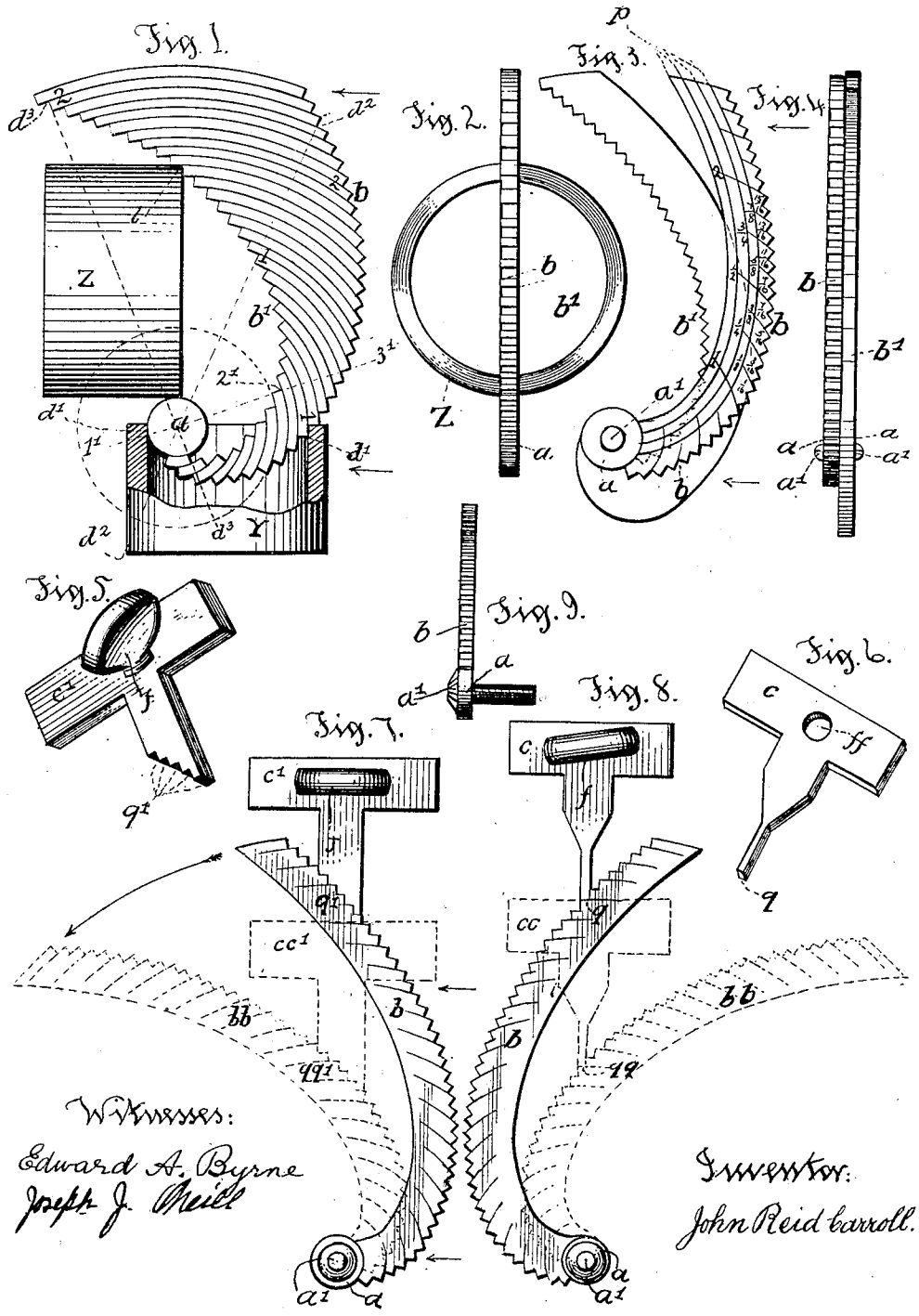
J. R. CARROLL.

MEASURE.

APPLICATION FILED JAN. 10, 1907.

926,688. Patented June 29, 1909.



THE NORRIS PETERS CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN REID CARROLL, OF WEST HOBOKEN, NEW JERSEY.

MEASURE.

No. 926,688. Specification of Letters Patent. Patented June 29, 1909.

Application filed January 10, 1907. Serial No. 351,675.

To all whom it may concern:

Be it known that I, JOHN REID CARROLL, a citizen of the United States, residing in West Hoboken, Hudson county, State of New Jersey, have invented a new and useful Improvement in Measuring Instruments; and I do hereby 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.

This invention relates to the utilization of a circle and a series of arcs of concentric annuli as an accurate and instantaneous means of obtaining dimensional measurements.

The novel construction of my invention enables minute measurements to be readily obtained, and to still further enhance its usefulness in this respect a series of steps may be cut along the outer edges of the cam-shaped plate, as hereafter fully specified.

I am aware that a patent was issued on October 13, 1903, No. 741,146, for a gage containing similar steps to mine, the two sides of the tool containing similar serrations, as a means of measuring, but I am not aware that the combination of a series of steps with a circular base have been used together.

Another object of my invention is to make a gage capable of producing any required measure on all devices and implements in which accurate adjustments are necessary.

To the ends and objects mentioned my invention consists of certain devices, combinations of parts and features of construction, all of which will be hereafter fully described and particularly pointed out in the concluding claims.

In the drawings forming part of this specification, Figure 1 is a geometrical plan of my invention, showing the circle, the portions of arcs of concentric annuli and the steps, and obtaining the interior and exterior dimensions of two cylindrical objects. Fig. 2 is an end view of Fig. 1, the cylinder Y being removed. Fig. 3 shows the two stepped sides of the measure with the superfluous intermediate part removed, and the two sides pivoted together at the center a'. Fig. 4 is an edge view of Fig. 3. Fig. 5 is a perspective view of a sliding finger or gage having steps on one end to engage with the steps of the measure. Fig. 6 is another form of sliding finger having one end made to engage with steps of the measure. Figs. 7 and 8 show the gage as it is used in setting a finger or sliding gage on devices where dimensions are required. Fig. 9 is an edge view of the gage as seen in the position of the shadow b b, showing the means of pivotal fastening.

As shown in the drawing (Fig. 1) a series of arcs of concentric rings project on a cam-shaped plate, from one complete center circle, the complete circle forming the base of the instrument and being cut out all around its circumference, with the exception of the portion from which the plate projects, the whole forming a cam having its lateral edges in the general form of spiral-like curves. Along the edges and between each two adjacent arcs an angular step may be formed, one side of the angle being formed by a portion of a certain radial line of the center circle a, extending from one arc to the next adjacent one. The other side of the angle being formed by a portion of the adjacent one of the arcs. This is repeated between each two adjacent arcs. In practice these steps may be made right angles, the curved graduation mark being a continuation of the arc side of the angle.

To obtain a measurement with this gage it is necessary to understand the peculiar relation of the circular base a to the various steps b and b^1. In Fig. 1 the various broken lines are numbered respectively d^1 d^2, and d^3; another line is numbered 1^1, 2^1, and 3^1 along its length. In measuring the inside diameter of a hollow circle it will be observed (Fig. 1) that the gage is inserted inside the cylinder Y with the circle a touching one side of the inner part of the tube. Zero is not, as might be supposed, in the center of a, but at its circumference.

1^1, 2^1 and 3^1 represent various dimensions on the gage. Zero from 3^1 is a point on the circumference of a indicated by 1^1, when using the b side of the measure. For example, suppose a to be three-eighths of an inch in diameter, and the various steps one-sixteenth of an inch in height. From the point on a, indicated by the broken line, to the step 3^1 would be:—Diameter of a, $\frac{3}{8} + 14$ steps $= 1\frac{1}{4}$ ins. In the measurement of the cylinder Z, a, being on the outside of the cylinder, it is not included in the measurement, therefore from a to b is 23 steps, $= 1\frac{7}{16}$ ins. Therefore from 1^1

to 2^1, is 8 steps, $\frac{1}{2}$ inch. The cylinder Y, on the other hand, having a on the inside, is $\frac{3}{8}+10$ steps $=1$ inch. So the broken line, d^2, measures $\frac{3}{8}+30$ steps $=\frac{3}{16}=2\frac{1}{4}$ inches, but on the same broken line, on the b^1 side, a being omitted, the dimension would be 1 inch, and to d^3 from a, 2 inches. The gage having inches marked on both sides the foregoing will explain the difference between these figures on the b and b^1 sides of the gage. The numerals on the b side include the diameter of a, the numbers on the b^1 side omit this diameter.

In gages of a larger size than that shown the steps next to a might interfere with direct alinement from the radial side of a distant step through the center of a to its circumference. The circle a can be enlarged in proportion to the size of the measure, as shown by the broken line ring surrounding a, of course increasing its diametral value.

In Fig. 3 is shown a preferable form of using the measure. In this figure the measure is shown with the superfluous intermediate part eliminated, and the two sides b and b^1 made of two separate pieces, the two circular bases a being pivotally joined, so that either side of the gage may be used independently. The pivot fastening may be made in any of the regular forms, such as shown in Fig. 4, or other suitable method.

In fractional measurements confusion might be caused in measuring with this gage, owing to the curved outline. To assist the

any one of the steps of the sliding gage. These gages are generally sustained by a set screw or similar means when rigidity is required. The slide moving on a track or similar device on the measuring gage.

On the sliding finger c^1 the steps q^1 cut so that the sides of the steps fit closely to the radials distant from a about two inches. The steps will engage at any distance farther than two inches from a, because, the larger the rings forming the arcs become and the portion of the arc forming the step becoming a smaller fraction of the ring, the radials approach more and more to paralleling each other as they recede from a, therefore they will engage close enough for practical purposes in all cases except when required to engage with the steps nearest to a, and in this case the center step on the sliding finger will always engage with the required step of the measure. The radial side of the measure need not necessarily engage closely, the arc side of the step offering the desired resistance when the radials from one arc to the next one are of equal height to the steps on the sliding gage.

This combination may be applied to all machinery and devices on which its application would be valuable. In Fig. 9 it is shown that the gage can be affixed to any device by means of a screw pivot.

The step measure and the accompanying parts required for its proper use as shown may be made of brass, steel or other suitable material. The steps may be of any required size, and the measure made of any convenient thickness.

As slight changes may be made in the general construction of my measuring gage and its accompanying parts, I consider myself at

in determining dimensions of a minute

ne measure,

, tak-

every

t line

character a series of parallel longitudinal lines

may be made on the surface of th

as shown in Fig. 3 (p). In this drawing

ing the same dimensions as in Fig. 1,

second step $\frac{1}{2}$ is drawn to reach the firs

eye

l line, while

e breadth of

dications are

plain this

8; looking at

Fig. 3.

rements are

used in ob-

connection

s shown in

ings. The

y gage used

purpose. The

figs. 5 and

djacent to the opposite point on said ob-, the indicating numerals will give cor- diameters, substantially as specified.

In a measuring instrument a flat plate ing its lateral edges in the general form piral-like curves, the side of the plate g provided with a series of graduation ks, suitably numbered to denote their ensional relation to each other or to er end of the plate and having a series of

within the spirit and scope of my invention.

Having described my invention, what I claim is:

1. In a measuring instrument a flat plate having its lateral edges in the general form of spiral-like curves, the side of the plate adjacent to such edges being provided with a series of graduation marks suitably numbered to denote their dimensional relation to each other or to the end of the plate, so that the instrument, when placed inside a hollow cylinder or outside any object, one end against one side and one of the graduation marks on the same edge in line with

6), having an extension with a step or a series of steps on one end is designed to engage with the steps of the measure. In Fig. 7 the steps q^1 on c^1 is a better form than the single step, q, in Fig. 8, though either may be used, since the series of steps q^1 give a steadier resistance where pressure may be required. By moving the measure b step by step in the direction b b as the curved arrow shows, the finger can be brought in contact with any series or

or a

ject

rect

2.

hav

of s

bein

mar

dim

eith

curved longitudinal lines paralleling the curved outline of the plate, these being crossed at intervals by portions of the concentric annuli, so that the instrument when placed inside a hollow object or outside any object and one of the graduation marks being brought in line with or adjacent to one end of the object to be measured, the indicating numbers will give correct diameters, substantially as specified.

3. In a measuring instrument a flat plate having its lateral edges in the general form of spiral-like curves, the side of the plate adjacent such edges being provided with a series of graduation marks, suitably numbered to denote their dimensional relation to each other or to either end of the plate, having at one end a complete circle from which the cam-shaped plate projects, and having a series of curved longitudinal lines paralleling the curved outline of the plate, these being crossed at intervals by portions of the concentric annuli, substantially as specified.

4. In a measuring instrument a flat plate having its lateral edges in the general form of spiral-like curves, the side of the plate being provided with a series of graduation marks suitably numbered to denote their dimensional relation to each other or to either end of the plate, having at one end a complete circle from which the cam-shaped plate projects, the complete circle having a hole through its center to permit of pivotal sustainment, and having a series of curved longitudinal lines paralleling the curved outline of the plate, these being crossed at intervals by portions of the concentric annuli, substantially as specified.

5. In a measuring instrument a flat plate having its lateral edges in the general form of spiral-like curves, the side of the plate being provided with a series of graduation marks suitably numbered to denote their dimensional relation to each other or to either end of the plate, having at one end a complete circle, from which the cam-shaped plate projects, the circle having a hole through its center to permit of pivotal sustainment, and having a series of curved longitudinal lines paralleling the curved outline of the plate, these being crossed at intervals by portions of the concentric annuli, each arc having between it and the next one adjoining an angular step, substantially as specified.

6. In a measuring instrument a flat plate having its lateral edges in the general form of spiral-like curves, the side of the plate being provided with a series of graduation marks suitably numbered to denote their dimensional relation to each other or to either end of the plate, having at one end a complete circle from which the cam-shaped plate projects, the circle having a hole through its center to permit of pivotal sustainment, and having a series of curved longitudinal lines paralleling the curved outline of the plate, these being crossed at intervals by portions of the concentric annuli, each arc having between it and the next one adjoining, along the curved edge of the plate, an angular step, in combination with a sliding gage having one end made to engage with the angular serrations on the cam-shaped measuring instrument, substantially as specified.

7. In a measuring instrument a flat plate having its lateral edges in the general form of spiral-like curves, the side of the plate being provided with a series of graduation marks suitably numbered to denote their dimensional relation to each other or to either end of the plate, having at one end a complete circle, from which the cam-shaped plate projects, the circle having a hole through its center to permit of pivotal sustainment, and having a series of curved longitudinal lines paralleling the curved outline of the plate, these being crossed at intervals by portions of the concentric annuli, each arc having between it and the next one adjacent, an angular step, in combination with a sliding finger or gage having one end made to engage with the angular serrations on the side of the measuring instrument, and means of pivotally and adjustably sustaining the sliding gage and measuring instrument in combination, substantially as specified.

In testimony whereof I have hereunto set my hand this 4th day of January, 1907 in the presence of two attesting witnesses.

JOHN REID CARROLL.

Witnesses:
JOHN T. BROSNAN,
EDWARD A. BYRNE.

Corrections in Letters Patent No. 926,688.

It is hereby certified that in Letters Patent No. 926,688, granted June 29, 1909, upon the application of John Reid Carroll, of West Hoboken, New Jersey, for an improvement in "Measures," errors appear in the printed specification requiring correction, as follows: Page 1, line 51, the reference-letter "a'" should read a^1; line 110, the reference-letter "b" should read l, and same line the number "$1\frac{1}{16}$" should read $1\frac{7}{16}$; page 2, line 66, the words "of the sliding gage" should be stricken out, and the words *on the measuring gage* be inserted instead; line 70, the words "on the measuring gage" should be stricken out; line 73, the period should be stricken out and a comma inserted, and line 74, the word "The" should commence with a small t, thus making a continuous sentence; and that the proper corrections have been made in the files and records of the Patent Office, and are hereby made in said Letters Patent.

Signed and sealed this 24th day of August, A. D., 1909.

[SEAL.]

F. A. TENNANT,

Acting Commissioner of Patents.