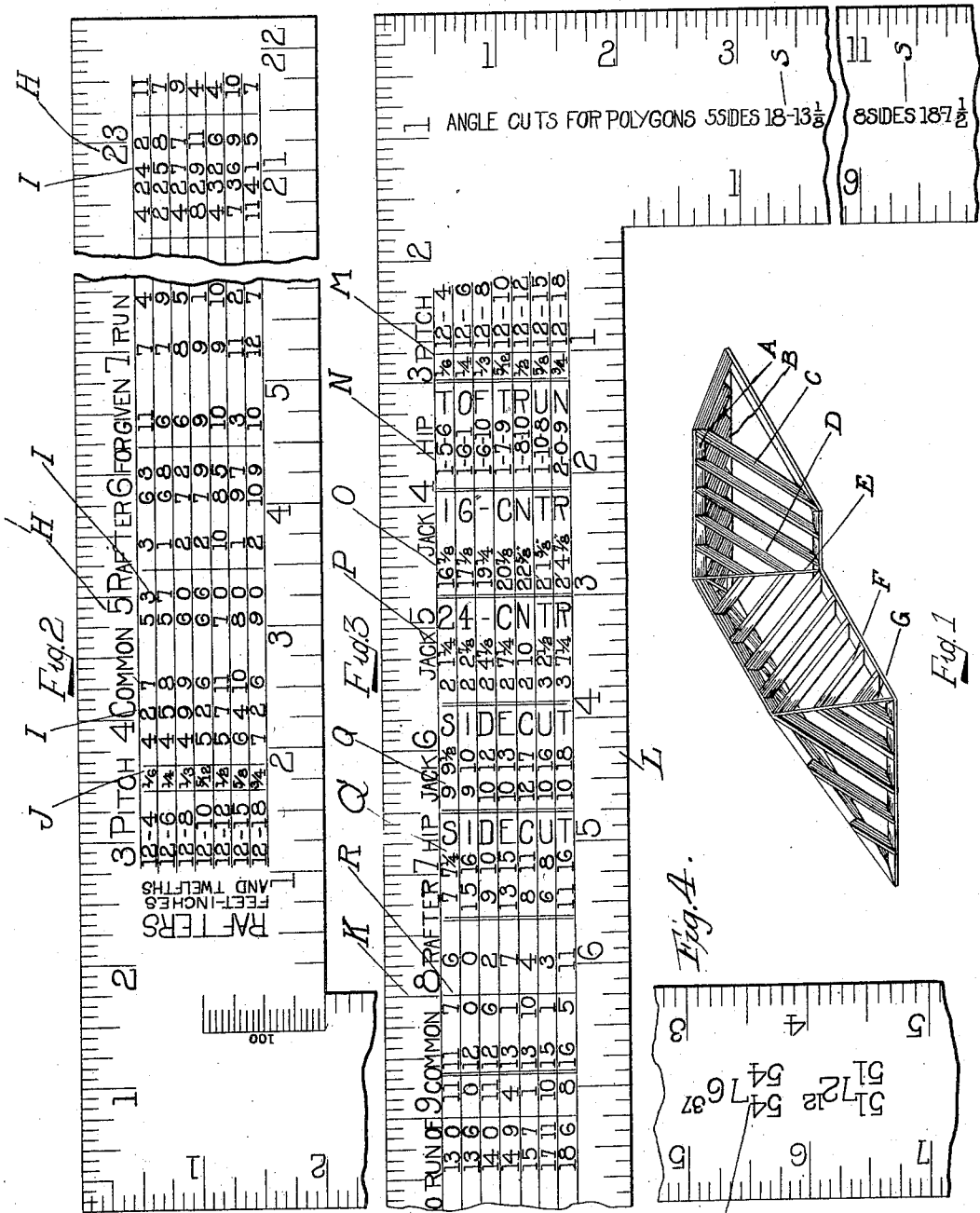


1,102,689.

Patented July 7, 1914.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

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## FRAMING-SQUARE.

1,102,689.

Specification of Letters Patent.

Patented July 7, 1914.

Application filed July 10, 1911. Serial No. 637,700.

*To all whom it may concern:*

Be it known that I, HENRY B. SARGENT, a citizen of the United States, and a resident of the city of New Haven, county of New Haven, and State of Connecticut, have invented certain new and useful Improvements in Framing-Squares, of which the following is a full, clear, and exact description, when taken in connection with the accompanying drawings, which form a part thereof.

My invention relates to carpenters' framing squares, and the primary object of the invention is to provide a square having an arrangement of rafter tables whereby a maximum amount of useful information to the carpenter may be placed on the square with the use of a minimum number of figures.

The novel features of the invention will appear from the following description and claims.

In the accompanying drawing Figure 1 is a perspective view of a roof frame, Fig. 2, a fragmentary plan view showing the front of the square, Fig. 3, a similar view of the back of the square, and Fig. 4, a fragmentary view of the front face of the tongue.

In all the figures, similar letters of reference represent like parts.

In Fig. 1, a roof frame is illustrated for the purpose of enabling the application of the invention to be better understood. In this view, A designates the ridge, B the plate, C a common rafter, D a cripple rafter, E a valley rafter, while F and G are a jack rafter and hip rafter, respectively. The rise of the roof is the distance in a plumb line from a point on the central line of the top of the ridge to the level of the top of the plate, while the run is the shortest distance from said plumb line to the outer edge of the plate. The run is therefore always half the outside width of the building. The pitch is represented by the proportion between the rise and the width of the building, and hence a roof of four feet rise, on a building twenty four feet wide, is called a roof of one-sixth pitch. The diagonal from the outer edge of the plate to the nearest point in the central line of the top of the

ridge measures, of course, the length of the common rafter. The rafter ends are cut to roof angles to rest respectively against ridge and plate. The cut against the ridge is called the top cut or plumb cut and the cut against the plate is called the bottom cut or heel cut. To find the top and bottom cuts the square is placed upon the rafter so that a portion of one arm of the square corresponds to the run, and a portion of the other arm corresponds to the rise, and the proper bevels are obtained by moving the square until the graduation on the body corresponding to the length of the run registers with the lower edge of the rafter, and the graduation on the tongue corresponding with the height of the rise also registers with the lower edge of the rafter; thus, for common rafter, the run is 12, and the rise 4, for one-sixth pitch. It will be seen that the hip rafter G forms the hypotenuse of a right angle triangle, one side being the common rafter C, and other side part of the plate B. The rise of the hip rafter is the same as that of the common rafter, while its run is the horizontal distance from the plumb line of its rise to the outside of the plate at the foot of the hip rafter. This run of the hip rafter is to the run of the common rafter as seventeen is to twelve, therefore for one-sixth pitch the common rafter run and rise are respectively twelve and four, while the hip rafter run and rise are respectively seventeen and four. The valley rafter forms the hypotenuse of a right angle triangle of which one side is the ridge and the other a common rafter, hence this triangle is similar to the triangle of which the hip rafter is the hypotenuse, and therefore the same rules apply in measuring its length and cuts as for the hip rafters. The jack rafters F are usually spaced either 16" or 24" apart, and, as they lie against the hip or valley rafters equally spaced, the second jack rafter must be twice as long as the first, the third three times as long as the first, and so on. It will thus be seen that there is a definite relation between the runs of the common rafters of given pitches and the runs, and consequently the lengths, of the hip and valley rafters of the same pitch. There is also a definite relation between the pitch and

the length of the jack rafters and between the pitch and the side cuts of the jack rafters. My invention aims to give these relations in final calculated form in tables carried by the square, so that the rafter lengths and cuts may be read at a glance without the necessity of calculation.

In Fig. 2, illustrative of the front of the square, are tables giving the length of the common rafters according to the runs thereof. In this view H are the figures designating the runs of the common rafters, and these figures are the same as those used ordinarily to designate inches. These figures constitute headings for columns I designating the lengths of the common rafters of a given pitch, the different ordinary pitches being indicated in a column J, at the left end of the body of the square, so that the pitch and run of the common rafter being known, the length may be read in the space opposite the given pitch and under the heading of the given run. This arrangement is the same as shown in the Roberts Patent No. 651,057. On the back of the square are shown at the outer edge of the body the figures K indicating the runs of the common rafters and using for this purpose the graduations usually employed for indicating inches. Inner edge graduations L may be employed for the usual inch measurements. As shown in Fig. 3 the figures indicating the common rafter runs begin at the right hand end of the body and run toward the left. The usual inch numerals 1, 2, 3, etc., are associated with the graduations on the edges of the square. At the right hand end of the body is a triple column M, in which are placed the figures indicating the given pitches of the rafters, disposed in different horizontal ruled spaces. To the left of this column, is a column N denoting the length of the hip rafters to one foot of run of the common rafters. Beyond the column N is a column O giving the lengths of the shortest jack rafter, spaced sixteen inches on center, which dimension is also the difference in length of succeeding jack rafters—as  $16\frac{1}{2}$  inches for one-sixth pitch. My next block of figures P gives the length of the shortest jack rafters spaced twenty-four inches on centers. The next block Q gives the side cut of jacks against the hip or valley rafter as “9—9 $\frac{1}{2}$ ” for one-sixth pitch. In order to obtain this side cut, the square is placed across the rafter with the inch graduation 9 of the body of the square in coincidence with one edge of the rafter, and with the 9 $\frac{1}{2}$ ” graduation of the tongue in coincidence with the same edge of the rafter. A line drawn along the graduated edge of the tongue will then indicate the desired cut. The jack rafter top and bottom cuts are the same as for the common rafter and found in the same way. The next block of figures Q' gives the side

cut of hip or valley rafters against ridge board or deck as 7—7 $\frac{1}{4}$  for one-sixth pitch. Following in the table are given for each pitch the lengths of the hip or valley rafters relative to the run of the common rafter, beginning with the run of eight, and having the respective lengths arranged in line with the given pitches and in columns R under the headings indicating the runs. For instance, for a roof having a one-sixth pitch and having a common rafter run of eight feet, along the same line of figures with the one-sixth pitch indication, and under the heading “8” is found “11—7—6.” which should be read as eleven feet, seven and six-twelfth inches, which is the length of hip or valley rafter required for a roof of one-sixth pitch and a common rafter run of eight feet.

Referring to Fig. 3, it will be noted that in the particular embodiment illustrated, the tables M, N, O, P, Q, and Q' are associated with certain of the lower inch graduations on one edge of the square, *e. g.* the inch graduations 3, 4, 5, 6, and 7. The next tables or groups of figures giving the lengths of the hip and valley rafters per foot of run of the common rafters are associated with and cooperate with the higher inch graduations on the same edge of the square, *e. g.* the inch graduations 8, 9, 10, etc. This is an especially advantageous arrangement, as in practice common rafters seldom have a run of less than eight feet (corresponding to eight inches on the square), which permits the tables M, N, O, P, Q, and Q' to be placed in association with the lower inch graduations where they may be very conveniently referred to in reference to the adjacent tables giving the lengths of the hip and valley rafters. Hence it will be understood that by the arrangement of the tables in the manner described, a maximum amount of useful information to the carpenter may be placed on one of the arms of the square with the use of a minimum number of figures.

The figures given are for the rafter lengths from the center of the ridge-board to the outer edge of the plate, hence in the actual use of the square and table, one-half of the thickness of the ridge-board should be deducted from the figures for the lengths, and any projection beyond the plate for the eave, added.

In addition to the above tables there is shown on the tongue a set of figures S cooperating with the body and tongue and expressing the angle of cuts for common polygons. Thus for a figure of eight even sides, place the square on the piece of lumber, and take on the body of the square eighteen, and on the tongue seven and one-half, and then mark the piece by such angle, and then saw eight pieces of equal length having the angle cut at each end of each piece, and the pieces will fit together to make an eight

sided figure, in size depending upon the length of the pieces. The standard brace measure T may also be marked upon the tongue of the square at the front face thereof, as shown in Fig. 4.

The measurements in the main table are in duodecimals, or feet, inches, and twelfths of an inch. In case the run is taken in feet, one inch on the square is called a foot, and in case the run is taken in inches, the readings will be in inches, twelfths, and one-hundred and forty-fourths of an inch.

Various changes in the details of the device may be adopted within the scope of the claims.

Having thus described my invention, what I claim is:—

1. A carpenter's square having a plurality of graduations along the edge of one arm, to denote inches, a transverse column of figures on said arm, indicating different pitches, transversely arranged tables or columns of side cuts for the hip and jack rafters arranged parallel to the pitch column under the lower inch graduations, and tables or columns of rafter lengths, arranged parallel to the aforesaid columns, under the higher inch graduations, such higher inch gradua-

tions corresponding to the length of certain rafter runs; substantially as described. 30

2. A carpenter's square having graduations along the edge of one arm, numerals associated with said graduations to denote inches, a transverse column of figures adjacent one end of the arm to indicate different roof pitches, transversely arranged columns or tables of figures parallel to the pitch column under the numerals respectively of the higher inch graduations, to indicate hip or valley rafter lengths corresponding to the runs of common rafters, said last named numerals corresponding to the runs of common rafters referred to by said tables, and transversely arranged columns of figures parallel to the pitch column in association with the lower inch graduation numerals, giving measurements of other rafters, and intended for use in connection with said first named tables or columns of figures; substantially as described. 50

In witness whereof I have hereunto set my hand on the 6th day of July, 1911.

HENRY B. SARGENT.

Witnesses:

MAY L. O'CONNOR,  
F. W. FELLOWS.