No. 658,262. Patented Sept. 18, 1900.

S. J. HESTER.

ADJUSTABLE FRAMING SQUARE.

(Application filed June 22, 1900.)

(No Model.)

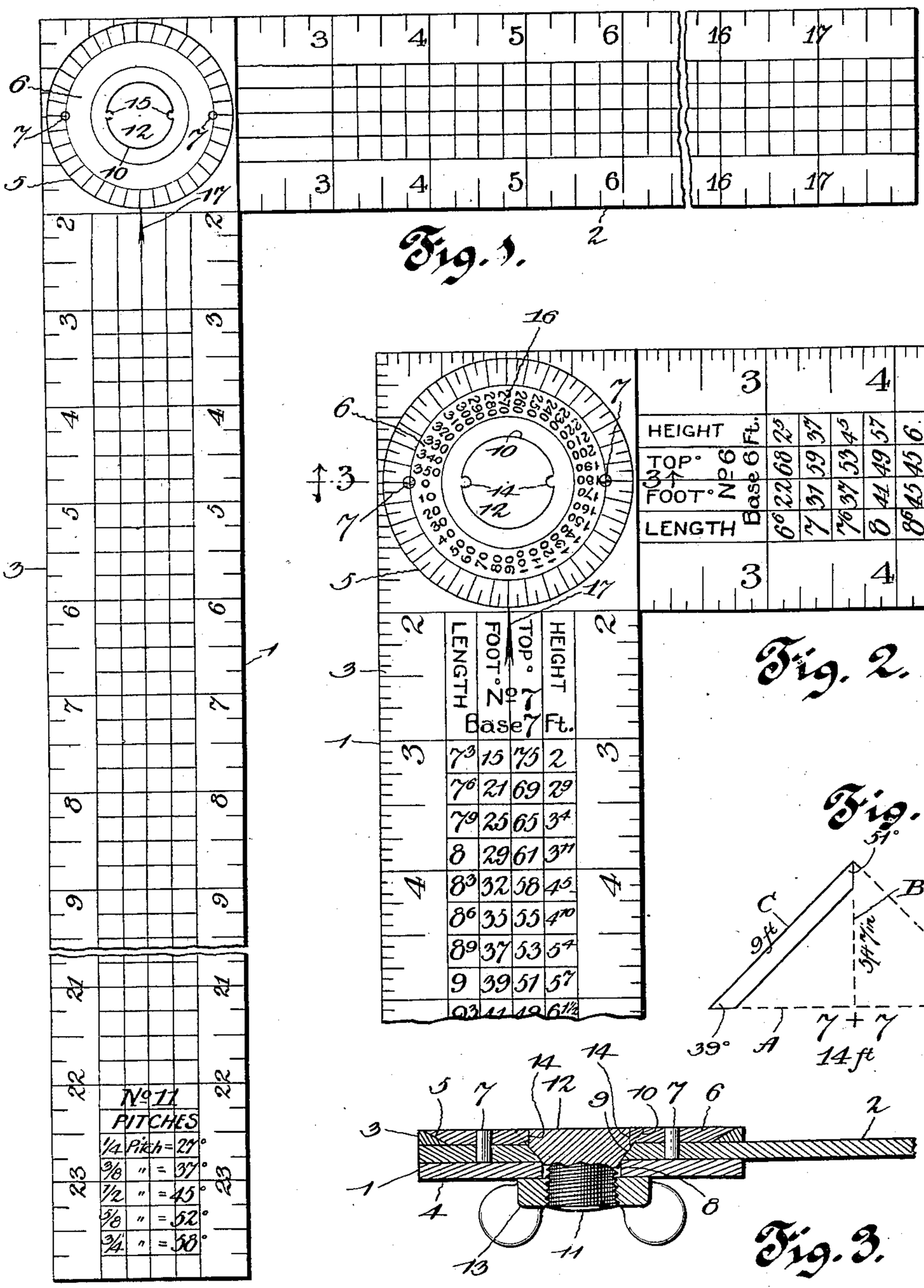

Fig. 1.

Fig. 2.

Fig. 4.

Fig. 3.

Witnesses

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STEPHEN J. HESTER, OF MAYFIELD, KENTUCKY, ASSIGNOR OF ONE-HALF TO WILLIAM A. CARTER AND JAMES I. CARTER, OF SAME PLACE.

ADJUSTABLE FRAMING-SQUARE.

SPECIFICATION forming part of Letters Patent No. 658,262, dated September 18, 1900.

Application filed June 22, 1900. Serial No. 21,226. (No model.)

To all whom it may concern:

Be it known that I, STEPHEN J. HESTER, a citizen of the United States, residing at Mayfield, in the county of Graves and State of Kentucky, have invented a new and useful Adjustable Framing-Square, of which the following is a specification.

This invention relates to squares for use by carpenters and builders generally, and is designed to provide an improved adjustable connection for the arms of the device, so that the latter may be conveniently and accurately adjusted to any angles desired, and to provide an improved arrangement of degree-marks, so as to facilitate the adjustment of the arms.

The device is especially designed for use as a framing-square to mark off the opposite ends of the beams in the construction of the frames of roofs, and a further object is to provide the device with means for quickly and accurately determining the proper lengths of the beams and the required angles for the opposite ends thereof.

With these and other objects in view the present invention consists in the combination and arrangement of parts, as will be hereinafter more fully described, shown in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that changes in the form, proportion, size, and minor details may be made within the scope of the claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings, Figure 1 is an elevation of the improved framing-square. Fig. 2 is an enlarged detail fragmentary view thereof. Fig. 3 is a detail transverse view taken on the line 3 3 of Fig. 2. Fig. 4 is a diagrammatic view illustrating the use of the present device.

Corresponding parts are designated by like characters of reference in all of the figures of the drawings.

Referring to the accompanying drawings, 1 and 2 designate, respectively, the long and short arms of the square, the long arm being formed by spaced members or plates 3 and 4, as best indicated in Fig. 3 of the drawings, so that the short arm may be pivoted between the two plates and swung in between the latter, whereby the short arm is housed within the longer arm and the square may be folded into compact form for storage and transportation.

As best shown in Fig. 3 of the drawings, one end of one of the plates of the longer arm—as, for instance, the plate 3—is provided with a comparatively-large circular opening 5, the walls or edges of which are beveled or inclined inwardly toward the center of the opening. The adjacent end of the other or short arm is inserted between the two plates and a circular plate or disk 6 is then snugly fitted within the circular opening 5, said disk having its peripheral edge beveled, so as to correspond with and snugly fit the beveled edge of the opening, the opposite faces of the disk being flush with the corresponding faces of the plate 3. After the disk has been fitted in place it is fixedly secured to the shorter arm by means of suitable fastenings—as, for instance, rivets 7. By this arrangement the two arms are pivoted or swiveled together, the disk preventing lateral separation thereof.

In order that the arms may be fixedly held at different angles, the plate 4 is provided with an opening 8, which is arranged concentrically of the opening in the opposite plate, and the arm 2 and the disk are provided with corresponding openings 9 and 10, respectively, the walls or edges of which are correspondingly beveled inwardly toward the center of the opening, so that the outer diameter of the opening 9 in the short arm 2 is equal in length to the diameter of the inner end of the opening 10 in the disk 6, so that the edges of these two openings form continuous walls, which incline inwardly to the walls of the opening 8 in the plate 4. An adjusting-screw 11 is inserted through the combined openings from the disk side of the square and is provided with a circular enlarged head 12, the marginal edge of which is beveled or inclined inwardly toward the shank of the screw, so as to snugly fit the beveled edges of the combined circular openings 9 and 10. The threaded stem of the screw projects loosely through the opening 8 and a suitable winged thumb-nut 13 is fitted thereto, so as

to bind against the adjacent outer face of the long arm of the square, so as to hold both arms at any required angle. The marginal edge of the head of the adjusting-screw is provided with a pair of diametrically-opposite notches or recesses 14, as best shown in Fig. 2, and for the reception of corresponding projections or lugs 15, formed upon the beveled edge of the opening in the disk 6, so that the latter and the adjusting-screw are fixedly connected, and these parts are also connected to the short arm 2 by means of the rivets or fastenings 7.

From the foregoing description it will be seen that by loosening the binding-nut 13 the two arms may be turned upon their pivotal connection to any desired angle and then fixedly held in such position by setting the nut against the longer arm. Also the disk 6 forms a detachable part of the head of the adjusting-screw and the disk is fixedly connected to the arm 2, so as to prevent unnecessary looseness and separation of the arms when the screw is loosened to adjust the angular relation of the arms. So far as the coöperation of the index-mark 17 and the circular degree-scale 16 is concerned the disk 6 may be an integral part of the head of the screw, in which event the head may or may not be permanently connected to the arm 2; but in any event it should be held against rotation upon said arm.

As hereinbefore described, the disk 6 turns within the opening 5 in the plate 3 of the longer arm during the adjustment of the two arms, which relative arrangement of parts is used to accurately adjust the arms to any determined angle by dividing the outer face into three hundred and sixty degrees and marking off the degrees in a circular series upon said outer face of the disk, so as to form a circular degree-scale 16, the marks of which intersect the marginal edge of the disk. The relatively-fixed arm 1 is provided with a mark or pointer 17, which registers with the ninety-degree mark of the circular degree-scale when the two arms are arranged at right angles, so that by opening or closing the arms any angular adjustment may be had by registering the pointer or mark 17 with the desired degree-mark upon the circular degree-scale.

To conveniently determine the proper lengths of beams and the required angles at the tops and bottoms thereof, there is provided a plurality of tables, computed upon one-half of the width of a building, as one side of a right-angle triangle. As shown in Fig. 2, each arm of the square is marked off into four longitudinal columns, which are designated consecutively from the left, by the words "Length," "Foot°," "Top°," and "Height." These words are arranged adjacent to the pivotal connection of the arms, so as to be at the top or head of each column, and the latter is divided into blocks or squares by means of transverse lines or marks, which are common to all of the columns in any individual table. Each table is based upon a certain length, corresponding to one-half of the width of a building—as, for instance, the table "No. 7," shown upon the arm 1 in Fig. 2, which is computed upon a right-angle triangle having a base of seven feet. The respective squares or blocks of the table are provided with numbers corresponding to the length of the beam, the angle in degrees at the bottom or foot of the beam, the angle in degrees at the top of the beam, and the perpendicular distance between the top of the beam and the center of the adjacent rafter of the frame of the roof of a building.

For a complete understanding of the manner of using the tables, reference is had to Figs. 2 and 4. In the latter figure, A designates a rafter which corresponds to the width of a building of fourteen feet, from the center of which rises a standard B, the height of which is five feet and seven inches, thereby forming two right-angle triangles, each of which has a base of seven feet and a height of five feet and seven inches. To determine the length of a beam C to reach from the outer end of the rafter to the top of the standard, reference is had to that table which is computed upon a base equal to one-half of the length of the building—in this instance the table No. 7. In the "height-column" you look for the number corresponding to the height of five feet and seven inches, which is indicated thus: "5⁷," then travel straight across the table to the left-hand block, which indicates that the length of the beam should be nine feet. The next column to the right indicates that the lower end or foot should be cut at an angle of thirty-nine degrees, while the next column indicates that the top of the beam should be cut at an angle of fifty-one degrees. Thus after the beam has been sawed to the required length the arms of the square may be quickly adjusted to lay off the required angles at the opposite ends of the beam.

As indicated in the drawings, the No. 7 table has been started with a length of seven feet and three inches and a height of two feet; but it will be understood that the table may be started with any desired length. Also the square is provided with a plurality of similar tables computed upon different bases, so that the square may be used in the construction of buildings of various widths.

It is common among carpenters and builders to indicate the inclination of a roof by the terms "quarter-pitch," "half-pitch," and the like, and to accommodate the present device to such measurements there is provided a "pitch-table"—as, for instance, at the outer end of the longer arm 1—in which a quarter-pitch is equivalent to an angle of twenty-seven degrees, a half-pitch to forty-five degrees, and so on. Should the measurement be given as a "three-eighths" pitch, which is equivalent to thirty-seven degrees, and the width of the house is fourteen feet, reference is had to the No. 7 table to find the thirty-seven mark in

the foot degree-column. Then by reference to the corresponding blocks in the other columns it will be seen that the length of the beam is eight feet and nine inches, the upper angle fifty-three degrees, and the height five feet and four inches.

What is claimed is—

1. A framing-square, comprising pivotally-connected arms or members, a pivot-pin fixedly connected against rotation upon one of the members, and having its shank passing loosely through an opening in the other member, a circular degree-scale provided upon the head of the pivot-pin, an index or mark provided upon the said other member and coöperating with the marks of the degree-scale, and an adjustable binding device fitted to the projecting end of the pivot-pin.

2. A framing-square, comprising a pair of angularly-related arms or members, one of the latter having a comparatively-large circular opening formed therein, and the other member having a smaller concentrically-arranged opening to correspond with the former opening, a pivot-pin, having an enlarged circular head rotatable within the larger opening and fixed against rotation upon the other arm, and a screw-threaded shank projecting through the opening of the other arm, a thumb-nut provided upon the projecting end of the shank, a circular degree-scale provided upon the outer side of the head of the pivot-pin, and an index or mark provided upon the first-mentioned arm and coöperating with the marks of the circular scale.

3. A framing-square, comprising a pair of angularly-related arms or members, one of the latter having a comparatively-large opening formed therein, and the other arm having a smaller opening arranged concentrically with the former opening, a disk rotatable within the former opening, fixedly connected to the other arm, and provided with a central opening corresponding to the opening in said other arm, a circular degree-scale provided upon the outer face of the disk, an index or mark provided upon the first-mentioned arm and coöperating with the degree-scale, a pivot-pin, having one end fixed against rotation within the opening in the disk and also removably connected thereto, the opposite end projecting through the opening in the other member, said disk forming a removable part of the head of the pin, and an adjustable binding device fitted to the projecting end of the pivot-pin.

4. A framing-square, comprising a pair of members or arms, one of the latter having a comparatively-large opening formed therein, and the other arm having a smaller concentrically-arranged opening, a disk rotatable within the large opening and fixedly connected to the other arm, said disk also having a central opening, and lugs or projections upon the walls of said opening, a headed removable pivot-pin projecting through the two openings, the head of the pin being seated within the opening in the disk, and having marginal notches or recesses receiving the respective lugs or projections to fixedly connect the pivot-pin and the disk, the latter forming a removable part of the head of the pin, a binding device provided upon the opposite end of the pin, a circular degree-scale upon the disk, and an index or mark provided upon the first-mentioned arm and coöperating with the degree-scale.

5. A framing-square, comprising a pair of angularly-related arms or members, one of the latter having a comparatively-large circular opening, the walls of which are beveled inwardly toward the center of the opening, and the other arm having a smaller concentrically-arranged opening, the walls of which are beveled centrally inward, a disk having an inwardly-beveled marginal edge rotatably fitted within the large opening, and fixedly connected to the other arm, said disk being provided with a central opening having beveled walls which form continuations of the beveled walls of the opening in said other arm, projections or lugs upon the walls of the opening in the disk, a pivot-pin projecting through the openings, and having an enlarged head, the marginal edge of which is beveled inwardly toward the shank thereof to snugly fit the combined openings, and having notches or recesses receiving the projections to fixedly and removably connect the pin and the disk, the latter forming a removable part of the head of the pin, the shank of the pin being screw-threaded, a thumb-nut provided upon the pin, a circular degree-scale provided upon the disk, and a mark or index provided upon the first-mentioned arm and coöperating with the degree-scale.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

STEPHEN J. HESTER.

Witnesses:
J. S. LANGWIN,
S. T. DAUGHODAY.