S. H. ROADS.

TRIANGLE FOR ENGINEERING DRAFTING.

APPLICATION FILED OCT. 24, 1916.

1,315,333.

Patented Sept. 9, 1919.

2 SHEETS—SHEET 1.

Fig. 1

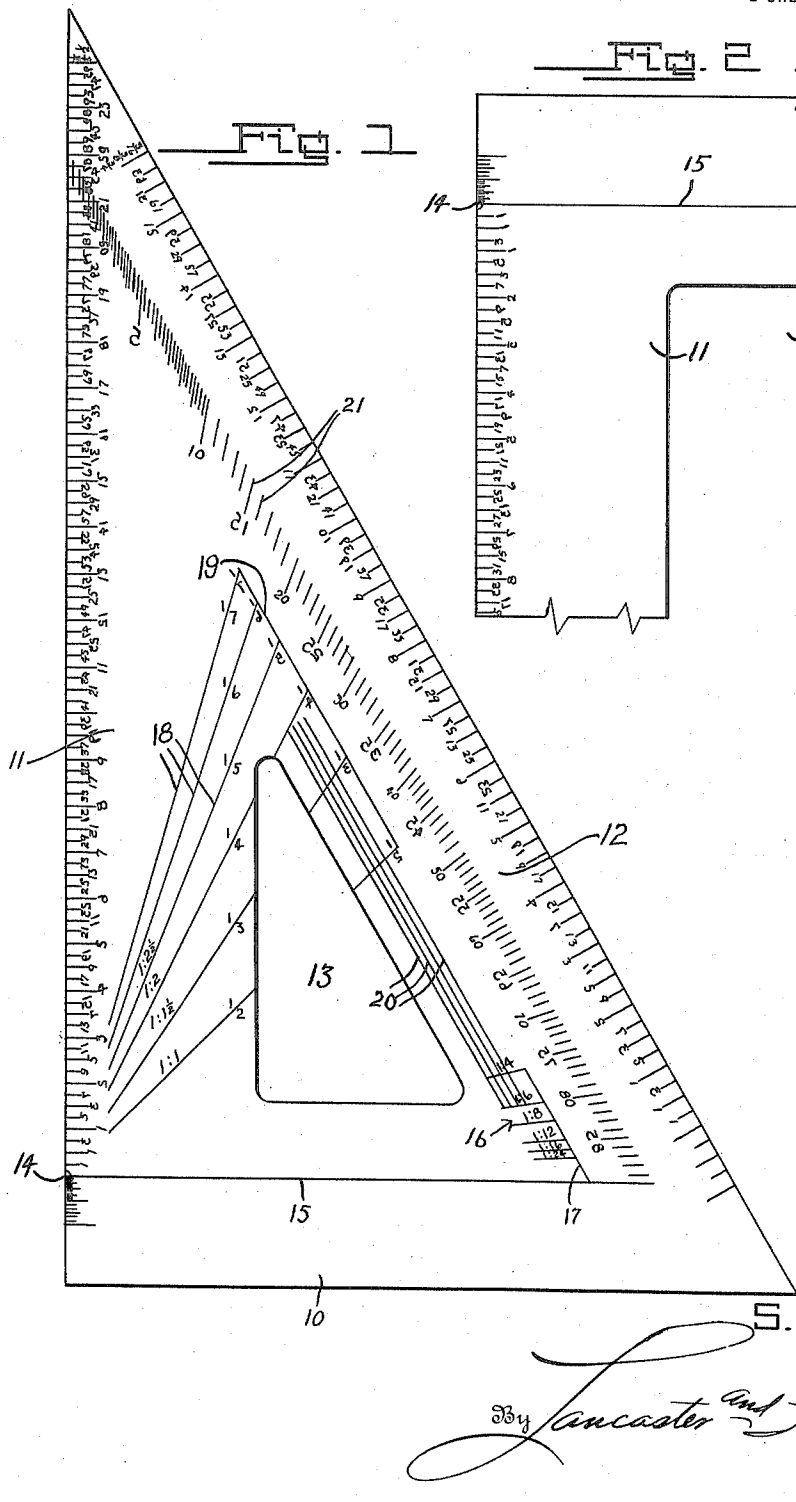


Fig. 2

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Fig. 3

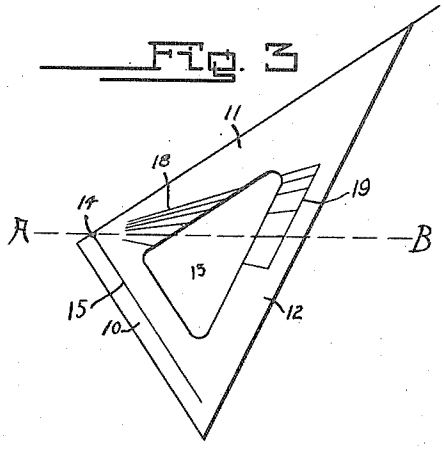


Fig. 4.

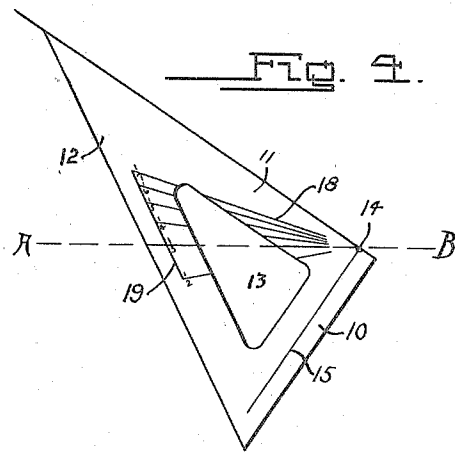


Fig. 5.

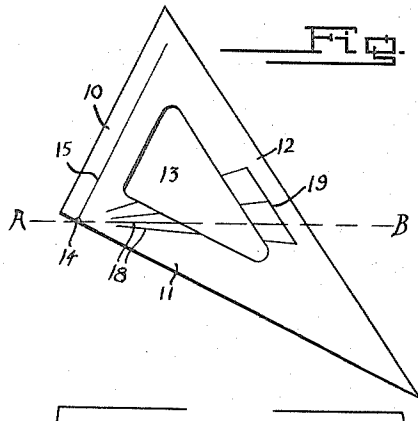


Fig. 6.

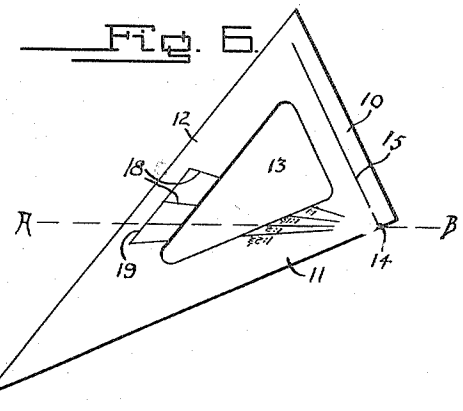


Fig. 7.

Fig. 8.

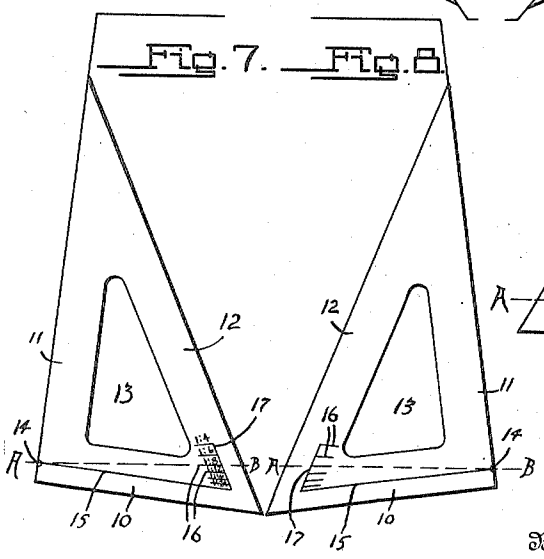
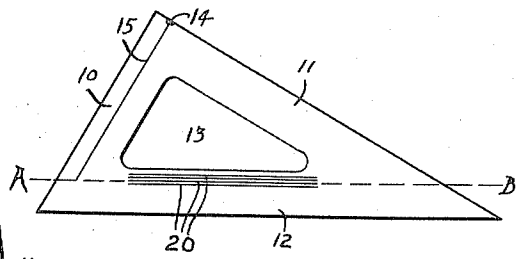


Fig. 9.



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UNITED STATES PATENT OFFICE.

SAMUEL H. ROADS, OF SPRINGFIELD, MASSACHUSETTS.

TRIANGLE FOR ENGINEERING DRAFTING.

1,315,333. Specification of Letters Patent. Patented Sept. 9, 1919.

Application filed October 24, 1916. Serial No. 127,479.

To all whom it may concern:

Be it known that I, SAMUEL H. ROADS, a citizen of the United States, and a resident of Springfield, in the county of Hampden and State of Massachusetts, have invented a certain new and useful Improvement in Triangles for Engineering Drafting, of which the following is a specification.

The present invention relates to drafting instruments, and more particularly to that type known as triangles.

An object of the present invention is to provide a triangle adapted particularly for use by engineers and architects, and to provide an instrument of this character which is so constructed, and so delineated, that it combines in a single instrument a large number of the drafting instruments usually required, and permits the rapid obtaining, in laying off drawings, of roof pitches; slopes or batters for retaining walls, piers, abutments, and the like; slopes of embankments, fills and cuts; guide lines for lettering; and various other angles and lines found necessary in engineering and architectural drawings.

It is the further aim of the present invention to provide a triangle of this character having the scales and delineations peculiarly and coöperatively arranged on the opposite sides or faces thereof, and to thus permit the turning over of the triangle for right and left side calculations.

The invention has for a still further object to provide a triangle having the above outlined scales and graduations, and which may also be provided, such as along the long leg and hypotenuse, with various other scales used by engineers and architects.

The above, and other objects and advantages of this invention will be more particularly pointed out in the following detailed description of the present preferred embodiment of the invention, the same being illustrated in the accompanying drawings wherein:

Figure 1 is a plan view of one side of a triangle constructed and delineated according to the present invention.

Fig. 2 is a fragmentary plan view of the right angled corner of the triangle, showing the opposite face thereof.

Fig. 3 is a face view of the instrument as applied to a drawing for indicating the pitch of the left side of a roof.

Fig. 4 is a similar view disclosing the opposite face of the instrument, the latter being adjusted to determine the pitch of the right side of the roof.

Fig. 5 is a face view of the triangle adjusted for indicating the slope of an embankment, a cut, or fill, the instrument being adjusted to indicate the left-hand side slope.

Fig. 6 is a similar view disclosing the instrument turned over to show its opposite face and being adjusted to the right-hand side of the slope.

Fig. 7 is a face view of the instrument adjusted to the left-hand side of a batter for retaining wall, bridge, and pier work.

Fig. 8 is a similar view disclosing the instrument turned over and applied to the right-hand side of the drawing.

Fig. 9 is a face view of the instrument adjusted for drawing guide lines for letters and the like.

Referring to these drawings, wherein like parts are designated by similar numerals of reference throughout the several views, the triangle comprises a preferably transparent body of right-angled triangular form providing a short leg 10, a long leg 11 arranged at right angles to the short leg, and a hypotenuse side 12. The middle portion of the transparent body may be cut away or slotted to provide the usual opening 13. The long leg 11 of the triangle is provided at its outer edge, adjacent to the base or short leg 10 of the triangle, with a center point or demarcation 14 which is preferably formed in the opposite sides of the body. A base line 15 is formed across the opposite sides of the body, and extends from the point 14 at right angles to the long leg 11. This center point 14 is adapted to indicate the axis about which the entire instrument is adapted to be swung to adjust the long leg 11 into the desired angle according to the various scales of graduations marked upon the opposite sides of the instrument.

The hypotenuse 12 is provided, on opposite sides and at its inner edge, with a scale of graduations 16 formed at the base of the triangle and being struck from the center 14. The graduations 16 are relatively short, and are joined at their outer ends by a line 17 extending longitudinally of the hypotenuse 12, to group together the graduations 16. On one side of the instrument, the graduations

16 are provided with suitable indicia, such as 1:4, 1:6, 1:8.

The triangle is further provided, upon its opposite sides, with a second group or scale of graduations which are relatively long, are struck from the center 14 and extend radially across the long leg 11 and the hypotenuse 12. This second scale of graduations is located intermediate the base and apex end of the triangle, and the lines or demarcations 18 thereof are joined at their outer ends by a grouping line 19 which forms a disconnected continuation of the line 17 at the lower end of the hypotenuse 12. The lines 18 are provided with indicia at their outer ends, such as $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, and the like indicating various pitches of roofs, this indicia being preferably placed on one side only of the instrument. The same indicia is placed with respect to the lines 18 on the opposite side of the instrument along the inner edge of the long leg 11. When the triangle is swung downwardly, as shown in Figs. 5 and 6, the lines or graduations 18 are adapted to indicate the slope of a sill or cut, or when turned upwardly as shown in Figs. 3 and 4, to indicate the opposite slopes of an embankment. For this purpose the instrument is provided, on one side, with indicia indicating different slopes and applied to the respective lines 18, such as 1:1, 1:1$\frac{1}{2}$, and the like.

The triangle is also preferably provided, upon one side, with a plurality of parallel lines or delineations 20 arranged in parallelism with, and adjacent to the inner edge of the hypotenuse 12. These lines 20 extend throughout substantially the length of the opening 13 and are adapted to be used as gage lines for measuring the height of guide lines for lettering and the like.

The triangle is adapted to be placed upon the drawing with the center point 14 coincident with the base line A—B on the drawing, as shown in Figs. 3 to 8 inclusive. The instrument is adapted to be turned about the point 14 to dispose the long leg 11 at different desired angles with respect to the horizontal base line A—B. For determining the various angles of the long leg 11, the hypotenuse 12 is provided with a degree scale 21, the graduations of which are struck on radial lines having the common center 14 and being provided upon the opposite sides of the instrument, with consecutively increasing degree numbers arranged alternately on the opposite sides of the instrument and indicating the various degrees of rotation through which the long leg of the triangle may be swung.

The long leg 11, and the hypotenuse 12, are preferably provided upon the opposite sides of the instrument, with engineers' and architects' scales. In the present embodiment of the invention, the instrument is shown as being provided along the long leg 11, with a scale of eighths, quarters, and halves, and along the hypotenuse 12, with a scale of $\frac{3}{16}$ths, $\frac{3}{8}$ths, and $\frac{3}{4}$ths. The consecutively arranged numbers of the graduations of the various scales are arranged alternately on the opposite sides of the instrument to permit the more easily reading of the numbers, and to permit of the same being made relatively large.

In use, practically any angle may be obtained either at the right or left-hand side of the drawing, by merely placing the center point 14 on the base line A—B and swinging the triangle about such point according to the degree scale 21. If it is desired to obtain the pitch of a roof, the instrument is first adjusted into the position shown in Fig. 3 and swung about the point 14 according to the scale of graduations 18, and according to the indicia arranged opposite each line of the scale. This adjustment gives the pitch for the left-hand side of the roof. The instrument may now be turned over and the center point 14 placed coincident with the base line A—B, and the instrument swung in the opposite direction, as shown in Fig. 4, to obtain the right-hand side of the roof.

In Figs. 5 and 6, the instrument is shown as being adjusted in right and left-hand positions, and wherein the same lines 18 are used with respect to the slope indicia of 1:1, 1:1$\frac{1}{2}$, and the like, so as to obtain the desired slope of a cut, a fill or the like.

In Figs. 7 and 8 the instrument is shown as adjusted according to the slope scale 16 located at the base of the instrument, and adapted particularly for indicating various slopes of batters for retaining walls, abutments, piers and the like.

For drawing guide lines for letters and the like, the instrument is turned down into the position shown in Fig. 9. One of the guide lines 20 is arranged coincident with the base line A—B of the drawing. A line is now drawn along the inner side of the hypotenuse 12, in the opening 13, and the instrument is shifted upwardly or downwardly as desired, to bring another one of the guide lines 20 into register with the base line A—B.

It is to be understood that these scales or graduations may be varied within the scope of the following claim to indicate various other angles or slopes desired in different classes of drafting work, and that the instrument may be provided with other scales and demarcations which are found convenient and necessary in various lines of drafting.

It is also to be understood that the instrument may be given any other than triangular form in order to accomplish the features of this invention, this form being

preferable as the same may be used in the manner of an ordinary triangle aside from all the various novel uses above described.

I claim:

In a drafting instrument, a flat right angled triangle, having a center point marked thereon a short distance upwardly from its base on its altitude, a plurality of graduations on the triangle radiating from said center point and adapted to co-act with the altitude of the triangle to indicate roof pitches and batter inclinations or with the hypotenuse of the triangle to indicate embankment slopes, and a dual set of indicia on the triangle for each of said radiating graduations.

SAMUEL H. ROADS.