric circles, both having the center 59 and the construction circle being designated by the numeral 60 while the circle to be divided is designated by the numeral 61. This point 58 having been determined in cases where it is desired to divide the circle at a given point and at another point a certain number of degrees therefrom, or else if no point is determined I then apply my instrument to any desired portion of the circle. In any event the two marks or graduations 4 on the edge of the plate 1 are placed to be exactly at the points of intersection of the arc of the circle with the edge of the plate with the body of the plate extending inward toward the center of the circle. The distance between the said graduations 4 is measured in the making of the tool to cut off exactly an arc of ninety degrees or one-quarter of the circumference when the instrument is in the position shown and described. The two endmost apertures 8 of the plate which are respectively designated by the numerals 0 and 90 are so positioned that radii extending to the points of contact of the instrument with the circle will pass directly beneath the said apertures, while the other apertures 3 are so disposed relative to each other that radii extending outward between the two radii just mentioned which make right angles with each other, if at angles of five degrees with each other will each pass beneath one of the apertures 3. Consequently when the plate 1 is in the position shown in Fig. 5 passing of a pencil point through any desired aperture 3 will determine on the drawing sheet the points 62 through which lines should be drawn or imaginary lines passed to cut a segment of the desired number of degrees from the arc of the circle 61 or to designate a sector of the circle. These points having been determined, I then shift my instrument to have the edge thereof rest against the pin 15 which has been left at the center of the circles and swing the instrument till said edge is adjacent the point 62 when the designating lines or radii of the circles may be readily drawn.

From the foregoing description taken in connection with the accompanying drawings the construction and use of my improved combination drafting instrument will be readily understood, and it will be seen that I have provided a highly efficient combination instrument having a plurality of sets of apertures formed therein which serve in conjunction with graduations or marks upon the instrument both in the making of circles of varying diameters within certain limits and also serve in measuring and marking off both acute and right angles and in measuring degrees on the circumference of a circle. It will further be observed that I have provided my improved drafting instrument with various novel means for securing the delicate adjustments of the pivot pin which serves as a center for the various circles formed by the use of my instrument, all of said means for adjusting the pivot pin performing a similar function in that they enable me to vary the position of the main plate of my instrument relative to the pin

and thus to employ the apertures in the plates in the formation of circles varying from each other by but a fraction of an inch in diameter.

It will consequently be seen that I have provided an improved drafting instrument which may be easily manufactured and which is of simple and durable construction and cannot be easily broken or gotten out of order and which will prove extremely satisfactory to those desiring to make either concentric circles or other circles of different diameters and wishing to have the diameters of the circle as exact as possible or adjusted to but slightly vary from each other.

I claim:

A drafting instrument comprising an elongated base plate having guide ears struck up from one end, said base plate having a series of equally spaced and a series of unequally spaced apertures, a plate slidable between the said ears and provided with an aperture, a bolt connected to the slidable plate, an upstanding apertured lug at one end of the base plate, the bolt extending through the aperture of the said lug, the outer extremity of the bolt being threaded and having a longitudinal socket formed in the end for the reception of a pin, and a coil spring embracing the bolt and disposed between the slidable plate and the upturned perforated lug for normally forcing the slidable plate to the inner limit of its movement.

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

JEPTHA L. MATSON.

Witnesses:
L. C. MATSON,
J. M. LEHR.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."