June 26, 1923.

1,460,103

D. C. LOPEZ

COMBINATION SQUARE

Filed June 9, 1920

2 Sheets-Sheet 1

Fig. 1.

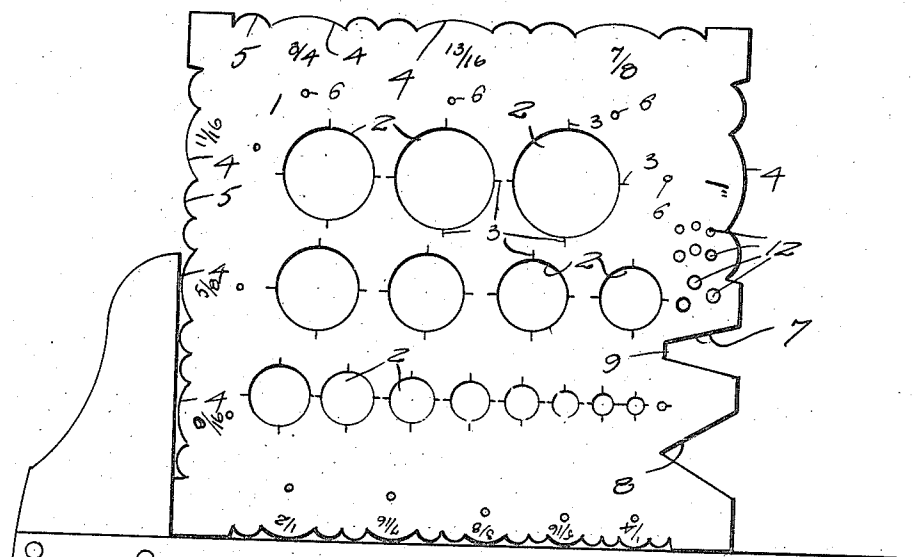


Fig. 2.

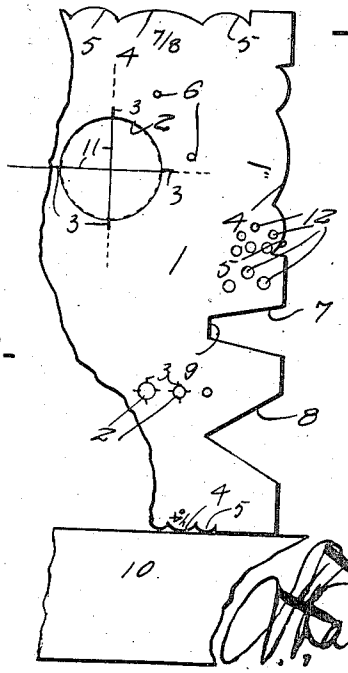


Fig. 4.

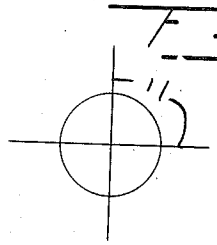
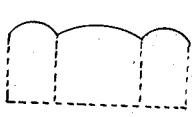


Fig. 3.



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Fig. 5.

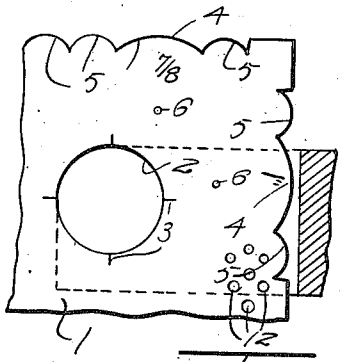


Fig. 6.

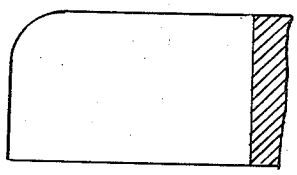


Fig. 7.

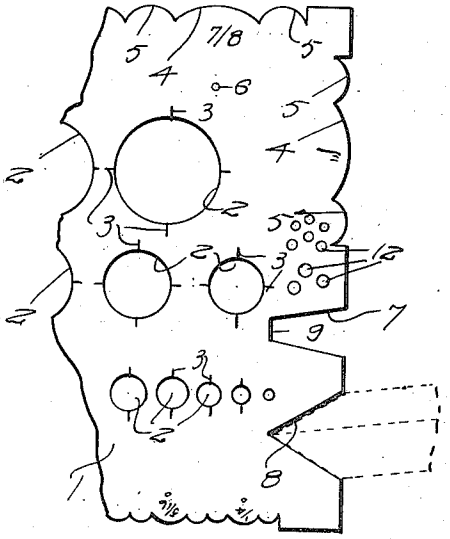


Fig. 8.

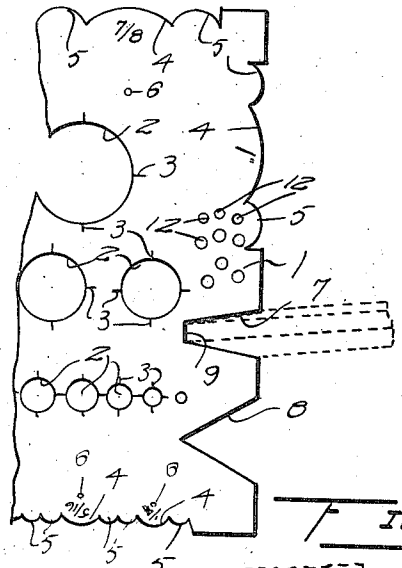


Fig. 9.

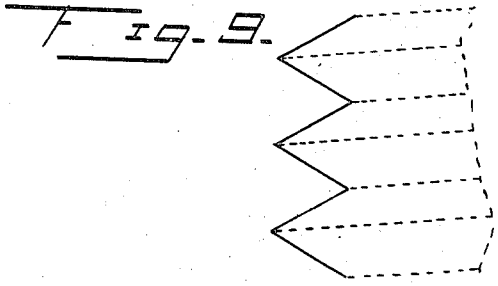
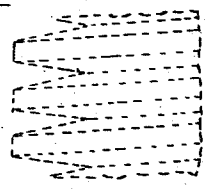


Fig. 10.



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Patented June 26, 1923. 1,460,103

UNITED STATES PATENT OFFICE.

DAVID CABRERA LOPEZ, OF DETROIT, MICHIGAN.

COMBINATION SQUARE.

Application filed June 9, 1920. Serial No. 387,652.

To all whom it may concern:

Be it known that I, DAVID CABRERA LOPEZ, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Combination Squares; 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.

This invention has relation to certain new and useful improvements in combination squares and has for its primary object, the provision of a drawing implement of the above stated character which may be employed for various purposes and which will be of simple and compact form for use in connection with a T-square.

The invention has for another object, the provision of a combination square of the above stated character which will be especially useful in drawing bolts and various bolt thread, nuts and circles or segments of circles of different diameters.

The invention has for a still further object, the provision of a combination square of the above stated character which will be constructed in such a manner that either one of its four sides may be placed against the edge of a T-square to bring the portion of the combination square to be used to proper position for outlining the desired size of the nut or the threads of a bolt, or a circle of the desired diameter.

The invention has for a still further object, the provision of a combination square of the above stated character which will be constructed in such a manner that an elevation of a nut may be readily drawn with the combination square placed so as to give the proper size of the nut including the depth, width and curved lines for the upper or outer face of the nut without moving the combination square.

The invention has for a still further object, the provision of a combination square of the above stated character which will be constructed in such a manner that it may be readily employed for various purposes by draftsmen and the like and the use of which may be readily understood by parties familiar with such implements.

With the foregoing and other objects in view, as will be readily understood as the description proceeds, the invention consists in the novel combination, arrangement and cooperation of the various elements, as hereinafter more specifically set forth, claimed and pointed out in the accompanying drawings, and in which:

Figure 1 is a plan view of the combination square showing the manner of using the same in connection with a T-square when outlining a nut.

Figure 2 is a view similar to Figure 1 showing the manner of using the combination square in connection with a T-square to produce a circle.

Figure 3 is a detail view showing the result of using the combination square as shown in Figure 1.

Figure 4 is a view showing the result of using the combination square in the manner shown in Figure 2.

Figure 5 is a view showing the manner in which the combination square must be employed to form a curved line to connect two straight lines at an angle to one another, the curved line forming an arc of a circle and a period.

Figure 6 discloses the result of the use of the combination square as shown in Figure 5.

Figure 7 is a view showing the manner of employing a combination square to produce the sixty degree thread of a bolt or the like or any sixty degree line.

Figure 8 is a view showing the result of the use of a combination square as disclosed in Figure 7.

Figure 9 is a plan view showing the manner of employing the combination square to produce a twenty nine degree thread of a screw or the like.

Figure 10 is a view showing the result of the use of the combination square as disclosed in Figure 9 of the drawings.

Referring more in detail to the drawings, in which similar reference characters designate corresponding parts throughout the several views, 1 indicates the body of the combination square which is of substantially rectangular form and may be produced of any suitable material. This combination square may be constructed of a flat sheet of metal or celluloid or any other suitable material and within the main portion of the body are arranged in order in spaced rows or in any other suitable manner the circular openings 2, the smallest of which may have

a diameter of one sixteenth of an inch while the largest is one inch in diameter. The body 1 has marked on its face at diametrically opposite portions of each circular opening 2 the centering lines 3 whereby the centre of each opening may be readily located.

The body 1 has its four sides cut to form arcs or to describe portions of circles of different diameters, a large arc 4 having smaller arcs 5 to either side thereof with the centre of each arc or curved portion in line with the edge on which the arcs are formed so that the combination square may be turned so as to place either side in engagement with a T-square 10, as shown in the drawings. Inwardly of the centre of each arc 4 is a small opening which will be termed a nut centering opening 6. In the drawings I have shown the arcs 4 and 5 and nut centering openings for describing or outlining nuts of different sizes from one fourth or four sixteenths of an inch to seven eighths or fourteen sixteenths of an inch and for a one inch nut, the arcs for each side of the nut being arranged in regular order from one corner of the triangle along that side the adjacent side and the third side with the arcs for the full inch nut and the centering opening therefor on the fourth side or edge of the body 1. On this edge are also provided incisions 7 and 8, the incision 7 having the main walls thereof separated at their inner ends by the short transverse wall 9 and the main wall diverging at an angle of twenty nine degrees so that the incision 7 may be employed for describing the angle of the threads of a bolt or the like having a twenty nine degree thread thereon. The combination square is placed with the opposite edge in engagement with a T-square when employed for this purpose, and after being employed in this manner may be moved to another place or completely removed from the board and the threads completed as indicated in Figure 10. It will be understood, however, that if the threads are to extend in a different direction, the position of the T-square with relation to the board holding the drawing paper may be varied or the combination square may be turned to engage another side or edge thereof with the T-square.

The incision 8 comprises only two walls directed at an angle of sixty degrees so that this incision may be employed for describing the angle of sixty degree thread, or the like, as shown in Figures 7 and 8 of the drawings. It will be evident that the position of the combination square may be changed in this case with respect to the T-square or the drawing board and drawing paper, if desired.

When drawing the nut or outlining the same, the combination square 1 is placed in the proper position with respect to the T-square 10 and a pencil or the like inserted through the centering opening 6 for the size of nut to be drawn or outlined so as to make a mark to indicate the centre of the bottom or lower edge of the nut. The pencil is then moved along the large arc 4 for this size of nut and the two smaller arcs 5 on either side thereof, thereby outlining the upper end of the nut, after which the combination square may be moved along the square 10 and the drawing of the nut will be completed, as indicated by dotted lines in Figure 3 of the drawings. It will be evident that the combination square may be turned so as to draw a nut in the position shown in Figure 4 or in any other position desired with respect to the edges of the drawing board and drawing paper thereon.

When it is desired to draw a circle of a certain size at a particular place on the drawing paper the T-square and combination square are placed so as to bring the centering lines 3 of the openings of the sides to correspond with the circles to be drawn so that the centering lines 3 will be directly over the right angle crossed lines 11 shown in Figure 4 of the drawings and which must be previously placed upon the drawing paper. This will bring the centre of the opening directly over the crossed portions of the lines 11 and by moving a pencil around the edge of the opening 2 a circle of the desired diameter will be drawn on the paper.

When it is desired to connect two lines at an angle to one another by a curved line of a certain degree, the T-square 10 and combination square are so placed as to bring the proper size opening 2 to position so that the wall thereof connects the two lines, preferably only one fourth of the wall of the opening 2 being thus employed, but of course this may be varied as desired. When the combination square and T-square are thus placed, it is simply necessary to draw a pencil around the wall of the opening to connect the two lines, as indicated by dotted lines in Figure 5 of the drawings.

A plurality of openings 12, varying in diameter, are provided through the body 1 at one edge thereof adjacent the incisions 7 and 8. Said openings 12 enable a draftsman to gage the width of lines of letters of the alphabet in plotting or laying them out, since the opening of the desired diameter may be selected and its outline traced to form a circle after which parallel lines are drawn intersecting the circle at diametrically opposite points, thus insuring lines of uniform width.

From the foregoing, it will be clearly apparent that this combination square may be employed in any number of ways by draftsmen and other parties using such implements and will be accurate and save much

time and work of the party properly employing the same. It will also be evident that by providing the different size circular openings 2 to correspond with the sizes of the nuts and threads to be drawn, this body portion of the combination square may be employed for drawing quickly and accurately the circles to represent the ends of the bolts or of circular nuts, washers and the like or openings in members to receive the bolts. It will therefore be seen that complete cooperation may be had between the various parts of this combination square and all of the parts may be employed when preparing drawings showing nuts, bolts, washers and the like.

While the preferred embodiment of the invention has been shown and described, it will be understood that minor changes in the details of construction and arrangement of parts may be resorted to within the scope of what is claimed without departing from the spirit of the invention.

What is claimed is:—

1. A plotter consisting of a generally rectangular body the edges of the body being irregular and having convex portions on arcs of different radii, and the plotter having means representing the centers of said arcs.

2. A plotter consisting of a generally rectangular body the edges of the body being irregular and having convex portions on arcs of different radii, the plotter having means representing the centers of said arcs, and the plotter also having a series of openings therethrough of different sizes for use in laying out letters of the alphabet.

3. A plotter consisting of a generally rectangular body the edges of the body being irregular and having convex portions on arcs of different radii, the plotter having means representing the centers of said arcs, the plotter also having a series of openings therethrough of different sizes for use in laying out letters of the alphabet, and the plotter having a second series of openings of different diameters for use in drawing circles.

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

DAVID CABRERA LOPEZ.

Witnesses:
A. G. COLIN,
F. E. MARTIN.