C. L. VAN NESS.

DRAFTING IMPLEMENT.

APPLICATION FILED JULY 19, 1913.

1,154,673.

Patented Sept. 28, 1915.

4 SHEETS—SHEET 1.

Fig. 3.

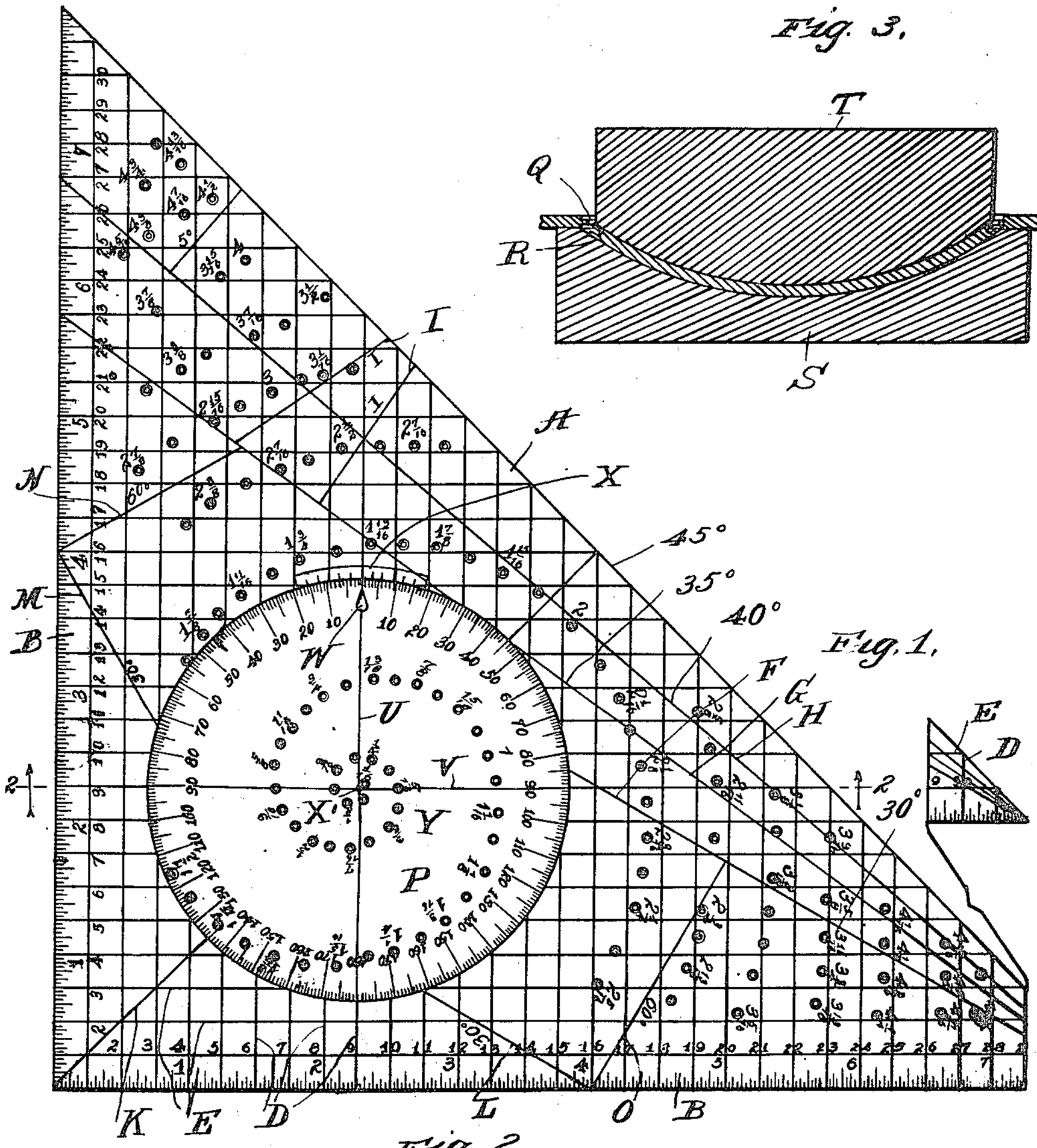
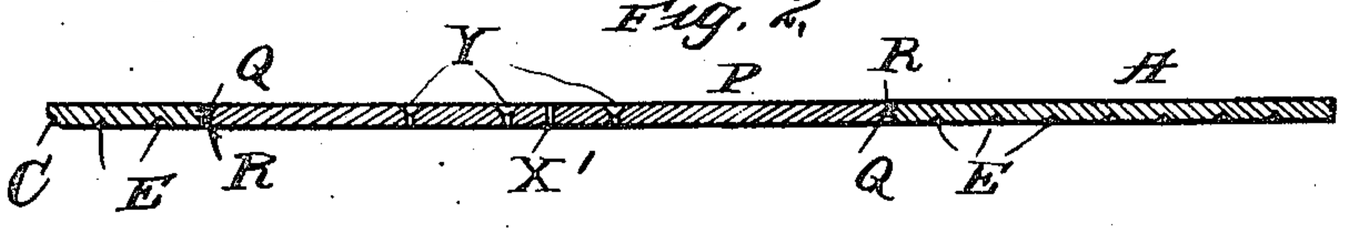


Fig. 1.

Fig. 2.



Witnesses:

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4 SHEETS—SHEET 2.

Fig. 4.

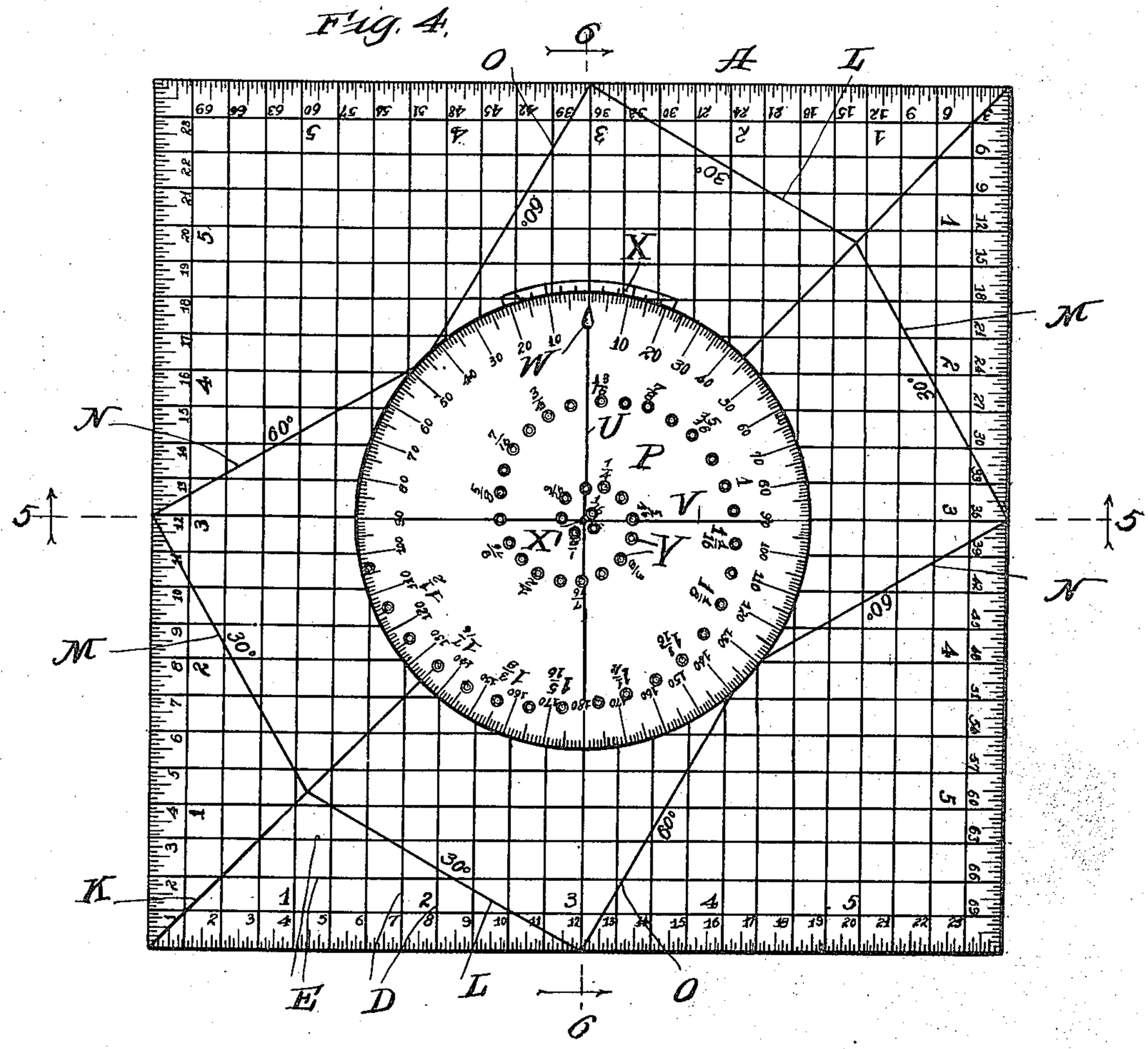


Fig. 5

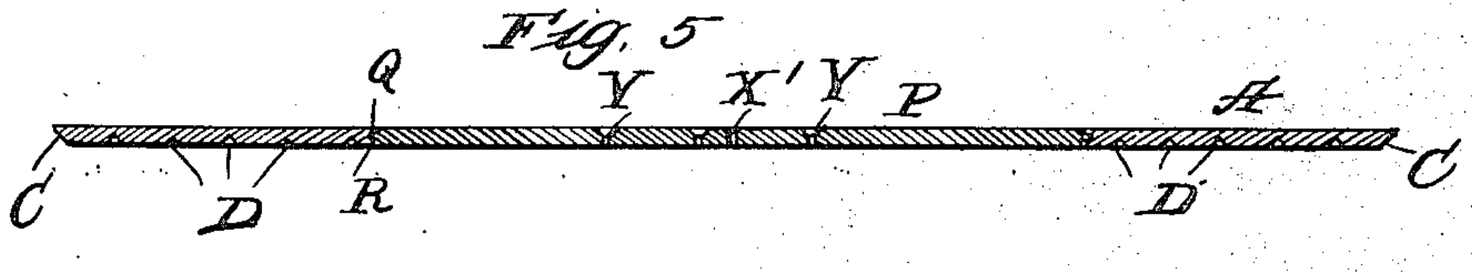
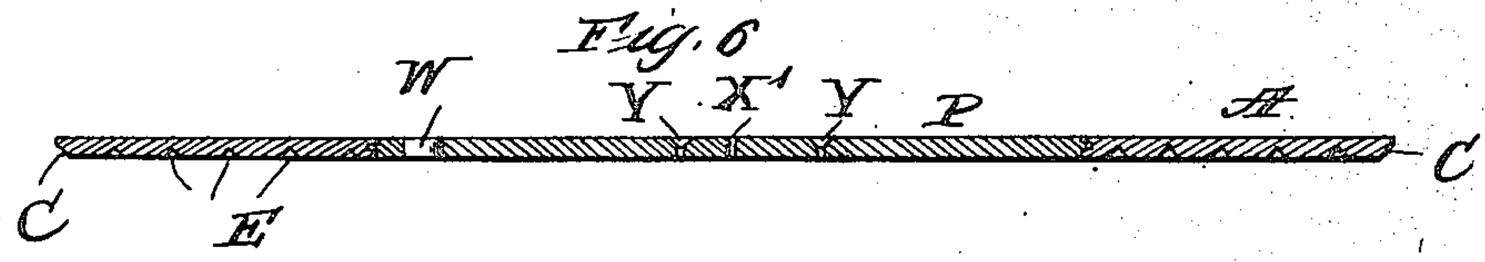


Fig. 6



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4 SHEETS—SHEET 3.

Fig. 16.

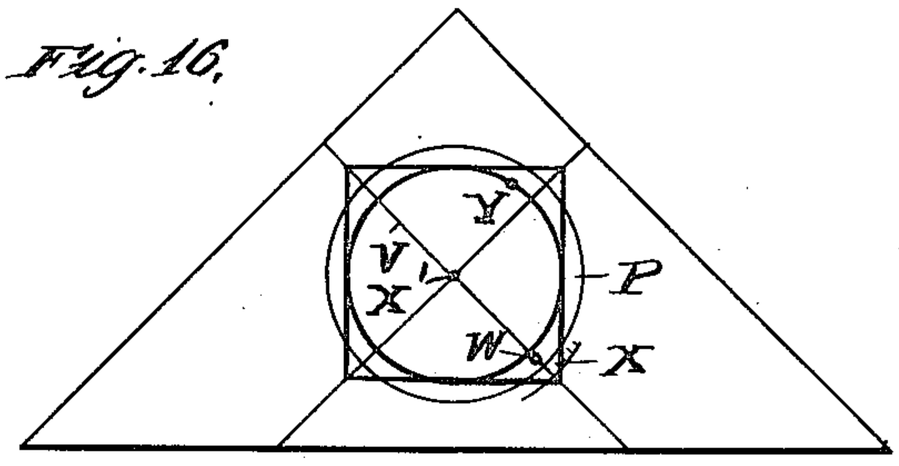

Fig. 17.

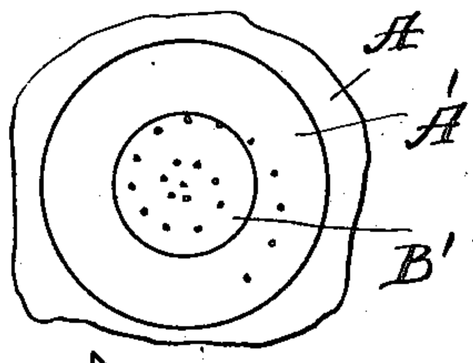

Fig. 7.

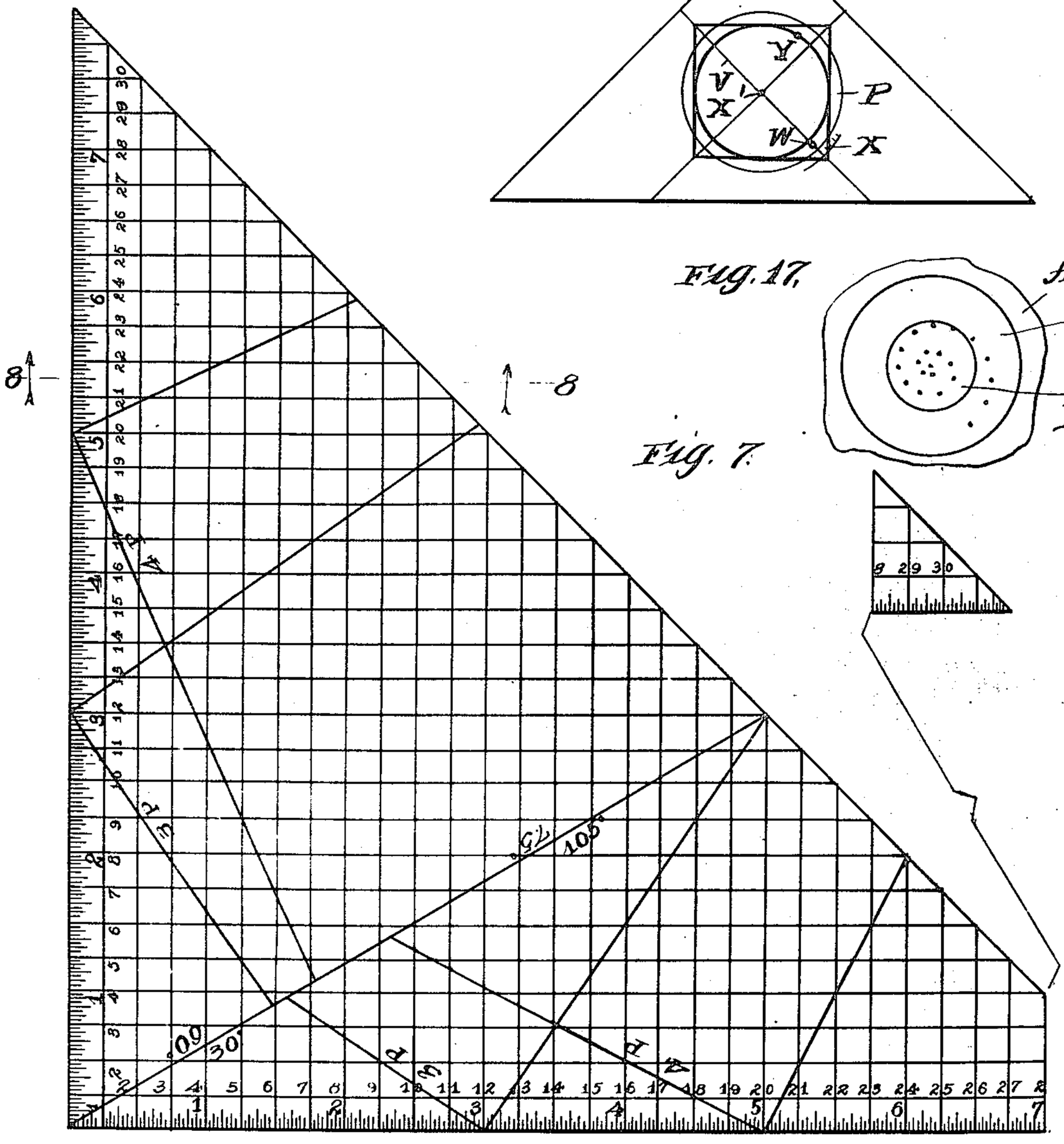

Fig. 8

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4 SHEETS—SHEET 4.

Fig. 9.

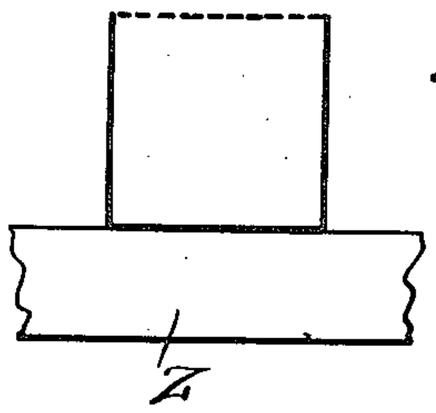


Fig. 10.

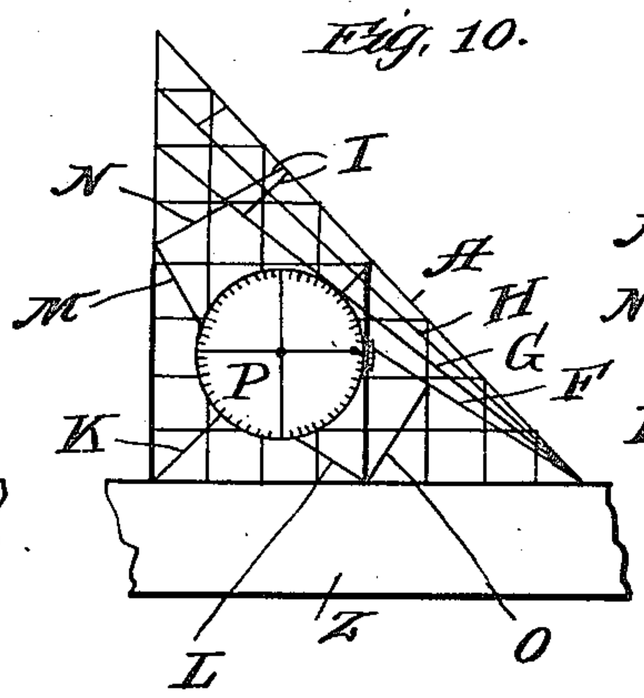


Fig. 11

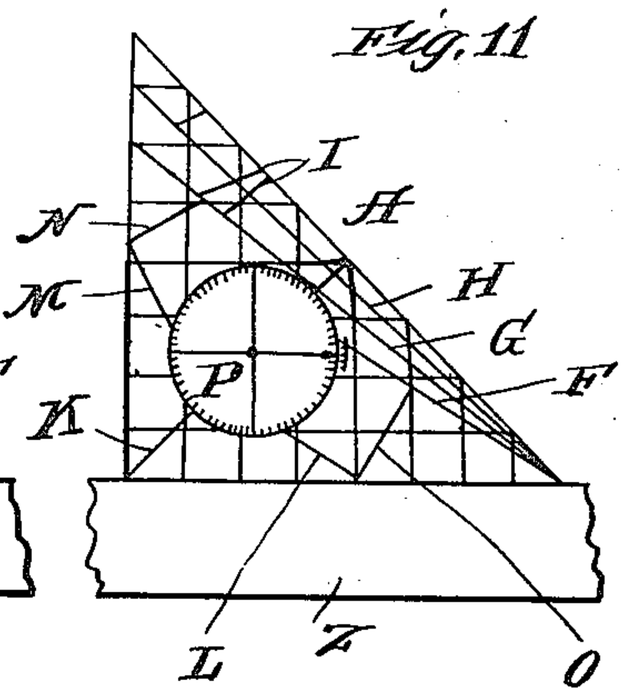


Fig. 12.

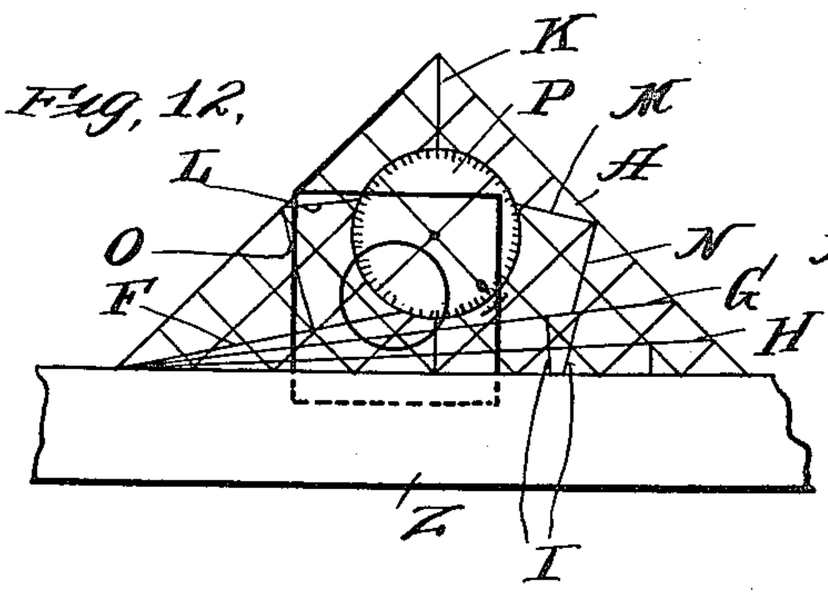


Fig. 13.

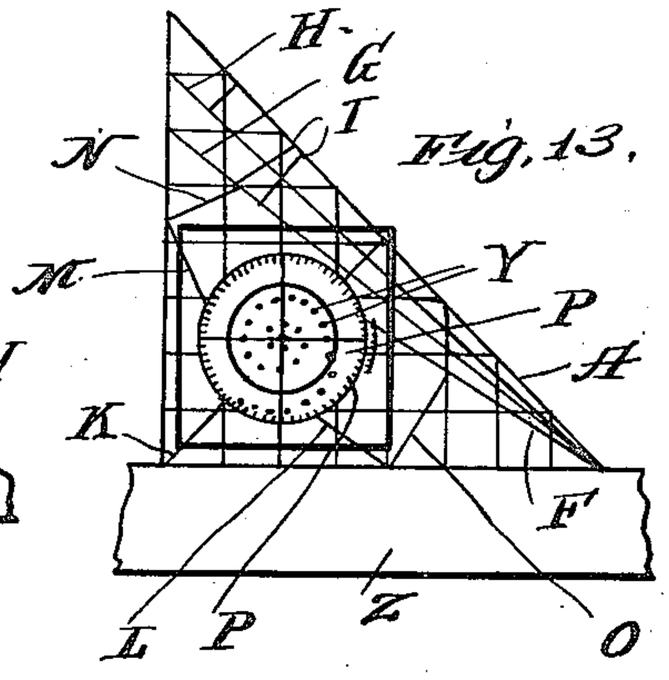


Fig. 14.

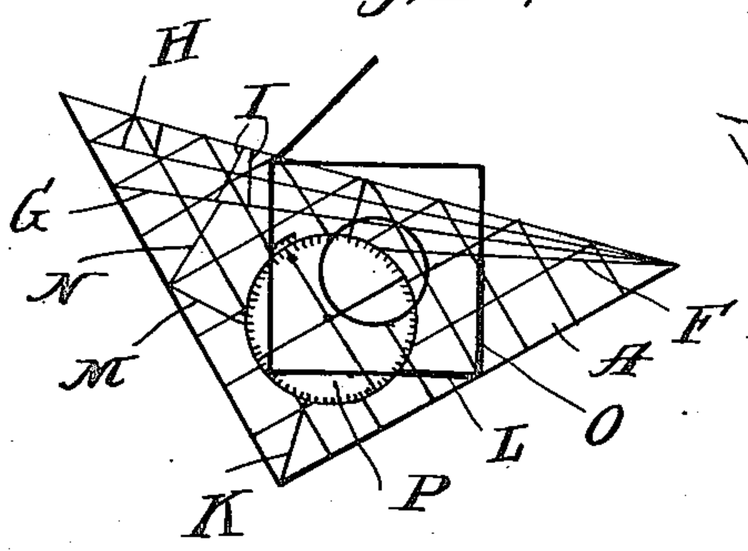
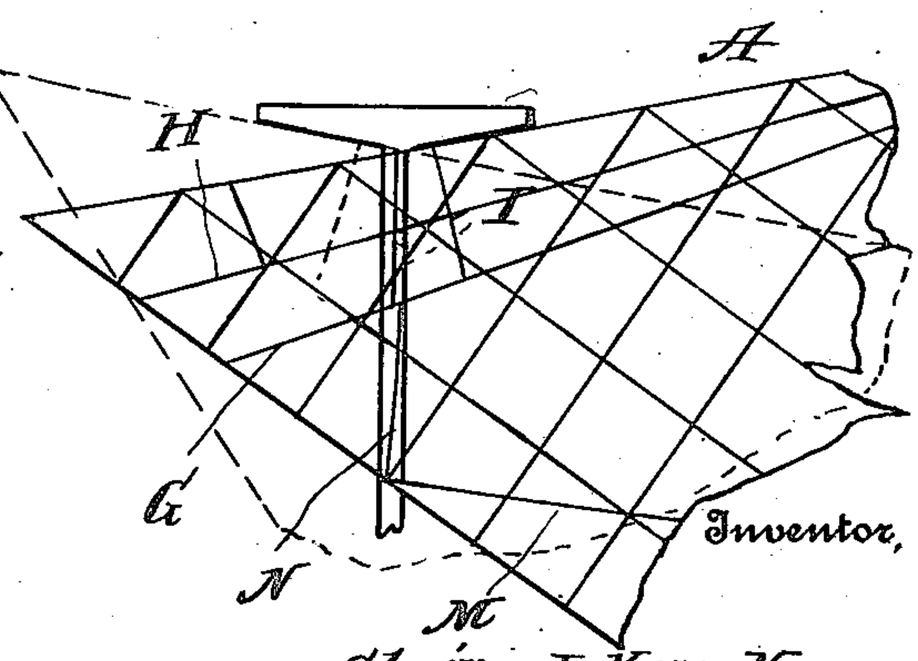


Fig. 15.



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UNITED STATES PATENT OFFICE.

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DRAFTING IMPLEMENT.

1,154,673. Specification of Letters Patent. Patented Sept. 28, 1915.

Application filed July 19, 1913. Serial No. 779,993.

To all whom it may concern:

Be it known that I, CLAIR L. VAN NESS, a citizen of the United States, and residing at Akron, in the county of Summit and State of Ohio, have invented certain new and useful Improvements in Drafting Implements, of which the following is a specification.

This invention relates to drafting implements.

The object of the invention is to provide an implement of this character in the use of which, in penciling drawings, the employment of a T-square and compass may be dispensed with, the utensil containing all of the essentials requisite in laying out work of any character.

Generally stated, the invention comprises a triangle, preferably, of a 45° angle, combined with which and wholly contained within the same, is a protractor of circular form, and readily revoluble relative to the triangle. The protractor is divided, in reverse order, into 180 degrees, starting from an orifice below the zero mark, and through which a pencil point is inserted in laying off circles, angles, or the like. Beginning at the center of the protractor and arranged in spiral order throughout its entire extent and also throughout the surface of the triangle is a series of orifices, appropriately designated for measurements defining the circumference of a circle, and in conjunction with the protractor, there is arranged a vernier scale to assist in dividing circles into any desired number of parts.

The triangle and protractor are composed of a transparent material, preferably celluloid, and the various marks used in indicating angles and the like are engraved or sunken in the under side of the angle and are defined by a distinctive color which shows through the triangle, and which may be a filling, or a pigment. Two edges of the angle in the present instance, the vertical and horizontal edges are undercut, and are graduated into any desired number of parts of an inch, or of meters as may be desired, and where an inch is employed as the standard, one-thirty-second thereof is indicated, and further, the triangle is laid off in parallel lines crossing each other at right angles, and which serve as guide lines and in compounding operations in laying off work. In addition to these lines, there are angular lines indicating roof pitches, as 30, 40, 45, and 50° angles, and instant angles of 5, 10, 15, 30, 40, 45, 50, 60, and 90°, and also angular lines for laying out the flanges of I-beams. As a matter of further and specific improvement, the invention may be carried out in connection with a rectangular implement, instead of a triangle, the later utilizing only two of its edges in making lines, whereas the rectangular form will utilize all four edges and provide room for a larger protractor.

Further and more specific details of construction will be hereinafter fully described and claimed.

In the accompanying drawings forming a part of this specification and in which like characters of reference indicate corresponding parts: Figure 1 is a plan view of a triangular implement constructed in accordance with the present invention. Fig. 2 is a transverse sectional view taken on line 2—2 of Fig. 1. Fig. 3 is a detail view, in section, displaying the manner in which the protractor is assembled with the triangle. Fig. 4 is a plan view of a rectangular form of drawing implement. Fig. 5 is a transverse sectional view taken on the line 5—5 of Fig. 4. Fig. 6 is a vertical transverse sectional view taken on the line 6—6 of Fig. 4. Fig. 7 is a plan view exhibiting a form of implement laid off for roof pitches, in addition to measurements of parts of inches and vertical and transverse guide lines. Fig. 8 is a transverse sectional view taken on the line 8—8 of Fig. 7. Figs. 9, 10, 11, 12, 13, and 14 are diagrammatic views exhibiting a method of laying off a square, and inscribing a circle within a square. Fig. 15 is a diagrammatic view exhibiting the manner of laying off the flange of an I-beam. Fig. 16 is a diagrammatic view indicating the manner in which a circle can be inscribed within a square, and touch all four sides thereof, and, Fig. 17 is a detail view of a modified form of protractor.

Referring to the drawings, and more particularly Figs. 1, 2, and 3, A designates a 45° triangle, which is constructed of celluloid and is provided along its vertical and horizontal edge with scales B, these two edges being undercut as shown at C in order to permit the operator to draw a line exactly parallel with the edge being used, thus to insure absolute accuracy in laying off work. In addition to the scales B, the triangle is divided by vertical transversely-disposed lines D and E into squares, in the present

instance, one-fourth of an inch in extent, the lines being of a distinctive color, say red, and operating as guide lines in laying off work, it being only necessary to establish either a vertical or horizontal line and to work from this in plotting the work. All of the lines, graduations, and designating characters displayed, are on the under side of the implement and are inset or sunken therein and as stated, are preferably rendered distinctive by a suitable color. This particular manner of displaying the markings of the implement are of great value for two reasons, the first being to enable the operator to see through the implement in laying off parallel lines or in describing angles or circles, and secondly, in protecting the coloring matter contained within the sunken lines from deterioration by the movement of the implement over the surface of the paper in use. In addition to the lines E and D, three angularly-disposed lines F, G, and H, located on the hypotenuse edge of the triangle are provided to indicate angles of 30, 40, and 60 degrees, the hypotenuse itself being 45°. At any preferred point on the triangle are arranged two lines I, which are utilized in laying off the flange of I-beams, as graphically shown in Fig. 15, additional lines K, L, M, N, and O, being provided to lay off roof pitches. Revolubly combined with the angle is a protractor P, which is held in position by providing the walls of the orifice in which the protractor is mounted with a bead Q that engages a circumferential channel R in the periphery of the protractor, as shown in Fig. 3, and to assemble the latter with the triangle, a male and female die S and T are employed which, when properly operated, serve to dish the protractor and thus allow it to be sprung into the position shown in Fig. 3. As will be obvious, the protractor could be made in two pieces suitably secured together. The protractor is provided with cross-lines U and V disposed at right angles to each other and the center is located at the intersection of the two cross lines of the protractor, the degrees of the angles being read from these lines along the periphery of the protractor. One terminal of the line U is provided with a plummet-shaped opening W, the point of which projects toward the periphery of the protractor and through which a pencil point can be inserted in marking off the starting point of a circle or an angle, and to enable the operator to divide a circle into any desired number of parts, a vernier scale X is furnished which may be extended through any desired number of degrees. In dividing a circle, say into five parts the number of sides determined upon is divided into the total number of degrees on the scale, so that in event a pentagon is to be inscribed, by dividing 5 into 360, the result had will be 72, and this indicates that the operator should move the protractor until 72 appears opposite the center graduation or zero mark on the vernier scale, and then by inserting the pencil point through the opening W, the first division of the pentagon is secured; the protractor scale is then moved to 144, and a second division marked, then moved again to 72 and again to 144 on the opposite side, and by this means accurate division of the circle will be obtained. Arranged spirally around the center portion X′ of the protractor is a series of counter-sunk orifices Y which are carried throughout the entire extent of the triangle, and which are employed in laying off circles, or arcs, the orifices being appropriately designated to indicate the diameter of the circle.

In the structure shown in Fig. 4, the implement is of rectangular form, and as shown in Figs. 5 and 6, the four edges are undercut for the same purpose stated in connection with the edges B described in connection with Fig. 2, and in which scale lines L, M, N, O, are duplicated, so as to avoid the necessity of turning the implement in laying off work.

In the structure shown in Fig. 7, the protractor is omitted, as it is not thought necessary to show the same, and this embodiment of the invention shows the triangle laid off for roof pitches, the various angles being designated 3 P and 4 P, and 30, 60, 75, and 105 degrees, and while these lines will give approximately any roof pitch that may be desired, it is to be understood that the number may be increased if found necessary or desirable.

As an example of one manner of operating the device, the method of incribing a square, and then of inscribing a circle within the square will be described as shown in Figs. 9 to 14. Beginning with Fig. 9, Z will represent the blade of a T-square, the edges of which are preferably beveled in the same manner as the triangle, and while the square will greatly facilitate the operation of laying off work, its use is not essential, but in this instance is illustrated as indicating one method of employing the triangle. The triangle is placed against the T-square, and the first vertical line is drawn along the triangle to the required length. The triangle is then moved to the left the required distance and the second line is drawn, then the base line, and finally the top line. Having now described the square, the triangle is placed in the position shown in Fig. 12, so as to cause one of the diagonal lines to mark the center, and upon the desired circle being selected, a pencil is inserted in one of the openings, and the protractor rotated, thus completing the circle. In Fig. 12 is shown the method of drawing a 45° angle of a required length

at one setting of the instrument from the upper left hand corner of the square.

The angles that can be fixedly drawn from the edge of the triangle shown in Fig. 1, are 5°, 10°, 15°, 30°, 40°, 45°, 50°, 60°, and 90°, and other angles are obtained by compounding, as for instance:

15+5=20 60+5=65
30—5=25 90—15—5=70
30+5=35 90—15=75
60—5=55 45+30+5=80
90—5=85

All other angles desired can be obtained by the use of the protractor.

While generally, it will be preferred to make the protractor as a single element, if found of advantage, it may be constructed of two concentric members A and B′, as shown in Fig. 17, the advantage of this arrangement being that the smaller member B′ of the protractor may readily be rotated in producing small circles, without providing a center pin as will be necessary with the use of the protractor shown in Figs. 1 and 4, it being obvious that in the latter case, the resistance presented to rotation by the protractor where the pencil is inserted in one of the orifices Y adjacent to the center might cause breakage of the pencil point.

In Fig. 15, the manner of laying off the flange of an I-beam is exhibited, to effect which, a vertical line is first struck and then the triangle is placed upon the paper and the first of the pair of lines I is brought to the incribed line, and the first line forming the base is struck, after which the position of the triangle is reversed, and the second base line is drawn.

As will be obvious, the uses to which the implement may be put are so varied that it will be impossible to state all, so that it is believed that the description given of the manner of carrying out the invention in drawing circles, inscribing squares, and laying off roof pitches, is all that is necessary to a perfect understanding of the invention.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A drafting utensil of polygonal contour including a circular protractor, the utensil and protractor being provided with circles determining orifices arranged spirally from a center point in the protractor.

2. A drafting triangle having a bodily contained rotary circular protractor, the triangle and protractor being provided with orifices for striking circles.

3. A transparent drafting triangle provided with appropriately colored guide lines crossing at right angles to each other and with a circular protractor graduated from a zero starting point reversely to 180° and provided with diagrammatic guide lines to aline with those of the triangle.

4. A transparent drafting triangle provided with appropriately colored guide lines crossing at right angles to each other and with a circular protractor graduated from a zero starting point reversely to 180° and provided with diagrammatic guide lines to aline with the edges of the triangle, the triangle and protractor being provided with appropriately designated orifices arranged spirally from the center of the protractor.

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

CLAIR L. VAN NESS.

Witnesses:
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HARRY L. KASER.