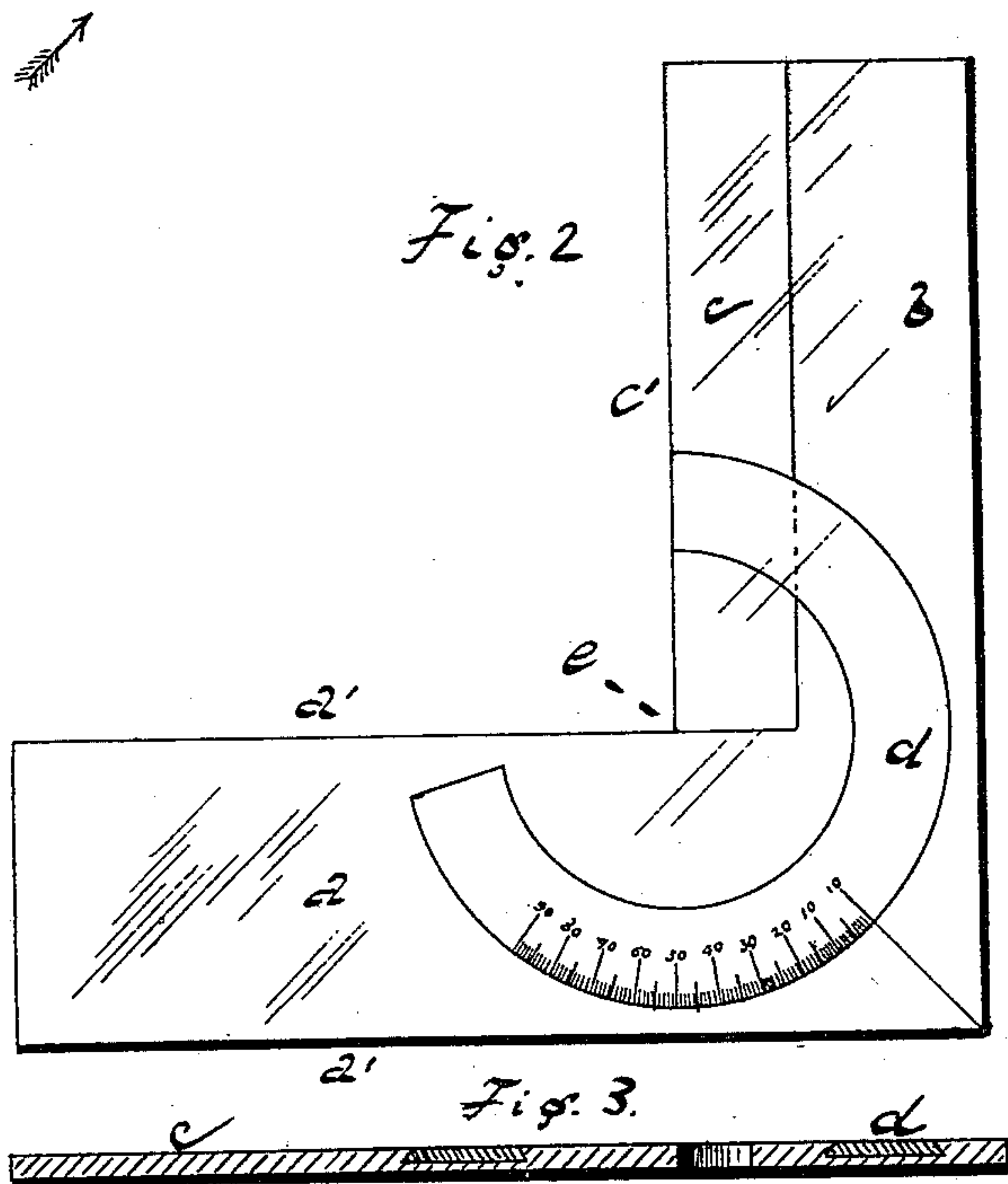
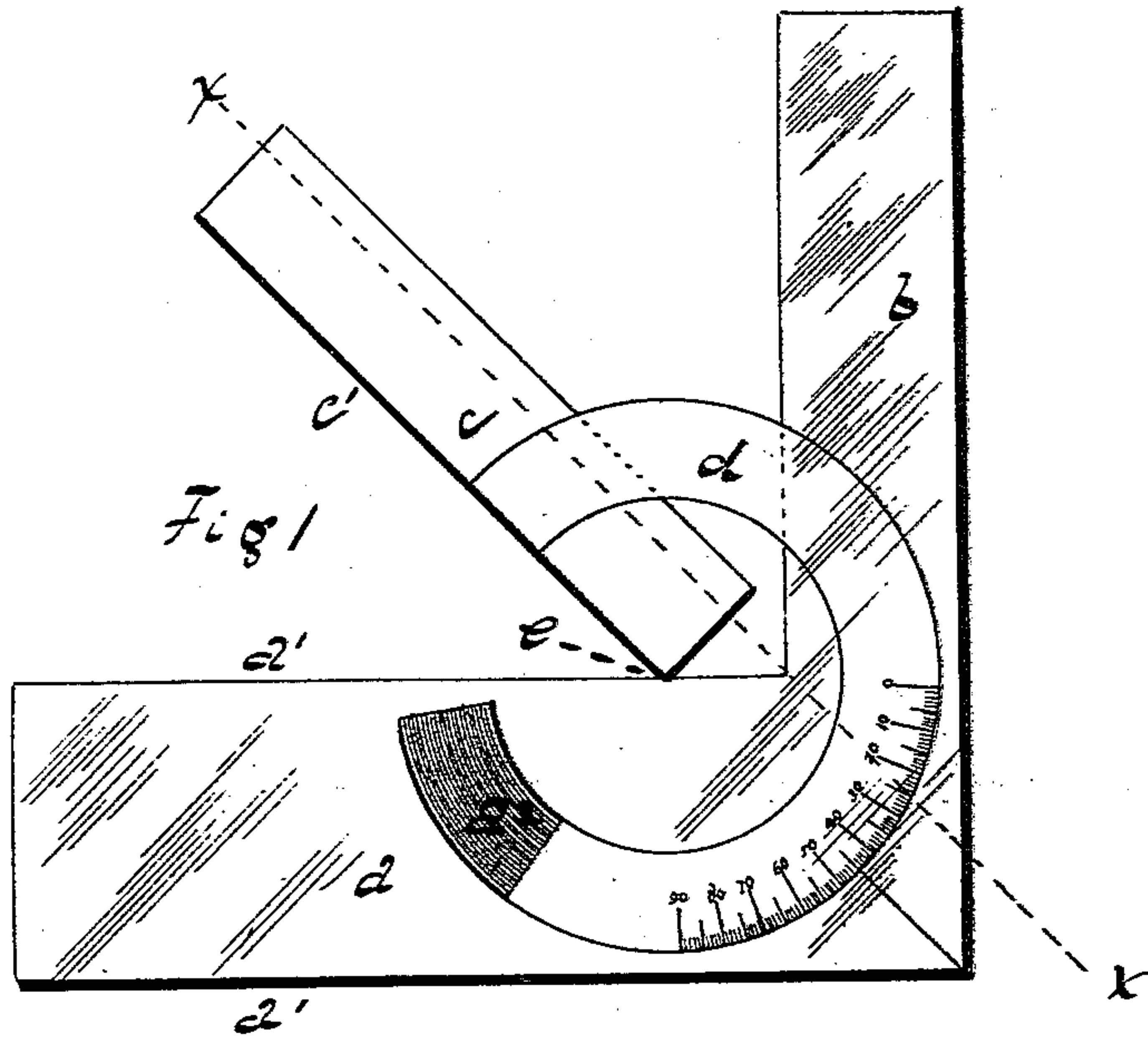


A. SWASEY.  
Protractors.

No. 165,519.

Patented July 13, 1875.



Witnesses

John Pollitt  
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Inventor

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# UNITED STATES PATENT OFFICE.

AMBROSE SWASEY, OF HARTFORD, CONNECTICUT.

## IMPROVEMENT IN PROTRACTORS.

Specification forming part of Letters Patent No. 165,519, dated July 13, 1875; application filed January 25, 1875.

*To all whom it may concern :*

Be it known that I, AMBROSE SWASEY, of Hartford, in the county of Hartford and State of Connecticut, have invented an Improved Angle-Determinator, of which the following is a specification, reference being had to the accompanying drawings, where—

Figure 1 is a flatwise view of the instrument, with the swinging rule closed down against the arm of the base-rule. Fig. 2 is a view similar to Fig. 1, with the swinging rule at an acute angle with the base-rule. Fig. 3 is a view of the instrument in section, on the plane denoted by the dotted line  $x x$ .

The article is an instrument for the use of draftsmen and machinists for laying out and measuring angles with great exactness; it is of metal.

The letter  $a$  denotes the base-rule, having two parallel edges,  $a^1 a^1$ , and of a uniform thickness throughout. This base-rule may or may not—but preferably may—have the right-angular arm  $b$ . The letter  $c$  denotes what I term the swinging rule, of the same thickness as the base-rule  $a$ , and of uniform thickness throughout, so that the two sides of the base-rule and of the swinging rule are always even or flush. The edge  $c'$  of the swinging rule is always a straight edge; the other or opposite edge is so by preference. The swinging rule is rigidly attached to the arc  $d$ , which travels in a part-circular groove,  $a^2$ , which is dovetail in cross-section, the arc being similarly dovetail in cross-section. This arc is graduated, and there are corresponding stop-marks on the piece  $a$ , by means of which the angle between the opposed edges of the base-rule and the swinging rule can be determined to a nicety. The point  $e$  is the center of the arc  $d$ , and always the apex of the angle.

By this construction I am enabled to have the sides of the base-rule and the swinging rule always flush or even, so that when the instrument is laid upon the paper with either face downward, the opposed edges of the base-rule and the swinging rule both touch the paper, thereby insuring exactness in the lines drawn thereby—an exactness which cannot be attained if either of these edges is raised from the paper.

In connection with the open angle formed between the opposed edges of the base-rule and the swinging rule, the even or flush sides of the two have another practical advantage in allowing a person to set the instrument squarely and firmly upon a solid body the angle of which it is desired to measure—a condition that would not obtain or exist if these opposed edges were not flush or even as to the sides of the two rules.

One peculiar and important advantage of this instrument over others is, that the user thereof can draw his lines straight, entire, and continuous to the apex of the angle, which would not be the case if a common pivot-joint were made use of, or if the graduated arc occupied other than its present position.

I claim as my invention—

The combination of the parallel straight-edged base-rule  $a$ , the arc  $d$  moving therein, and the swinging rule  $c$ , all constructed and arranged substantially as shown and described.

AMBROSE SWASEY.

Witnesses:

WM. E. SIMONDS,  
GEO. E. NOLAN.