

No. 727,680.

PATENTED MAY 12, 1903.

F. W. OTIS.
COMBINED PROTRACTOR, TRIANGLE, AND CURVE.
APPLICATION FILED JULY 24, 1902.

NO MODEL.

Fig. 1.

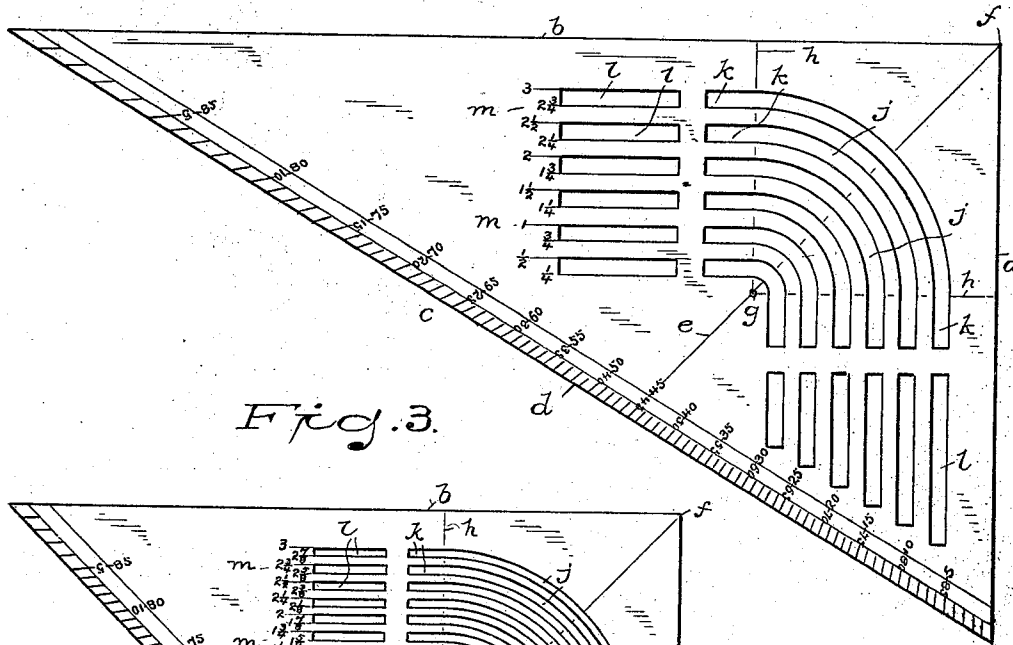


Fig. 3.

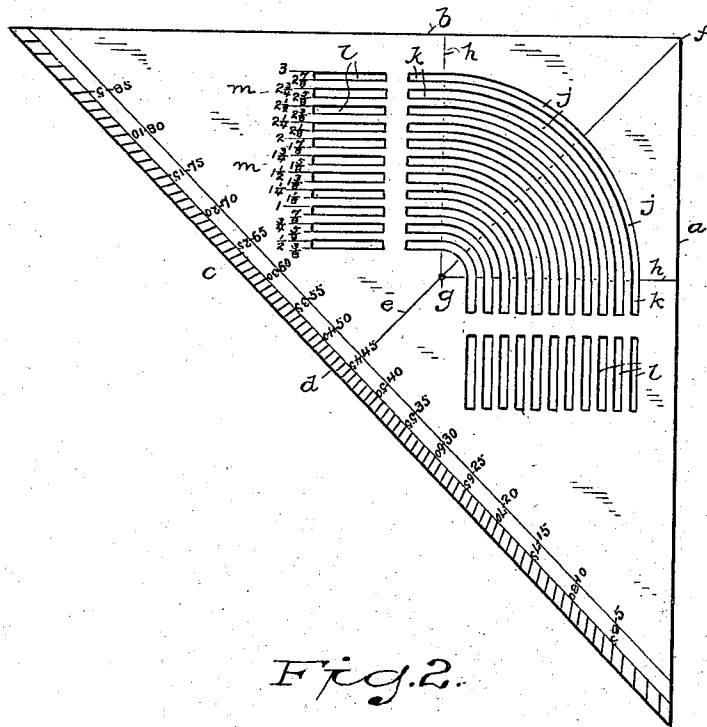


Fig. 2.

WITNESSES.

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FREDERIC W. OTIS, OF ORANGE, CONNECTICUT.

COMBINED PROTRACTOR, TRIANGLE, AND CURVE.

SPECIFICATION forming part of Letters Patent No. 727,680, dated May 12, 1903.

Application filed July 24, 1902. Serial No. 116,776. (No model.)

To all whom it may concern:

Be it known that I, FREDERIC W. OTIS, a citizen of the United States, residing at Orange, county of New Haven, State of Connecticut, have invented a new and useful Combined Triangle, Protractor, and Curve, of which the following is a specification.

My invention has for its object to provide an ordinary draftsman's triangle so graduated, slotted, and otherwise prepared as to adapt this single instrument to perform perfectly the additional functions of a protractor, a curve, and an arc-finder. With these ends in view I have devised the instrument adapted for general use, as by architects, draftsmen, carpenters, joiners, and other artisans, which I will now describe, referring to the accompanying drawings, forming part of this specification, and using reference characters to designate the several parts.

Figures 1 and 2 are plan views illustrating slightly-variant forms of my novel combined triangle, protractor, and curve; and Fig. 3 is an edge view corresponding with Fig. 1.

It of course makes no difference so far as the principle of the invention is concerned whether the base and perpendicular of the triangle—that is, the two sides at right angles to each other—are of equal lengths, as in Fig. 2, or different lengths, as in Fig. 1.

Let *a* designate one of the sides, which for convenience I will term the "base," *b* the perpendicular, which is longer than the base, and *c* the hypotenuse. At the outer edge of the triangle—that is, the edge corresponding to the hypotenuse—I provide a double degree-scale, which I have indicated by *d*—that is, a scale beginning at each end of the hypotenuse edge of the instrument and extending to the other end of said edge—the graduations corresponding with degree-lines extending from the angle of the instrument—that is, the intersection of the base and perpendicular—to the hypotenuse edge. In practice I mark the forty-five-degree line only, which I have indicated in the drawings by *e*, it being obvious that any angle may be obtained by running a straight-edge or a string from the angle of the instrument, which I have specifically indicated by *f*, to the degree-scale *d*.

g denotes a hole through the instrument on the forty-five-degree line, which is the center

of circles of which the curves or arcs laid out by the instrument are a part.

h h denote two lines running at right angles from hole *g*, which mark the quadrant of each circle or arc laid out by the instrument, each quadrant being bisected by the forty-five-degree line.

j denotes quadrant-shaped slots extending from quadrant-line to quadrant-line and crossing the forty-five-degree line at their mid-length. For convenience I provide the quadrant-slots with tangential extensions *k* at right angles and also provide straight slots *l* in line with the tangential extensions, so that I secure all the advantages of long straight slots at right angles to the quadrant-slots without weakening the instrument.

m denotes a scale which for convenience I term a "circle-scale," as it indicates the diameter of a circle of which any arc or curve that may be laid out by the instrument is a part. I have placed this scale at the end of straight slots *l*, although it may, if preferred, be placed at either end of the quadrant-slots or of the extensions *k* of the quadrant-slots. In the present instance I have made slots *j* and *l* one-eighth of an inch wide and have placed them one-eighth of an inch apart, so that the scale necessarily indicates diameters of circles in quarter-inches, the scale in the drawings indicating diameters from one-fourth of an inch to three inches.

The uses of this instrument that will suggest themselves to architects, draftsmen, and artisans generally are so many and various as to render other than brief description unnecessary. The following are given as illustrative of its uses: The instrument may be placed against a straight line or a straight-edge or a T-square and slid along until the angle of the instrument is at the starting-point of the angle it is desired to find. The operation would be precisely the same if the angle started from a corner. The starting or intersecting point of the degree-line wanted may be marked with a pin or pencil point. The operator then follows along scale *d* in either direction, as may be, until he finds the degree-mark required, which is also marked with a pin or pencil point. A line intersecting the two points marked will indicate the desired angle. When the instrument is set

in a corner, any angle may be found by running a straight-edge or string from the angle of the instrument to the desired mark in scale *d*. As an instance of such use may be mentioned getting the angle of rafters, &c.

In laying out quadrants or other arcs the forty-five-degree line of the instrument may be placed on any straight line, and by moving the instrument along the line any number of curves at any distance apart, comprising parts of circles of any required diameter within the capacity of the instrument, may be laid out. As each of the quadrant-slots has a tangential extension at each end, said extensions being at right angles to each other, it is obvious that round corners with right-angle extensions may be easily made, or the corners of drawings may be filled in, or the diameters of circles found without the use of compass or ruler by means of scale *m*. As the slots are one-eighth of an inch wide and one-eighth of an inch apart in the instrument illustrated in Fig. 1, it follows that curves and right-angle extensions may be made an eighth of an inch apart by using both sides of the groove. Smaller and closer grooves may be used where finer work is required, as illustrated in Fig. 2.

Having thus described my invention, I claim—

1. An instrument of the character described in the form of a right-angled triangle having a forty-five-degree line extending from the apex of the right angle of the instrument to the hypotenuse edge thereof, a hole in said forty-five-degree line and a series of quadrant-slots of which the hole is the center.

2. An instrument of the character described

in the form of a right-angled triangle having a forty-five-degree line extending from the apex of the right angle of the instrument to the hypotenuse edge thereof, a hole lying in the forty-five-degree line, quadrant-lines extending from said hole to the sides of the instrument and a series of quadrant-slots extending from quadrant-line to quadrant-line and crossing said forty-five-degree line.

3. An instrument of the character described in the form of a right-angled triangle having a forty-five-degree line extending from the apex of the right angle of the instrument to the hypotenuse edge thereof, a hole lying in said forty-five-degree line, quadrant-lines extending from said hole to the sides of the instrument, a series of quadrant-slots extending between the quadrant-lines and having tangential extensions at each end lying horizontal to each other.

4. An instrument of the character described in the form of a right-angled triangle having a forty-five-degree line extending from the apex of the right angle of the instrument to the hypotenuse edge thereof, a hole lying in said forty-five-degree line, a series of quadrant-slots of which the hole is the center, right-angle extensions at the ends of said slots, straight slots in line with the extensions and a scale for indicating the diameters of circles whose arcs are laid out by the quadrant-slots.

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

FREDERIC W. OTIS.

Witnesses:

WILLIAM J. SCOBIR,
ALEXANDER O. COBURN.