

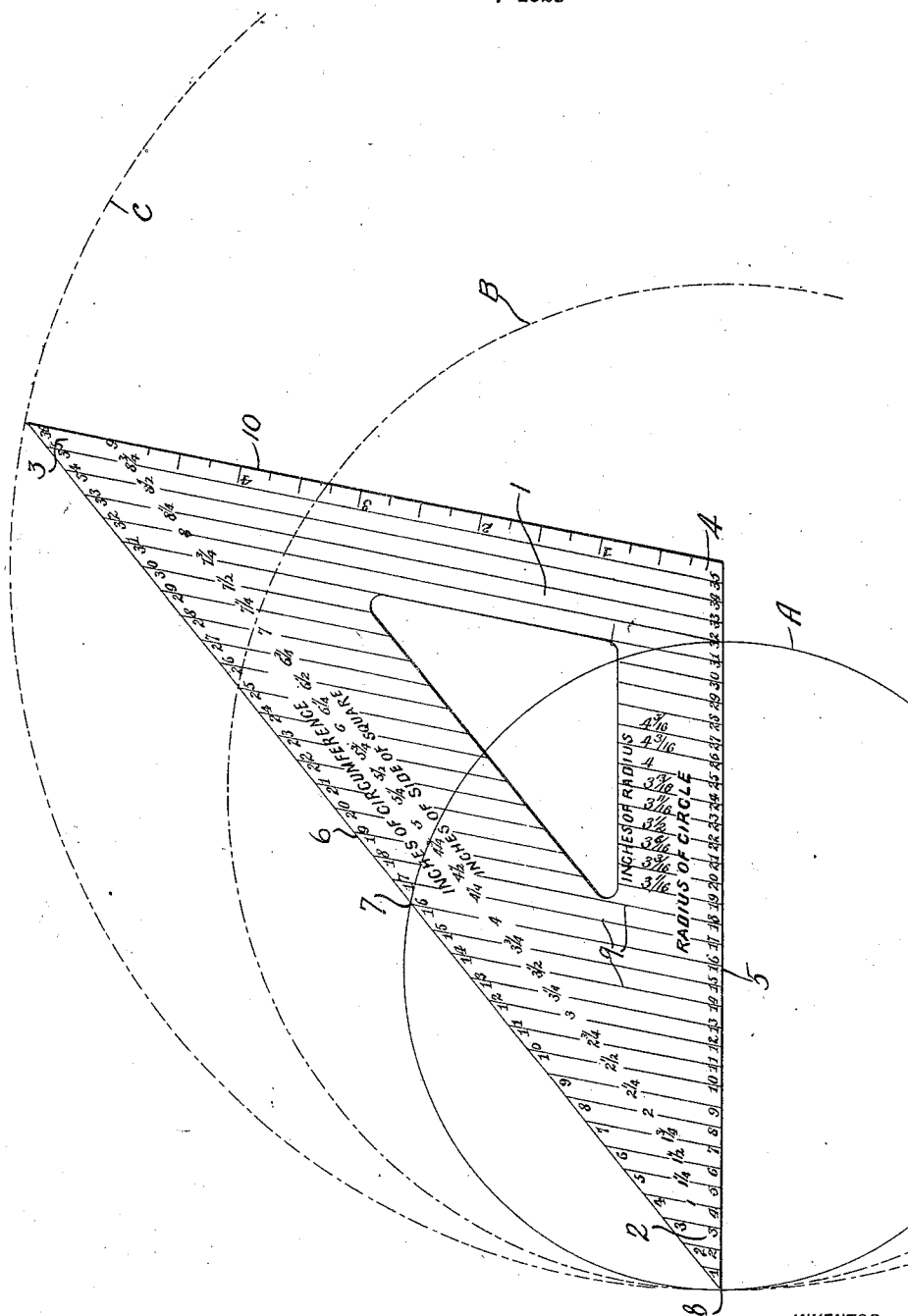
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MEASURING TRIANGLE

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WITNESSES

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MEASURING TRIANGLE.

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To all whom it may concern:

Be it known that I, CHARLES HOHMANN, a citizen of the United States, and a resident of Jersey City, in the county of Hudson and State of New Jersey, have invented a new and Improved Measuring Triangle, of which the following is a full, clear, and exact description.

This invention relates to a triangle, and has for an object the provision of a triangle so constructed as to the arrangement of its angles and the scales used on it that various information concerning the drawing and plotting of circles can be very simply and readily obtained.

Another object resides in the provision of means whereby merely laying the triangle in a particular manner on any circle drawn, the circumference of that circle can be obtained by reading a particular scale of the triangle.

A further object resides in the provision of means whereby the radius of a circle of any given circumference can be very readily ascertained by means of marks on the triangle.

A still further object resides in the particular construction and arrangement of parts which are hereinafter described and claimed and shown in the accompanying drawings.

The invention is illustrated in the figure, which shows the triangle with the scales thereon and three different sizes of circles concerning which the manipulation and observation of the triangle can result in definite information.

The form of the invention shown in the drawing is a preferred form, although it is understood that modifications in the construction and arrangement of the parts and in the character of the materials used may be adopted without departing from the spirit of the invention.

A triangle 1 is formed of any suitable material, preferably a transparent material such as celluloid. The corners 2 and 3 of the triangle are formed by equal angles, namely, 39° each. Consequently the angle in the corner 4 is 102°.

While I have stated that the angle designated by the numeral 2 is substantially 39°, by a more careful calculation this angle is approximately 38° 33' 3". This was found in the following manner:

The length of the radius between the

numerals 8 and 5 is designated as unity. The length of the lines between the numerals 7 and 8 is designated as

$$\frac{2\pi R}{4} \quad 60$$

and when reduced is equal to

$$\frac{\pi R}{2} = 1.5708. \quad 65$$

A line drawn from the point where the circumference A cuts line 6 to the point where said circumference cuts line 5 would complete a right-angle triangle designed by said line (line 5) and by the line between the numerals 7 and 8.

Find the sine of the angle designated by the numeral 2.

The line between the numeral 7 and 32 I designate by X and the portion of line 6 between 8 and 7 as Y = 1.5708. The portion of line 5 between 8 at the circumference A, I designate as M.

$$\begin{aligned} X &= \sqrt{M^2 - Y^2} \quad 80 \\ &= \sqrt{4 - 2.44466} + \\ &= 1.24641 \end{aligned}$$

$$\text{Sine of angle 2} = \frac{X}{M} \quad 85$$

$$\begin{aligned} &= \frac{1.24641}{2} \\ &= .62321 \quad 90 \end{aligned}$$

Since the sine of angle 2 is .62321, the angle = 38° 33' 3" — which warrants applicant in stating that the equal angles are substantially 39° for practical purposes.

I have shown the circles A, B and C laid out with respect to this triangle, and it is found, for instance, that if the tip of the triangle adjacent the angle 2 be placed on the circle A at the end of any diameter, and if the edge 5 be disposed to lie along the diameter of the circle A, then the edge 6, which in this case would be the hypotenuse of the triangle, would intersect the circumference of the circle at a point 7. The distance of the point 7 from the point 8, the tip of the triangle, would be equal to the side of a square the perimeter of which would be equal to the circumference of this circle A. Therefore, if we multiply this distance in any given unit, such as inches, by the number four, representing the four

sides of the square, the value obtained in the units, such as inches, will represent the circumference of a circle. Since the distance from 8 to 7 is four inches, the triangle is marked adjacent this point with the numeral 16. This numeral 16 is only one marking or graduation disposed adjacent the edge 6 of the triangle, and these various values, which are shown running from 1 to 36, represent the circumferences of circles in inches. Another scale is disposed along this edge 6 at the triangle and relates to the length of the sides of equal squares in inches. This second set of markings or graduations is disposed on lines such as 9 which are drawn from the marks of circumference in a direction parallel to the edge 10. The points where each of the lines 9 intersects the edge 5 of the triangle are marked with numbers similar to the numbers at the other end of the line, namely, from 1 to 36. The edge 10 is laid out in a scale of inches for any convenient use. It is also to be noted that the length of the line 9 drawn from the numeral 14 on the circumference scale to the same number on the edge 5 is two and one-quarter inches. This represents the radius of a circle the circumference of which is fourteen inches. Calculation will prove this to be substantially correct. Therefore, if the tip 8 is laid on the pole of the diameter of any given circle, the circumference can be read by noting the value of the graduation at the point where the edge 6 intercepts the circumference of the circle, and the radius of the circle can be instantly located by following down the line 9 from its graduation to the edge 5. The value of the radius can be ascertained from the scale called "Inches of radius" disposed near the edge 5 and which represents the respective lengths of the various lines 9 which are equal to the length of the radius of the circle in question. As a further example of the use of this scale, consider circle B, and assuming that the tip 8 of the triangle is laid at one end of a diameter of the circle B, the edge 6 intercepts the circumference of the circle B at a point marked 25 on the scale of circumference. This means that the circle B is twenty-five inches in circumference. Reading the scale called "Inches of the side of square", we note by following down the line 9 connected to the graduation 25 a little way, that the side of the square corresponding to this circle is six and one-quarter inches. To find the area of the square equal to the area of the circle, it is merely necessary to square six and one-quarter. Following this line 9 further down, the point 25 is located on the scale adjacent the edge 5, which immediately gives

the center of the circle B; and on the scale called Inches of radius, we read that the radius of this circle B is four inches. Calculations will prove these various facts to be approximately correct.

It will thus be observed that I have provided a simple triangle the angular formation of which and the scales on which enable various data concerning circles to be very quickly ascertained, and which also enables one to plot graphically this data with equal ease.

The limitation isosceles triangle wherever referred to in the specification and claims is to be construed as a plate of material in the shape of a triangle.

What I claim is:

1. A measuring device which comprises an isosceles triangle for use in plotting circles, the equal angles of the triangle being substantially 39° , said triangle being provided with spaced lines parallel to a side opposite one of the equal angles and cutting the other two sides to form graduations along the longer side and numbered to designate the lengths of the circumference of various circles to which the device may be applied, said parallel lines being numbered progressively to designate the length of the radii of circles, said parallel lines being also numerically designated to represent the length of a side of a square the area of which is equal to the area of a circle defined by the graduations on the triangle and to which the device has been applied.

2. A measuring device comprising an isosceles triangle for use in plotting circles, the equal angles of which have a value of substantially 39° , said triangle having a scale of graduations along the edge of its longer side to represent the lengths of the circumference of circles, said triangle being provided with a plurality of lines drawn from each graduation to the opposite side and intercepting said side, the length of each of said sides being equal to the radius of a circle, the circumference of which is represented by the first mentioned graduations.

3. A measuring device which comprises an isosceles triangle for use in plotting circles, the equal angles of the triangle being substantially 39° , said triangle being provided with a scale of graduations along one side of the triangle, said scale of graduations representing the circumferences of circles, the circumference of which intercepts the side provided with the graduations when the vertex of either of the equal angles is placed at one end of the diameter, with the adjacent side extending along the diameter of said circle.

CHARLES HOHMANN.