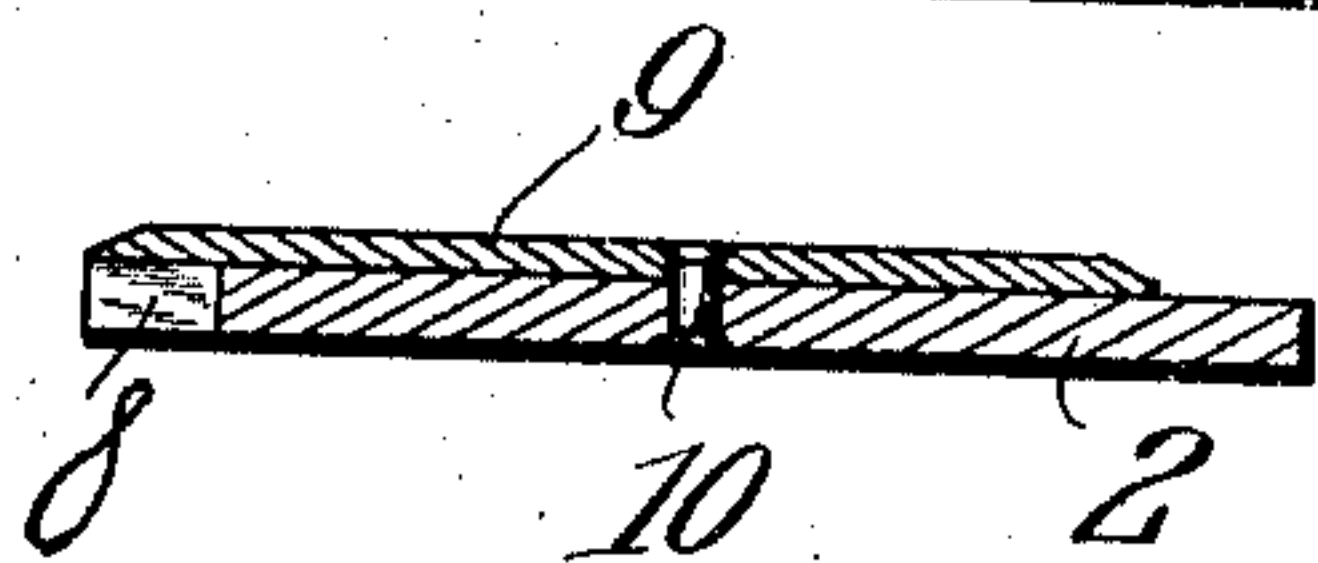
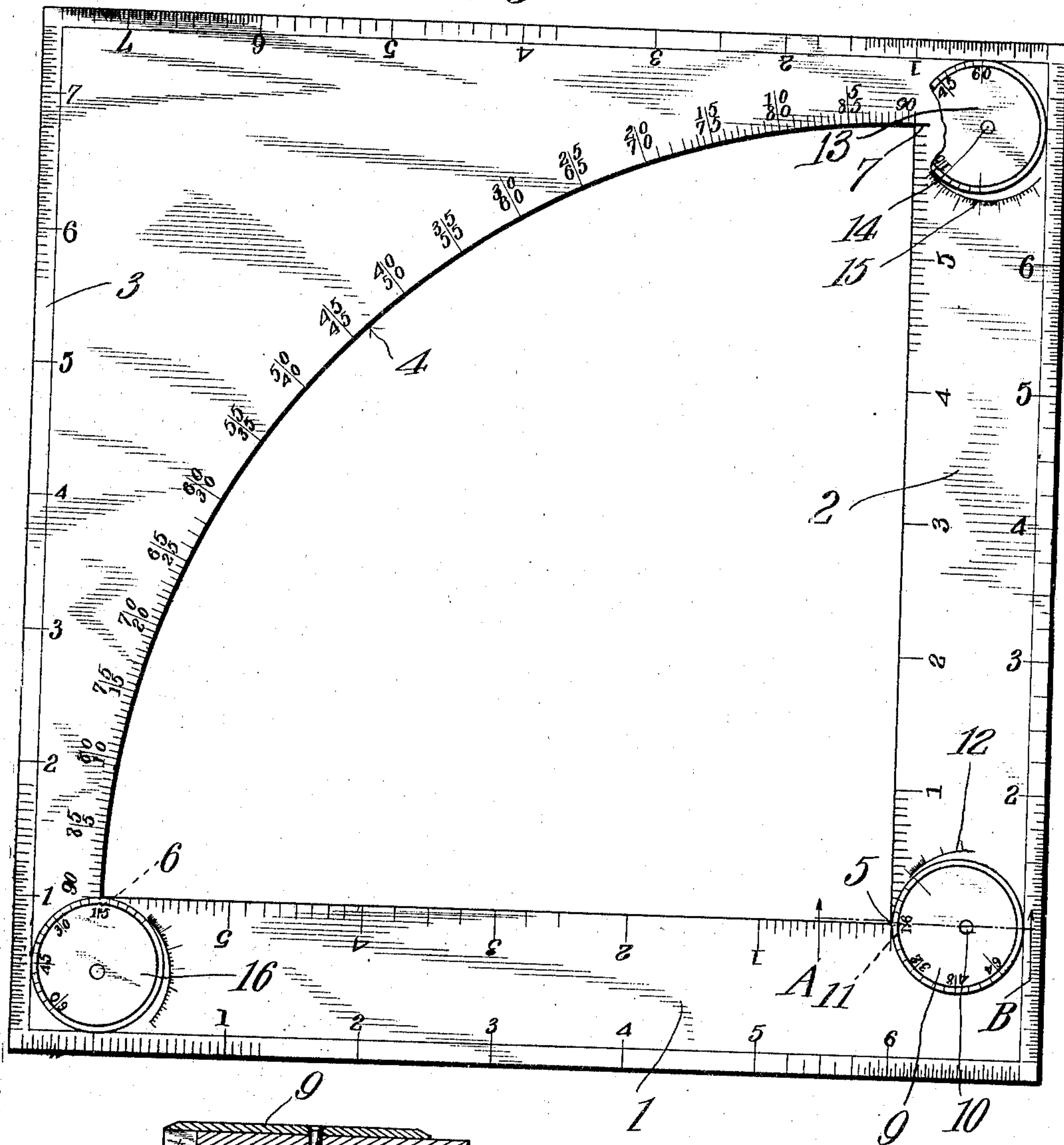


989,327.

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PROTRACTOR.  
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Patented Apr. 11, 1911.

*Fig. 1.*



*Fig. 2.*

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Witnesses

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# UNITED STATES PATENT OFFICE.

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## PROTRACTOR.

989,327.

Specification of Letters Patent.

Patented Apr. 11, 1911.

Application filed April 19, 1910. Serial No. 556,310.

*To all whom it may concern:*

Be it known that I, ABRAHAM BRUBAKER, a citizen of the United States, residing at Warsaw, in the county of Kosciusko and State of Indiana, have invented a new and useful Protractor, of which the following is a specification.

This invention relates to protractors and its principal object is to provide a simple device of this character having a novel arrangement of disks combined therewith and whereby very minute measurements may be obtained.

Another object is to provide a protractor which can be readily adjusted without the aid of separate devices and which can be conveniently manipulated.

With these and other objects in view the invention consists of certain novel details of construction and combinations of parts hereinafter more fully described and pointed out in the claims.

In the accompanying drawings the preferred form of the invention has been shown. In said drawings:—Figure 1 is a plan view of the protractor. Fig. 2 is an enlarged section on line A—B of Fig. 1.

Referring to the drawings by characters of reference 1 and 2 designate two sides of a square, the remote ends thereof being connected by an integral plate 3 having straight outer edges. These sides and edges are all graduated to indicate inches and, preferably, fractions thereof down to thirty-seconds, the graduation extending along both edges of each side 1 and 2. A segmental opening is formed within the protractor, said opening being outlined by the arms 1 and 2 and by an arcuate inner edge 4 of plate 3 concentric with the angle 5 formed by the inner meeting edges of the arms 1 and 2. The arcuate edge 4 is preferably located six inches from the center 5 and is marked off in degrees and half degrees; two sets of numerals being preferably associated with the graduations so that they can be read from either end of the arc. An incision 6 is formed in the side member 1 and constitutes a continuation of the edge 4, this incision extending one degree into the side member. Another similar incision 7 is similarly arranged in the member 2. An incision 8 extends into the side member 2 at the angle 5 and aligns with the inner measuring edge of the side member 1, this incision being preferably one-eighth of an inch in

length. All of the incisions are just wide enough to receive a marking needle or pointer.

A disk 9 is mounted on the member 2 and adjacent angle 5 and when it is in its normal position the inner edge of member 1 extends radially therefrom and the corresponding edge of member 2 is disposed tangent thereto. The pivot 10 of the disk is eccentrically disposed and is in line with the inner edge of member 1. This pivot is removed one-sixteenth of an inch from the center of the disk and that portion of the periphery of the disk which is farthest removed from the pivot normally rests at the angle 5 and on the open end of incision 8. This point on the periphery has been indicated at 11 and is adapted to swing along an arcuate line 12 of 90 degrees, said line being subdivided into two equal parts one of which has sixteen graduations.

The zero graduation on the disk normally rests at the middle graduation on the line 12. The said disk is graduated to indicate  $1/16$ ,  $1/32$ ,  $1/48$ , and  $1/64$ .

By arranging the disk 9 in the manner described it can be rotated so as to recede from the angle 5 and when the disk has been given approximately a one quarter rotation,  $1/16$  of an inch of the incision 8 will have been exposed and added to the measuring rule. By stopping the zero graduation at any one of the graduations on the line 12 a fraction of  $1/16$  inch can be measured along the incision 8 from the angle 5. Obviously by turning the disk 9 180 degrees the entire length of the incision 8 ( $1/8$  of an inch) will be exposed.

A disk 13 is mounted on the side member 2 upon an eccentric pivot 14, said pivot and the center of the disk being in the arc of the edge 4 under normal conditions. The said pivot is removed from the center  $1/2$  degree and the graduated arc 15 along which the disk swings extends 90 degrees and is subdivided into 30 parts. Obviously by shifting this disk any desired fraction of the incision 7 can be exposed so as to add any portion of a degree to the 90 degrees described by the edge 4. For example, when the disk 13 is given a one-half revolution, the incision 7 will be exposed its full length or one degree; should the disk be given a one quarter rotation or, in other words, moved through 90 degrees one half of the incision 7 will be exposed thus adding 30'



to the arcuate edge 4. It will be apparent therefore that each of the thirty parts into which the 90 degrees are subdivided, designates 3 degrees along the arc 15 but a movement of the disk along the incision 7 for a distance equivalent of 1'. Another disk 16 similar in all respects to the disk 13 is arranged upon the member 1 and coöperates with the incision 6.

10 In using the device it is necessary to employ a needle or similar marker or pointer having a very sharp point. If the first line is to be laid off S. 20 degrees, W. 17 rods (scale 8 rods to the inch), the angle 5 is placed at the point of beginning and the side 15 1 extended south. The needle point is placed at the graduation on line 4 which is 20 degrees from disk 16 on side 1 and the protractor is then swung about angle 5 20 until disk 16 comes against the needle. The permanent point can then be placed 2 1/2 inches from angle 5 along the graduated edge of arm 1, this distance being equal to 17 rods. If the next line is S. 30 degrees, 25 15' W., the protractor is adjusted to the new point as before, the disk 16 being turned 45 degrees to the right. The pointer or needle is then placed at the 30 degree graduation on the edge 4 and the protractor is 30 swung to the right until the pointer contacts with the edge of the disk 16 which will be 1 degree within the incision 6. The distance can then be pointed as before on the measuring rule. Should it be necessary 35 to utilize the disk 9 to get the exact distance, a temporary point may be placed near the outer end of the member 1 and the disk 9 then turned the required distance. The protractor can then be pushed longitudinally of the member 1, the temporary point 40 and the point at the angle 5'' acting as guides until one of the points strikes the disk in the incision 8. The permanent point can then be placed.

45 It is of course to be understood that various changes may be made in the construction and arrangement of parts without departing from the spirit or sacrificing any of the advantages of the invention as 50 defined in the appended claims.

The disks are adapted to bear upon the members 1 and 2 with sufficient pressure to be held by friction in the positions to which they are adjusted.

55 What is claimed is:-

1. A protractor including a square, an arcuate portion concentric with the angle of the square, there being incisions in the square constituting continuations of the 60 curved edge of the arcuate portion and of one straight measuring edge of the square,

and adjustable means for varying the length of the exposed portion of the incision, said means and square having coöperating means for indicating the lengths of the exposed portions of the incisions. 65

2. A protractor having an incision constituting a continuation of a measuring edge, and adjustable means for varying the length of the exposed portion of the incision 70 and having means for indicating such length.

3. A protractor having an incision constituting a continuation of a measuring edge, and an eccentrically mounted disk for 75 varying the length of the exposed portion of the incision.

4. A protractor having an incision constituting a continuation of a measuring edge, and an eccentrically mounted disk for vary- 80 ing the length of the exposed portion of the incision there being coöperating means upon the disk and protractor for indicating the length of the exposed portion of the slot.

5. A protractor including a square having 85 a segmental opening the arcuate edge of which is concentric with the angle of the square, there being an incision constituting a continuation of the arcuate edge, and movable means for varying the length of 90 the exposed portion of the incision.

6. A protractor including a square having a graduated edge, there being an incision within the square and constituting a continuation of the graduated edge for the re- 95 ception of a marking element, and a disk mounted for rotation about a point remote from the center thereof, said pivotal point being in alinement with the incision and with the graduated edge and said disk being 100 shiftable to partly or entirely conceal the incision.

7. A protractor including a square having a graduated edge, there being an incision within the square and constituting a continuation of the graduated edge for the re- 105 ception of a marking element, and a disk mounted for rotation about a point remote from the center thereof, said pivotal point being in alinement with the incision and with the graduated edge and said disk being 110 shiftable to partly or entirely conceal the incision, and coöperating means upon the square and disk for indicating the length of the exposed portion of the incision. 115

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

ABRAHAM BRUBAKER.

Witnesses:

MELVIN A. WILCOX,  
MAURICE WILCOX.