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# UNITED STATES PATENT OFFICE.

JOHN MCLEAN, OF MILLER'S FERRY, ALABAMA.

## COMBINATION SQUARE AND BEVEL.

SPECIFICATION forming part of Letters Patent No. 535,717, dated March 12, 1895.

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*To all whom it may concern:*

Be it known that I, JOHN MCLEAN, of Miller's Ferry, in the county of Wilcox and State of Alabama, have invented a new and Improved Combination-Square, of which the following is a full, clear, and exact description.

The invention consists principally of a stock, and two blades rigidly connected with each other at an angle of forty-five degrees, one of the blades being provided with a graduation of degrees, sides of polygons, bevels, &c., while the other contains tables for calculating rafters, braces, &c.

The invention consists of certain parts and details, and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a perspective view of the improvement. Fig. 2 is an inverted sectional plan view of the same; and Fig. 3 is a perspective view of a point.

The improved tool is provided with a stock A supporting in its lower end a pivot B, on which is fulcrumed a blade C having a segmental slot C' engaged by a bolt D, held in the upper part of the stock A and serving to clamp the blade C in position on the stock A.

The blade C is formed with an extension blade E standing at an angle of forty-five degrees to the upper end of the blade C, as is plainly illustrated in the drawings, the said blade E being adapted to form a try-square with the said stock A, as illustrated in Figs. 1 and 2.

On the blade C is formed a graduation F indicating degrees and subdivisions and also indicating the sides for polygons, plumb levels for common rafters, hip and jack rafters, also seat and side bevels for the same, and other desirable matter. This graduation F, is read on a fixed pointer G secured on the upper end of the stock A, as is plainly shown in Fig. 1. Now, it will be seen that when the thumb or wing-nut D is loosened, the blade C can be swung into a desired position or point on the graduation F standing over the pointer G, after which the wing-nut is

screwed up to fasten the blade C in position on the stock A. The edge of the blade C, then indicates relative to the side of the stock A the desired degree or other matter indicated by the graduation F, on the pointer G.

The blade E is provided on one face with a series of tables for calculating the length of hip rafters, common rafters and jack rafters, while the reverse face of the blade E, contains a brace scale, as is plainly indicated in Fig. 2. In the lower edge of the blade E, are arranged apertures E' placed one inch apart, and adapted to be engaged by a point H, shown in detail in Fig. 3, and having a stem H' formed at one end with the point H<sup>2</sup>, and at its middle with an enlargement H<sup>3</sup>, so as to abut for a rest against one face of the blade E, as indicated in Fig. 1.

In the stock A, is arranged a transverse aperture A' in alignment with which is arranged a spring I, secured to the side of the stock A, as indicated in Fig. 2.

The device is used as follows: When the several parts are in the position illustrated in Fig. 1, then the tool forms a perfect try-square by the stock A and blade E, and a true miter by the blade C with the stock A, by loosening the thumb-nut of the bolt D. The blade C may be shifted, that is, swung on its pivot B to any desired angle from 0 to 45° on the graduation F, and indicated on the pointer G. The device thus forms a valuable substitute for a quadrant and can be used as such.

It will further be seen, that the device may be readily used as an inclinometer, bevel protractor, try-square and miter-square, as a substitute for the compass and trammel points. It may be used in the following manner: At the point where it is desired the center of the circle shall be, press in the sharp point H<sup>2</sup> of the point H, and then measure from this point in any direction the radius of the circle required. Count from the stock toward the end of the blade E to the aperture E' nearest the measurement of the radius. Then place in the aperture A' a pencil or any pointed instrument and loosen the thumb-nut of the bolt D to move the stock A, until the pencil touches the measurement of the radius, after which the instrument is moved steadily to the right or left so that it turns upon the pivot until the complete revolution is made,



when it will be found that a complete circle has been described.

If it becomes necessary to have a longer miter blade than the one described in the drawings, the operator first loosens the nut of the bolt D and then moves the stock A in the direction indicated by the arrow  $a'$ , until the index or graduation indicates forty-five degrees on the point G. Then the long blade E forms with the handle or stock A a perfect miter.

It will be seen that the tables of any of the different rafters and the ease and accuracy with which the instrument may be adjusted to obtain the bevels for all rafters and polygons, and instantly changing the arrangement back to an accurate try-square, forms an excellent feature of my invention.

It will further be seen that the device may be readily used as a mechanical instrument in the measurement of angles and describing circles and finding, in an easy and accurate manner, the side of a square and the sides of different polygons that may be described in a given circle. For instance, in order to find one side of a square that may be inscribed in a given circle, the operator proceeds as follows: He first draws through the circle a diametrical line and then loosens the nut on the bolt D, so as to move the stock A back until the graduation F indicates  $45^\circ$  on the pointer G. The nut is then screwed up to fasten the stock A and blades in position. The side of the stock next to the blade E is placed along the diametrical line with the outer edge of the blade C, touching the center of the circle, and along this edge is then drawn a radius from the center to the periphery of the circle, after which the instrument is reversed and the above described operation is repeated to draw a second radius. Then from the points where the radii enter the arc of the circle, a chord is drawn which is one side of the square. To obtain one side of a polygon that may be inscribed in a given circle, the operator first moves the stock until the graduation points to the division indicating the polygon required. He then proceeds in the manner above described in reference to finding the square, until all the sides of the polygon are obtained.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. The herein described combination square

comprising the stock A the graduated blade E extending across the upper end of the stock and provided at its inner end with a blade C extending down from its upper straight edge at an angle of forty-five degrees thereto and pivoted at its lower end in the lower end of the stock, a curved slot C' in the angle between said two blades and concentric with the pivot B, a set screw extending through the upper end of the stock and through said slot to clamp the stock at any desired angle, and a series of graduations F along the slot C', substantially as shown and for the purposes described.

2. The combination square comprising the graduated blade E having a blade C extending downwardly from its inner end and inclined at an angle of forty-five degrees toward its outer end; the lower end of the blade C having a pivot aperture and a curved slot C' being formed in the angle between the two blades concentric with said pivot aperture, a series of graduations along said slot, a stock A having a pivot at its lower end on which blade C works, a set screw D extending through the upper end of the stock and the said slot, and a pencil hole A' through the upper end of the stock parallel with the set screw and a pencil clamping spring crossing said aperture, substantially as shown and described.

3. A combination square comprising the stock A having a slot through its upper end, a set screw crossing the slot and a pencil holder therebelow, a blade E extending through the stock slot having apertures along its lower edge and graduated on one side for rafters and on its opposed side for braces, and the blade C extending downwardly at an angle of forty-five degrees from the rear end of the blade A to the lower end of the stock and there pivoted, a curved slot C' in the angle between the two blades and concentric with the pivot; the said set screw being passed through said slot to adjust the stock toward and from the inclined blade C, a pointer on the upper end of the stock and a series of graduations along the slot C' over which said pointer works, substantially as shown and described.

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Witnesses:

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