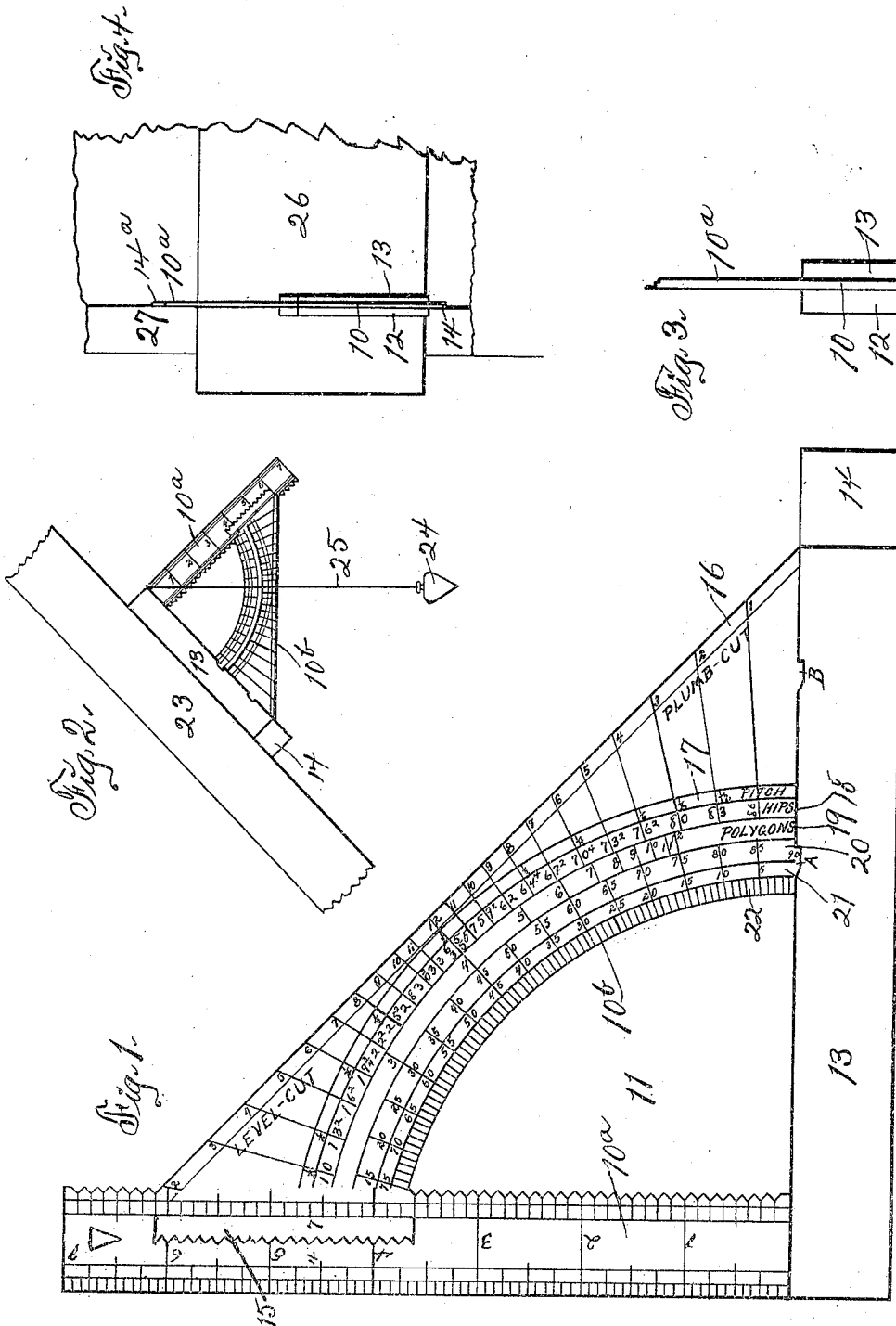


F. E. POWELL.
 SQUARE AND BEVEL.
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Patented May 31, 1910.



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UNITED STATES PATENT OFFICE.

FRANK E. POWELL, OF DES MOINES, IOWA.

SQUARE AND BEVEL.

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Specification of Letters Patent.

Patented May 31, 1910.

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To all whom it may concern:

Be it known that I, FRANK E. POWELL, a citizen of the United States of America, and resident of Des Moines, Polk county, Iowa, have invented a new and useful Square and Bevel, of which the following is a specification.

The object of this invention is to provide an improved construction for a combination tool partaking principally of the characteristics of a square and bevel.

A further object of this invention is to provide a tool combining the characteristics of a square, a try-square, a bevel-square, a protractor, a plumb, an inclinometer, a rafter chart, a polygon guide or chart, and an edge-guiding gage for marking siding or weather-boarding.

A further object of this invention is to provide an improved construction for combining two or more of the tools above recited in one instrument.

My invention consists in the construction, arrangement and combination of elements hereinafter set forth, pointed out in my claims and illustrated by the accompanying drawing, in which—

Figure 1 is a face view of the complete tool. Fig. 2 is a face view of the complete tool in combination with a plumb bob and line and in position in contact with an inclined plane, arranged to determine or ascertain the degree of inclination of the plane. Fig. 3 is an end view of the device. Fig. 4 is a view illustrating the device in position to serve as a gage in marking siding or weather-boarding.

In the construction of the tool as shown the numeral 10 designates a plate, preferably made of sheet metal and of generally right-angled triangular shape. The plate 10 is formed with a parti-circular opening 11 bounded on one right side by a handle portion, on the other right side by a rule portion 10^a and on the curved side by a hypotenuse portion 10^b. The inner margin of the hypotenuse portion is curved on the arc of a circle having its center at the point of intersection of the outer margin of the rule portion 10^a with the inner margin of the handle portion. The outer margin of the hypotenuse portion 10^b is plane and inclined 45° to the outer margins of the handle portion and rule portion 10^a, and the plane thereof is in alinement with the extremities of said handle and rule margins. Handle

members 12, 13 are fixed to or formed on opposite faces of the handle portion of the plate 10 and extend from the outer margin of the rule portion 10^a at one end to one end portion of the outer margin of the hypotenuse portion 10^b at the other end, thus forming a tongue 14 on the extremity of the handle portion. The outer marginal portion of each face of the rule portion 10^a is graduated, preferably to twelfths of inches and the effective and graduated length thereof preferably is seven inches. The inner marginal portions of each face of the rule portion 10^a is graduated, on both sides of the hypotenuse portion, preferably to eighths of inches and each graduation is coincident with a notch in the margin. A slot 15 is formed in the rule portion 10^a, opposite the jointure of the hypotenuse portion therewith, and one wall of said slot is graduated and notched in continuation of the graduations and notches of the inner margin of said rule portion.

The hypotenuse portion 10^b of the plate 10 is laid off in spaces as follows: a plane space 16 parallel with the outer margin, and concentric parti-circular or arc-shaped spaces 18, 19, 20, 21 and 22 concentric with the inner margin. The arc-shaped space 22 is laid off or graduated on degrees of a circle from naught to seventy-five on lines projected from the center of the arc. The arc-shaped space 21 is laid off and graduated on degrees of a circle based on five degrees of separation from naught at the handle portion to seventy-five at the rule portion. The arc-shaped space 20 is laid off or graduated on degrees of a circle based on five degrees of separation from fifteen at the rule portion to ninety at the handle portion. The arc-shaped space 19 is laid off and graduated on degrees of a circle showing the proper angle for shaping meeting faces forming the angles or edges of polygons, such as three, four, five, six, seven, eight, nine, ten, eleven and twelve-sided polygons. The arc-shaped space 18 is laid off and graduated on the degrees of a circle indicating the plumb and level cuts for hip and valley rafters of various pitches and inclinations, such as one-half, one-third, one-quarter, one-sixth, one-eighth and one-twelfth pitch, the graduations progressing each way from the center or one-half pitch, and the differences of such hip and valley rafters in different pitches, at a certain scale per foot of run or

base of triangle of which such rafter is to form the hypotenuse. The arc-shaped space 17 is laid off and graduated on degrees of a circle indicating inclinations or pitches each way from the center, or forty-five degrees, such as one-half, one-third, one-fourth, one-sixth, one-eighth and one-twelfth.

The plane space 16 of the hypotenuse portion is graduated on lines radiating from the point of intersection of the inner margins of the handle members 12, 13 with the outer margin of the rule portion 10^a of the plate. These graduations are provided with indices commencing with 12 at the point where a line from the aforesaid point of intersection, on an angle of 45 degrees relative to the inner margins of the handle members 12, 13, would intersect the outer margin of the hypotenuse portion, and proceeding through 11, 10, 9, 8, 7, 6, 5, 4, 3, 2 and 1 toward the outer ends of the handle members, and proceeding through 11, 10, 9, 8, 7, 6, 5, 4, 3, and 2 toward the outer end of the rule portion. These graduations indicate respectively the plumb and level cuts of common rafters at various inclinations or pitches. For instance, when it is desired to cut the ends of a common rafter having a rise of five inches to each foot of run, the plumb cut would be made by utilizing the graduation indicated 5 on that side of the index 12 nearest to the handle members 12, 13; and the level cut would be marked by using the index 5 on that side of the index 12 nearest to the rule portion 10^a.

A notch A is formed in each inner margin of the handle members 12, 13 and a common rule (not shown) may be seated at one end in either of said notches and be projected to and across the outer margin of the rule portion 10^a to determine and indicate on the common rule desired length of a hip or valley rafter at a given pitch on a scale of one fourth inch to one foot in length of run. For instance, when it is desired to ascertain the length of a hip or valley rafter, the common rule is seated at one end in the notch A and is adjusted intermediate of its ends to an index on the outer margin of the rule portion 10^a corresponding on a scale of $\frac{1}{4}$ inch to one foot to the rise of the roof. If the rise of the roof be eight feet, the common rule would be adjusted to intersect the graduation "2" at the outer margin of the rule portion and then the amount indicated on the common rule in inches and fractions thereof, read into or transposed to feet and fractions thereof, would represent the length of the hip or valley rafter. Similar notches B are provided in the same margins of the handle members to be used in like manner for the same purpose in respect of a scale of one-half inch to one foot in length of run. For instance, when it is desired to ascertain the length of a common rafter, a common rule is

seated at one end in a notch B and adjusted across the rule portion. If the rise of the roof were eight feet the rule would be adjusted to intersect the angle of the graduation "4" and outer margin of the rule portion and then the readings on the common rule in inches and fractions thereof, transposed into feet and fractions thereof, would indicate the length of such common rafter. The notches may be multiplied indefinitely.

The tool may be used as shown in Fig. 2, with the outer margin of the handle portion in contact with an inclined plane, such as a cornice board 23, and a plumb bob 24 be suspended by a line 25 in such manner that the line crosses the plate at a graduation index in the arc-shaped space 17 that indicates the pitch or inclination of the cornice-board.

In Fig. 4 I illustrate the use of the tool as a gage. In such use the tool is arranged with the hypotenuse portion 10^b crossing a weather-board 26 and the ends of the tongue portion 14 and the rule 14^a in contact with the inner margin of a corner-board 27, in which position the hypotenuse portion serves as a gage to guide a pencil, or other scribing-tool, in movement across the weather-board on the line of said margin of the corner-board.

I claim as my invention—

1. The combination of a try-square formed with a handle portion and rule portion with square ends and an integral hypotenuse portion, the hypotenuse portion formed with a straight outer margin and subdivided into and provided with arc-shaped scales and a straight scale, the outermost two arc-shaped scales and the straight scale subdivided on angular lines radiating from the vertex of the angle formed by the inner margin of the handle portion and the outer margin of the rule portion, the subdivisions of the straight scale provided with indices retrogressing from twelve at its center to naught at one end and two at its opposite end and respectively indicating plumb and level cuts of rafters on opposite sides of its center, the outermost two arc-shaped scales provided with indices of pitch and of degrees of inclination of plumb and level cuts of hip rafters on opposite sides of the center respectively, the remaining arc-shaped scales variously subdivided, handle members on opposite sides of the handle portion, the handle portion projecting at one end beyond the handle members, the handle and rule portions projecting at their inner margins beyond the straight outer margin of the hypotenuse portion whereby the tool is adapted for use as a siding gage, the rule portion formed with a slot crossing one end of the hypotenuse portion, the rule portion notched on its inner margin and on one margin of said slot, the handle members

formed with notches A, B on their inner margins, and a plumb adapted to be engaged with one end of either handle member at the vertex of the angle aforesaid to depend across the hypotenuse portion.

2. The combination of a try-square formed with a handle portion and rule portion with square ends and an integral hypotenuse portion, the hypotenuse portion subdivided into and provided with arc-shaped scales and a straight scale, the outermost two arc-shaped scales and the straight scale subdivided on angular lines radiating from the vertex of the angle formed by the inner margin of the handle portion and the outer margin of the rule portion, the subdivisions of the straight scale provided with indices retrogressing from twelve at its center to naught at one end and two at its opposite end and respectively indicating plumb and level cuts of rafters on opposite sides of its center, the outermost two arc-shaped scales provided with indices of pitch and of degrees of inclination of plumb and level cuts of hip rafters on opposite sides of the center respectively, the remaining arc-shaped scales variously

subdivided, handle members on opposite sides of the handle portion, and a plumb adapted to be engaged with one end of either handle member at the vertex of the angle aforesaid to depend across the hypotenuse portion.

3. A square comprising a handle portion, a rule portion at right angles to said handle portion, and a hypotenuse portion integrally connected, the inner margin of the rule portion being graduated and notched coincident thereto, said rule portion formed with a slot, one side of said slot being notched, the outer margin of the rule portion being graduated, handle members on opposite sides of the handle portion, said handle members formed with notches A, B on their inner faces, ends of the handle portion projecting at their inner margins beyond ends of the hypotenuse portion.

Signed by me at Des Moines, Iowa, this eighth day of August, 1908.

FRANK E. POWELL.

Witnesses:

THOMAS G. ORWIG,
S. C. SWEET.