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ROOF-RAFTER-CALCULATING DEVICE.

1,027,766.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, DONALD ROBERTSON and JAMES A. ATKINSON, subjects of the King of England, residing at New Westminster, in the Province of British Columbia and Dominion of Canada, have invented certain new and useful Improvements in Roof-Rafter-Calculating Devices, of which the following is a specification.

10 This invention relates to devices for calculating the lengths of the rafters for the roofs of buildings and is an improvement in the devices illustrated and explained in United States Patent No. 989,806, issued to us April 15, 1911.

The principal object of our invention is to simplify the construction of the apparatus and render the work performed therewith more readily accomplished.

20 The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of our improved calculator. Fig. 2 is an elevation viewed from the lower edge of Fig. 1. Fig. 3 is a detail section through A—A of Fig. 1. Fig. 25 4 is a plan view illustrating the manner of marking a scantling for bevel-cuts from data derived from the calculator. Fig. 5 is a perspective view of a portion of the roof structure of a house.

30 According to the present invention, we provide a frame comprising a base member 1 having an arm 2 pivotally connected to its right hand end by a pin 7, and another arm 3 which is pivotally connected by a pin 8 to the free end of the arm 2 and is adjustably secured to the left-hand end of said base-member by a clamping wedge 4 cooperating with a stud 9 fixedly secured to such base-member. The wedge 4 is operatively 40 connected to said base-member by a headed pin 10 passing through a slot 11 in the wedge. A groove 12, desirably of a dovetail shape in cross section, extends longitudinally of the base member for the accommodation of a bar 13.

Slidably connected to the base-member is a blade 5 which is secured in selected positions lengthwise of the base member by a clamping wedge 6 acting against one edge 50 of the base member and in opposition to a bar 14 juxtaposed with the other edge thereof.

As illustrated in Fig. 3, the bar 14 is 55 formed at one end of a stem 15 which is se-

cured, as by rivets, to the blade 5 and is extended beyond the lower edge of the blade to carry a pin 16 whereby the wedge 6 is adjustably connected with the blade. Provided upon the blade are spaced marks 17 which 60 are designated by numerals, as 17', to indicate distances by scale from a line projected at right angles to the blade and extending through the axis of pivot 7. The arm 2 is likewise provided with graduations 18 and 65 indicating numbers, as 18', therefor to denote by scale distances from the axis of the pivot 7.

The slidable bar 13 is also provided with spaced marks 19 with indicating numerals 70 19' therefor and to a similar scale with the marks on the arm 2 and the blade 5. On the base-member 1 is an index mark X which is located to coincide with a predetermined mark, as 21, upon the bar when the initial 75 or zero mark of the latter is in alinement with the axis of the pivot 7. A scale 22 is provided on the arm 3 and is graduated to indicate, with reference to an index mark Y on the stud 9, the positions into which 80 the arm 3 is to be adjusted to cause the arm 2 to be presented in appropriate angular positions with relation to the base-member 1 in the operation of the invention.

In Fig. 5 is represented a portion of the 85 roof-frame of a building, comprising a ridge board A, a hip rafter B, main rafters C extending from the plate D to the ridge board A, and jack rafters E extending from said plate to the hip rafter. 90

The manner of employing the invention may be explained as follows: With the rod 13 located as shown in Fig. 1, the blade 5 is first moved into a position, as indicated by scale on rod 13, equal to one-half the 95 width of the building; whereupon the arm 2 is swung into a position whereat the measuring edge thereof will cross the corresponding edge of the blade 5 at a point on the latter, according to the scale, equal to the 100 "rise" or elevation of the ridge board A (Fig. 5) above the plate D. The arm 2 is now secured through the medium of the arm 3 and the wedge 4, and the blade 5 is then moved to have its measuring edge coincide 105 with the graduation mark "12" of the scale on the rod 13, whence by inspecting the position whereat the arm 2 crosses the blade 5 it is found, for example, to be located at the graduation mark "8" of the blade scale, 110

thus affording the rates of the "rise" to the half-span and which, in this instance, is as eight is to twelve. Employing the factor eight, the arms 2 and 3 are adjusted to present the graduation mark "8" of the scale 22 into register with the index mark Y therefor. The apparatus is thus adjusted and the measurements of the various rafters can be determined therefrom as follows:

10 Supposing one-half the span of the roof to be twelve feet, to correspond with the positioning of the parts of the apparatus as illustrated in Fig. 1, the main rafters C will be found by the scale on the blade 15 where the latter intersects the arm 2 to be fourteen and four-tenths feet, while the scale on the arm 2 indicates that the length of a hip-rafter B is eighteen and eight-tenths feet, and to which lengths the respective rafters may be cut. By successively shifting the blade 5 toward the pivot 7 to distances equal to the spacing of the jack rafters E, as denoted by the scale on the bar 13, the lengths of such jack rafters are 25 found from the intersection of the blade 5 with the arm 2 and read from the blade scale. The lengths of the rafters are laid off to their true measurements by rule on appropriate scantlings for roof timbers. The 30 bevels at which the ends of a main-rafter R (Fig. 4) are to be cut, are found by laying a carpenter's square S so that the square-tongue S' will have the inch mark eight thereon at the intersection of one of the end 35 marks previously made with the scantling edge R' and the twelve-inch mark of the square-stock S'' coincide with the same edge R' of the scantling. A scratch or pencil mark is then made upon the scantling along the edge M' of the square stock S' to indicate the proper cutting line for the heel of a main-rafter. The top or ridge cut is similarly found except that the cutting line is made along the edge M of the square tongue 45 when the same is held against the other of the length marks. The jack rafters E are similarly marked by the square to lengths ascertained from the blade scale at the intersection of the blade 5 and arm 2 when 50 the former is successively shifted distances equal to the spacing of these rafters; as, for

example, sixteen inches. The marks for a cut upon a hip rafter B are obtained by employing in the same manner the designating mark of the scale on arm 2, as will be understood. The purpose of having the bar 13 slidable is to permit the same to be shifted a distance equal, by scale, to the amount of the overhang of the various rafters, and when thus set the lengths of the rafters may be determined, as above explained, without regard to the increment due to such overhang of the rafters.

What we claim as our invention, is—

1. In an instrument of the character described, a base-member, a bar provided with a scale and slidable longitudinally in said base member, an arm hingedly connected at one of its ends to an end of said base member, a second arm hingedly connected with the free end of the aforesaid arm, scales provided on the respective arms, means for securing the free end of the second named arm with the end of said base-member remote from the connection of the latter with the first named arm, a blade provided with a scale and shiftable lengthwise of the base member, and means for securing said blade to the base member in various adjusted positions and at right angles to such member.

2. In an instrument of the class described, a base member, a bar shiftable longitudinally therein and provided with a scale, a blade provided with a scale and slidably connected to said member, means for securing said blade in adjusted positions, an arm hingedly connected at one end to one end of said member and provided with a scale, another arm hingedly connected at one end to the free end of the aforesaid arm and provided with a scale for indicating the inclination of the first named arm from said member in terms of the ratio of the rise of a roof to half its span, and means for securing said second named arm to the base member at various adjusted positions.

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Witnesses:

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