

No. 842,999.

PATENTED FEB. 5, 1907.

A. O. CALHOON.  
RAFTER AND POLYGON BEVEL.

APPLICATION FILED OCT. 5, 1906.

2 SHEETS—SHEET 1.

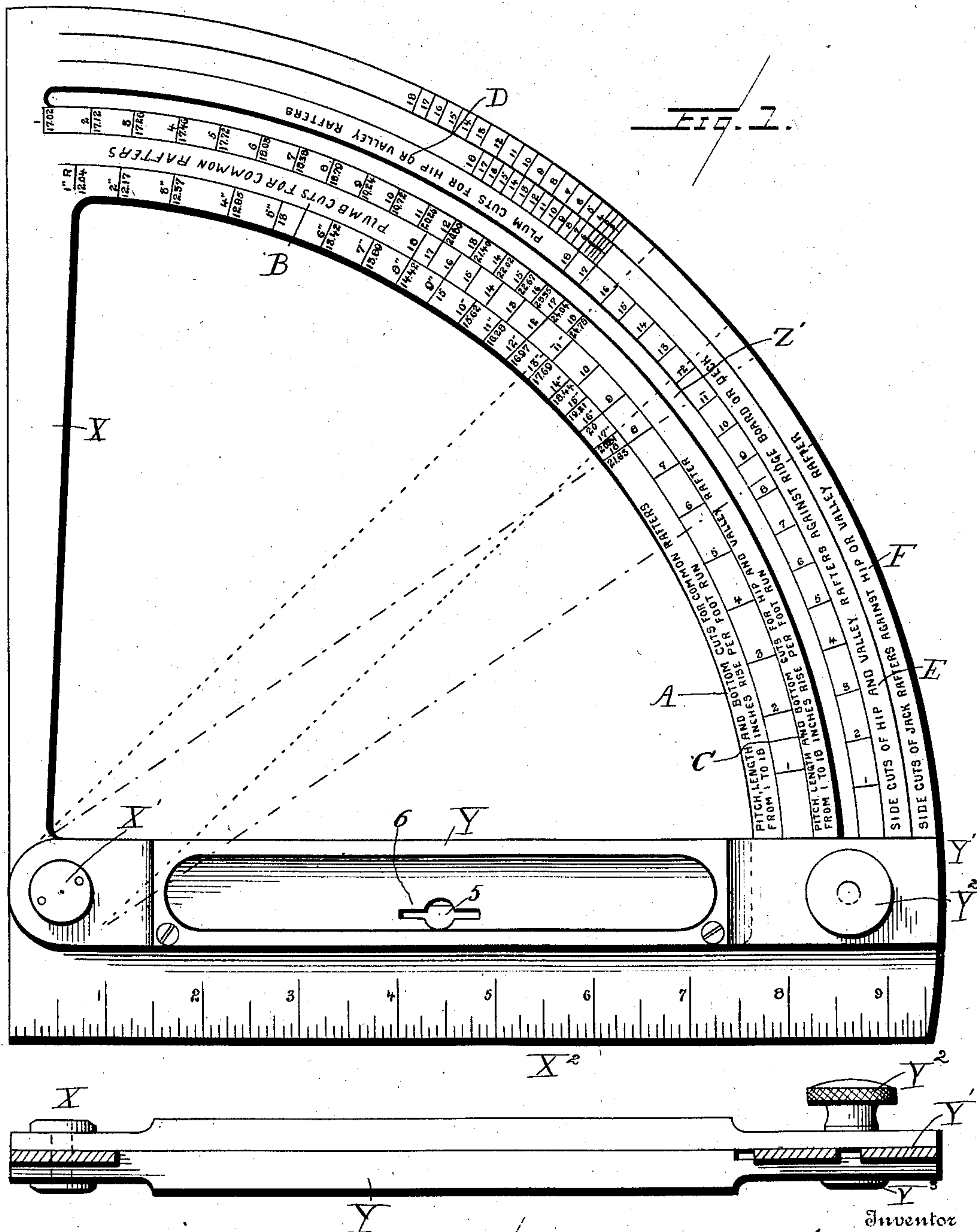


Fig. 4. Albert O. Calhoun,  
By Franklin D. Hough  
Inventor  
Attorney

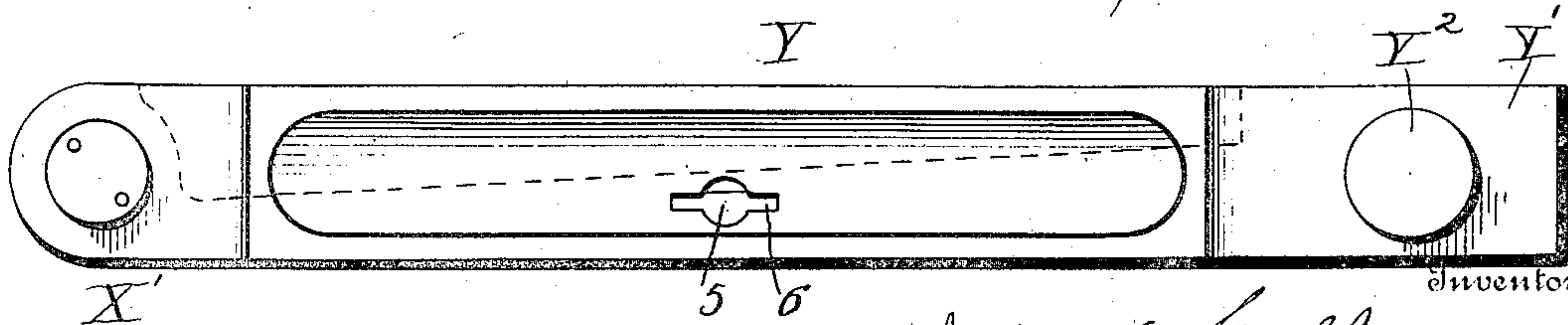
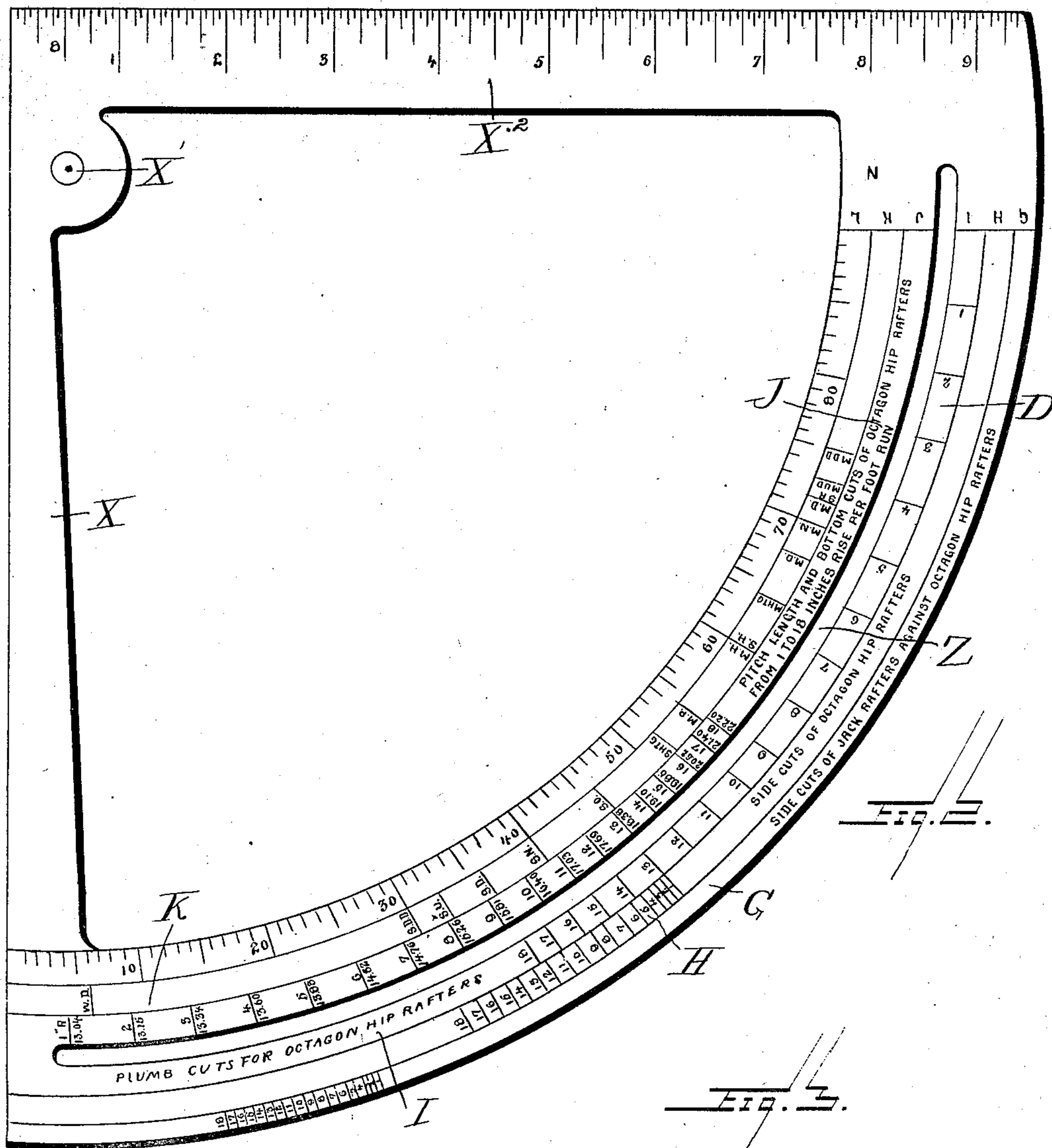
Witnesses  
H. F. [Signature]  
Edw. R. [Signature]

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Witnesses

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Attorney



# UNITED STATES PATENT OFFICE.

ALBERT O. CALHOON, OF VICTOR, MISSOURI.

## RAFTER AND POLYGON BEVEL.

No. 842,999.

Specification of Letters Patent.

Patented Feb. 5, 1907.

Application filed October 5, 1906. Serial No. 337,602.

*To all whom it may concern:*

Be it known that I, ALBERT O. CALHOON, a citizen of the United States, residing at Victor, in the county of Monroe and State of Missouri, have invented certain new and useful Improvements in Rafter and Polygon Bevels; 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, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to certain new and useful improvements in rafter and polygon bevels, and it relates particularly to the provision of a tool embodying the proper graduations for securing the desired angles in cutting rafters and other roof-timbers.

The invention has for a further object the provision of a combined tool embracing a square, try-square, bevel-square, plumb, and level, together with a dial-plate, upon which are indicated the lengths and bevels desired.

A further object of the invention resides in the provision upon opposite sides of the dial of different characters of graduation with which the handle portion coöperates in such a manner as to extend the use of the bevel to a great number of inclinations.

To these ends and to such others as the invention may pertain the same consists in the novel construction and in the peculiar arrangement, combination, and adaptation of parts, all as will be more fully hereinafter described, shown in the accompanying drawings and then specifically defined in the appended claims.

The invention is clearly illustrated in the accompanying drawings, which, with the letters of reference marked thereon, form a part of this specification, like letters indicating like parts throughout the several views, and in which drawings—

Figure 1 is a side elevation of my invention, showing one side of the dial-plate. Fig. 2 is a like view of the opposite side. Fig. 3 is a top plan view of the swinging handle, and Fig. 4 is an edge view of the same.

Reference now being had to the details of the drawings by letter, A designates the dial of the bevel, which is provided with a suitable segmental slot Z', extending concentric to the arc of the dial. From one end of this

dial a tongue X extends and is provided at its upper portion with a pivoting lug X', while from the opposite end of the dial an arm X<sup>2</sup> extends to this lug. The handle Y is pivoted at X' and is bifurcated at its lower end Y', so as to extend upon opposite faces of the dial to provide an edge to coöperate with the graduations of the dial. For the purpose of retaining this handle in any of its adjusted positions a thumb-screw Y<sup>2</sup> is applied and adapted to engage a nut Y<sup>3</sup>, carried by the handle, as shown in Fig. 4.

This tool is particularly adapted for cutting rafters, and one face of the dial, as shown in Fig. 1, is provided with a series of different graduations for this purpose. For instance, the graduations upon the arc A are adapted to give the pitch, length, and bottom cuts for common rafters from one to eighteen inches rise per foot run, the rise-number appearing above the horizontal line. The graduated arc B is for determining plumb-cuts for common rafters, while the letter C indicates the graduations to determine the pitch, length, and bottom cuts of hip and valley rafters from one to eighteen inches rise per foot run. The letter D indicates the graduations for securing the plumb-cuts for these latter rafters. The letter E indicates the segment containing graduations for the side cuts of hip and valley rafters for contact against the ridge board or deck, while the graduations in the segment F are for the purpose of securing the side cuts for jack-rafters intended to contact against hip or valley rafters. It will thus be seen that the graduations indicated in Fig. 1 are particularly intended and adapted for laying off and plotting the roof-rafters to be cut in building a roof structure. The opposite face of the dial, as shown in Fig. 2, contains in the segment G graduations giving the side cuts of jack-rafters intended to rest against octagon hip-rafters, while the graduations H are for the purpose of securing the side cuts of these octagon hip-rafters.

I designates the graduations for securing the plumb-cuts for octagon hip-rafters, while in the segment J graduations are given for securing the pitch, length, and bottom cuts of octagon hip-rafters from one to eighteen inches rise per running foot. In the segment K different graduations are given for the purpose of obtaining the various polygonal angles desired in framing or building work and reading from left to right are indicated as follows: "W D" gives pitch of window or



door sills. "S P" provides the bevel to form a side of a pentagon. "S H" is the bevel to form the side of a hexagon. "S H T G" gives bevel to form side of heptagon, while "S O" indicates the bevel of side of octagon. "S N" gives bevel to form side of nonagon, while "S D" forms side of decagon and "S U" forms side of undecagon. "S D D" provides side of dodecagon, and "M P" gives miter-cut for pentagon, and "M H" is the same for a hexagon. "M H T G" gives miter for a heptagon and "M O" miter for an octagon and "M N" the same for a nonagon. "M D" gives miter for a decagon, "M U" for an undecagon, and "M D D" is miter for a dodecagon. The space L is provided with a series of graduations indicating the degrees from one to ninety in the segment of a circle.

It will be noted that the arm  $X^2$  is of greater width than the corresponding arm X upon the opposite side of the pivot-point of the swinging handle. The object in thus widening the said arm  $X^2$  is primarily to provide a right angle, thus providing a try-square, this being accomplished by extending the width outwardly from the pivotal point of said arm  $X^2$ , the arm being widened upon the inner side for the purpose of producing a perfect try-square. It will be noted that when the swinging handle is permitted to drop or be folded back upon the arm X' that the inner face of the handle will be in alignment with the ninety-degree mark upon the quadrant, thereby rendering it possible to use it as a square, a try-square, a plumb, and a level, a suitable leveling-tube 5 being provided within the handle, as shown, an opening 6 in the handle being provided for its reception.

In the operation of this tool the proper bevel or cut may be indicated for any roof having a rise from one to eighteen inches rise per foot run. For instance, if the roof is of a pitch of ten inches rise to a foot reference to the graduations gives the length of both common and hip and valley rafters, the length of which can be very easily found by using the present invention by multiplying one-half the width of the building by the figures under the line indicating the desired pitch. For instance, taking a building eighteen feet wide, it is desired to find the length and cut of all the different rafters pertaining to the roof, which is to have a pitch of eight inches rise to the foot. Referring to Fig. 1, we find in the space A on the face of the bevel the pitch, length, and bottom cuts of any desired common rafter with any pitch roof from one to eighteen inches rise to the foot. In this example the pitch is eight inches, and the handle is moved until the side thereof next the tongue X is brought into alignment with the line marked "8 R." At this point the handle is fastened with the thumb-screw, thus giving the bottom cut of a

common rafter, while under this line the length of the common or jack rafter per foot run is given, which in the present instance is 14.42 inches, the run in this building being nine feet, which is one-half the width of the building. It will be seen that 14.42 inches multiplied by nine give ten feet nine inches, the length of a common rafter. In the space B the line marked "8 R" will be the proper plumb-cut for the same rafter, thus completing the rafter. The hip or valley rafter cuts are determined in the same manner, using the proper spaces C, D, and E. The jack-rafter is next indicated, and the proper graduations for the bottom and plumb cuts have been already ascertained, so that the side cut against the hip or valley rafter may be found in the space F, line marked "8 R." The length of this jack-rafter per foot run, which is 14.42 inches, has been already found, and in this case the run is two feet, space twenty-four inches to centers, and twice this amount (14.42) gives 28.84 inches, the length of the first jack-rafter. This amount is doubled for the length of the second rafter and trebled for the length of the third rafter, and thus continued as usual in completing the framing of the roof. When the roof is to be octagon hipped, we find the proper length and cuts on the lines marked for the desired pitch in spaces marked "G H I J," and the procedure is the same as that just given for a common rafter. In the space K the proper pitch for a window or door sill is given, and the remaining indications in this space give the bevels for the side of polygonal figures and also the miter cuts for such figures.

It will be seen that when the swinging handle is brought to its normal position with its inner edge upon the ninety-degree line of the quadrant that when it is placed upon edge and held in a position in which the device is shown to be level that a perfect square is provided, thus producing both plumb and level lines, and it will also be noted that a try-square is provided by the inner edge of the swinging handle when in this position in combination with the arm X.

It will be noted that by widening of the arm  $X^2$ , thereby extending it for a considerable distance beyond the outer side edge of the swinging handle, a broad surface is provided upon which a graduated scale is shown, the scale being so graduated upon its opposite sides as to provide a rule adapted for purposes of a carpenter's use, it being graduated upon one of its sides to twelfths of an inch and upon its opposite side to sixteenths of an inch. This provision could not be had were it not for the fact that the arm is widened for a considerable distance beyond the pivotal point of the swinging handle, as will be at once evident.

A further and essential advantage gained



by the widening of the arm  $X^2$  resides in the fact that by the said widening, a perfect square being provided in combination with the swinging handle provided, as stated, with a level, it renders it possible by the use of the instrument for the operator to determine at once the angle of a roof or other inclined surface and also to determine the length, pitch, bottom, and top cuts of any roof that he may be required to extend to the same pitch—as, for instance, it being desired to ascertain the pitch of a roof from the outside, by placing the outer edge of the arm  $X^2$  of the instrument upon the roof and bringing the pivoted handle carrying the level, as described, to a point at which the level is indicated, it will be shown upon segment B at the point of intersection of the upper face of the handle with the indication on the scale D, the plumb-cut of said rafter will be shown, and the corresponding number on segment A will give bottom cut and length for that rafter. In the event of its being inconvenient to apply the instrument to the upper face of the roof, by placing the outer edge of the arm  $X^2$  against the under face of the roof and bringing the handle up until a level is secured, then the length, pitch, and bottom cut of the rafter for that building will be shown at the intersection of the upper edge of the swinging handle with the scale A, thus eliminating the necessity of measuring distances, length of rafters, &c., which would otherwise be required. It will be noted upon reference to the drawings that the scales indicated upon the quadrant are such as to convey at once to the mind of the operator the information necessary as to the point at which the arm is to be set to the quadrant in order to indicate the various cuts as to pitch, length, &c., and it will further be noted that provision is made upon the scale for indicating side cuts, hip and valley rafters, &c., and that the tool is adapt-

ed for use in obviating in all cases the necessity of special measurement in roof construction and also in stair work, and it will be further noted that the invention is adapted for all forms of ship construction and in finding angles and distances in building construction generally.

It will be obvious that changes may be made in the system of graduations herein used, although those shown are most desirable, and also that the details of construction and configuration may be varied without departing from the spirit of the invention as defined in the appended claims.

Having thus described my invention, what I claim to be new, and desire to secure by Letters Patent, is—

1. In a bevel of the character described, a graduated quadrant, a handle pivotally connected at one of its ends at the apex of the quadrant and provided with a level, a screw upon the handle adapted to engage a slot in the quadrant, for securing the handle at any predetermined position upon the quadrant, and a lateral extension of the quadrant having a scale along its outer edge.

2. In a bevel of the character described, the combination with a quadrant graduated as described, a handle pivoted at the apex of the quadrant, and provided with a level, the opposite end of the handle being adapted to move upon the graduated circumference of the quadrant, means for locking the same in its adjusted position, said quadrant being provided with a lateral extension along one of its arms to produce a right angle at the apex of the quadrant, substantially as described.

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

ALBERT O. CALHOON.

Witnesses:

ROBERT A. BOSWELL,  
FRANKLIN H. HOUGH.