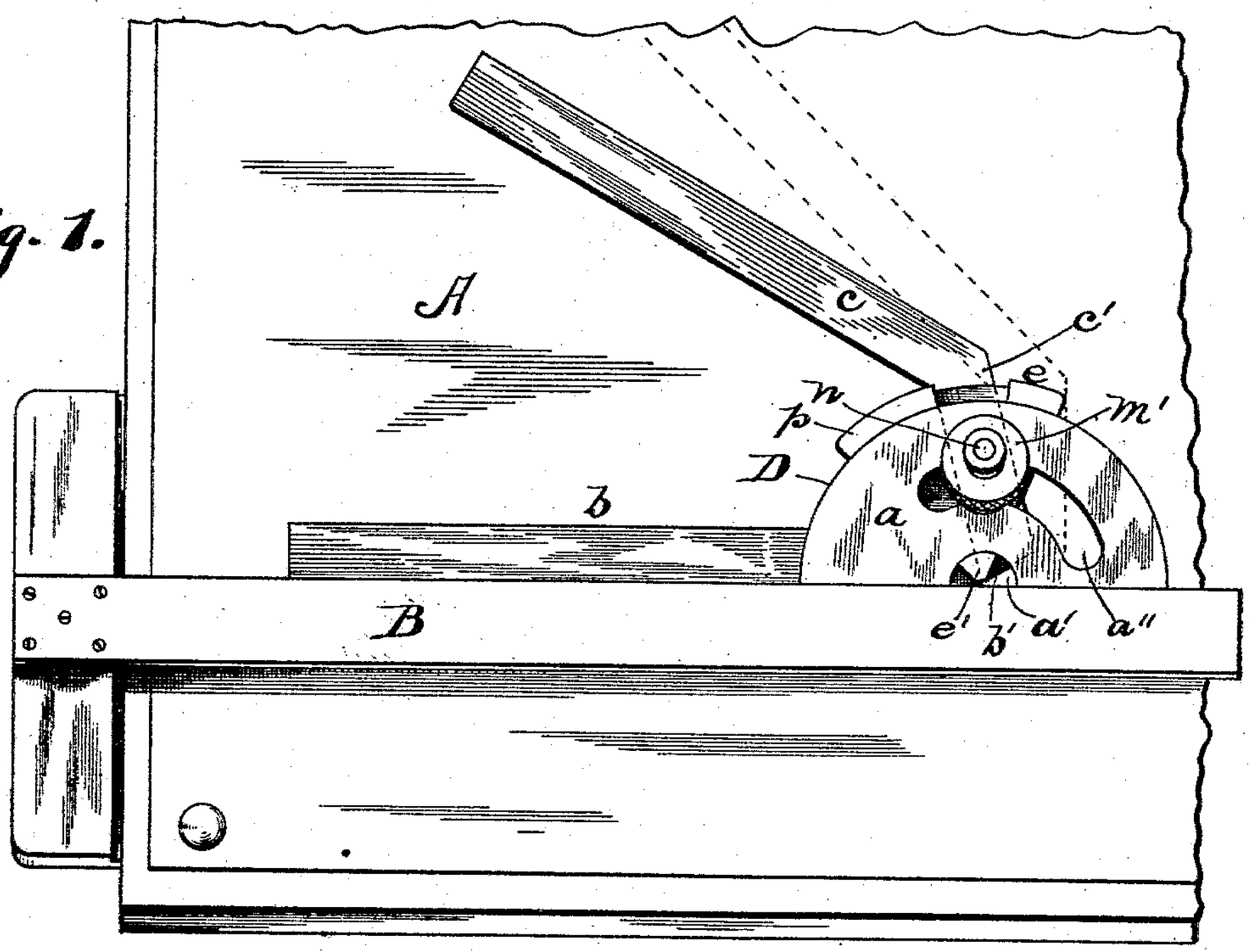
(No Model.) 2 Sheets—Sheet 1.

H. J. LEIGHTON.

PROTRACTOR BEVEL.

No. 490,121. Patented Jan. 17, 1893.

Fig. 1.



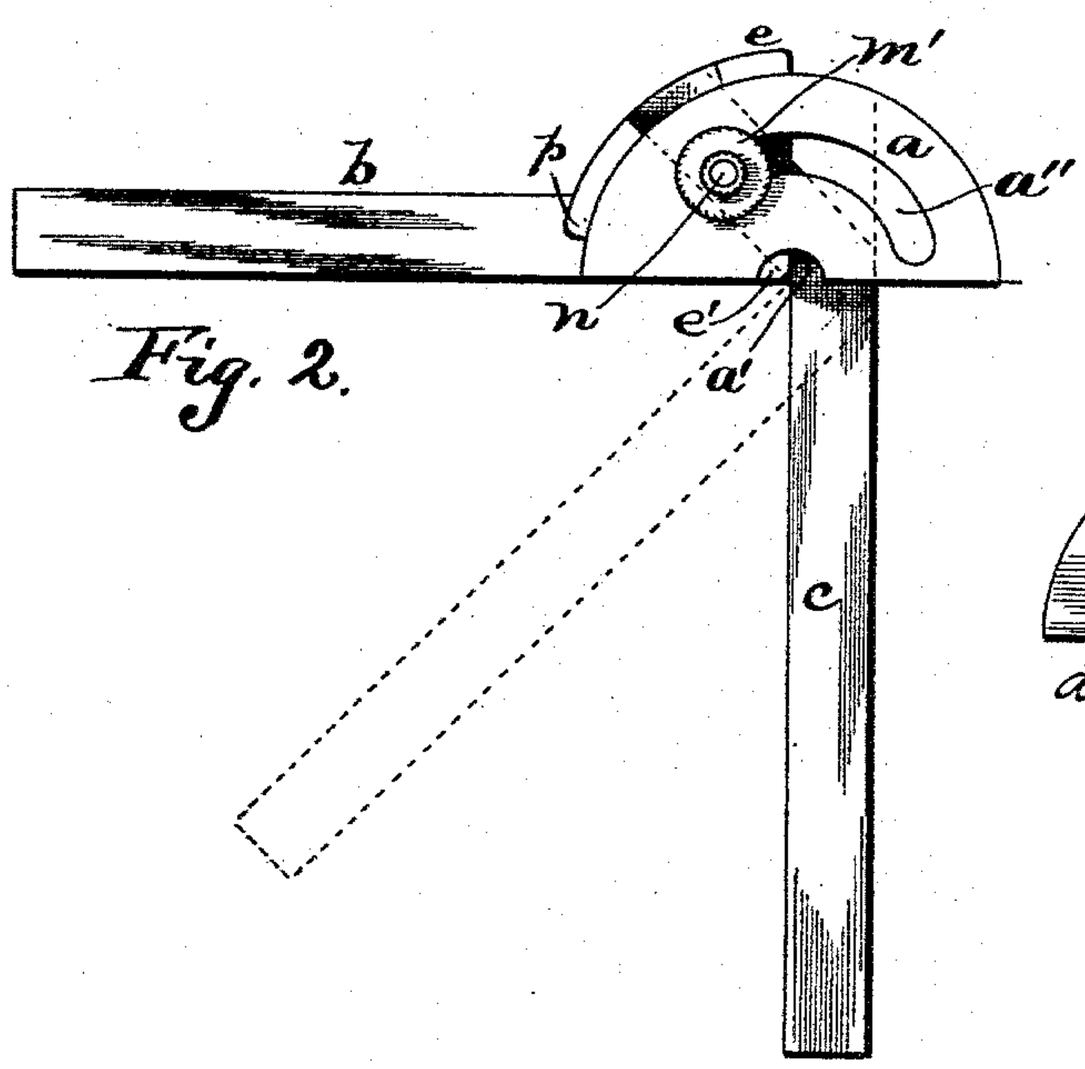


Fig. 2.

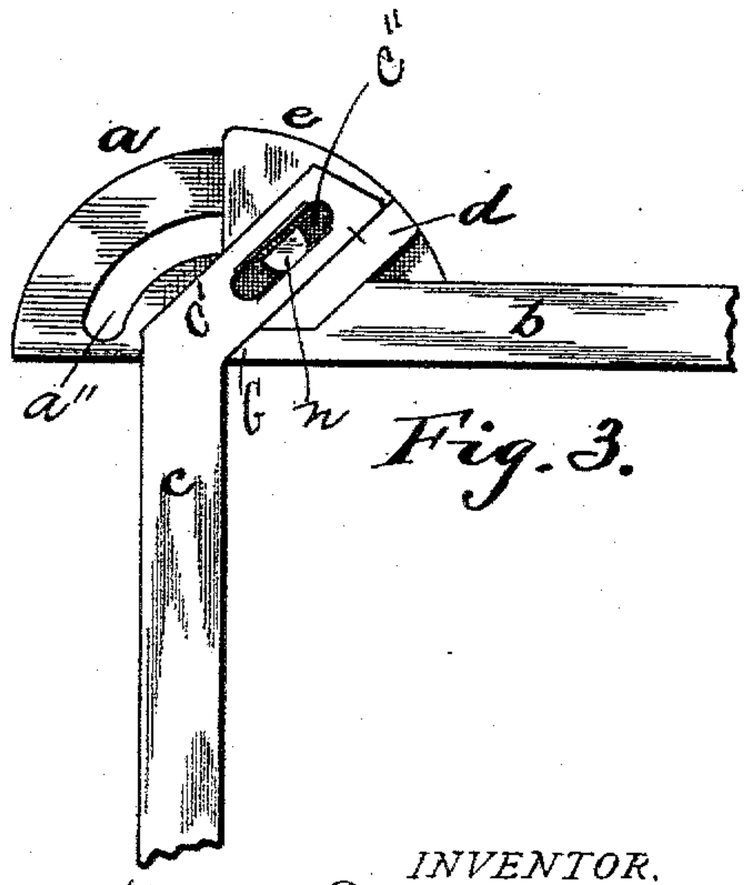


Fig. 3.

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INVENTOR.
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Smith & Bruce
ATTORNEYS

(No Model.) 2 Sheets—Sheet 2.

H. J. LEIGHTON.

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Fig. 10.

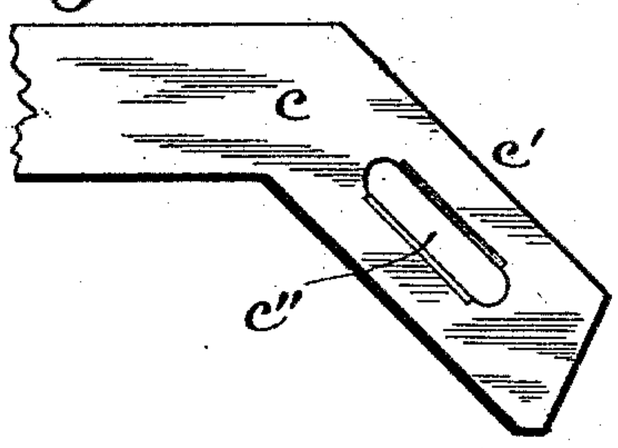


Fig. 4.

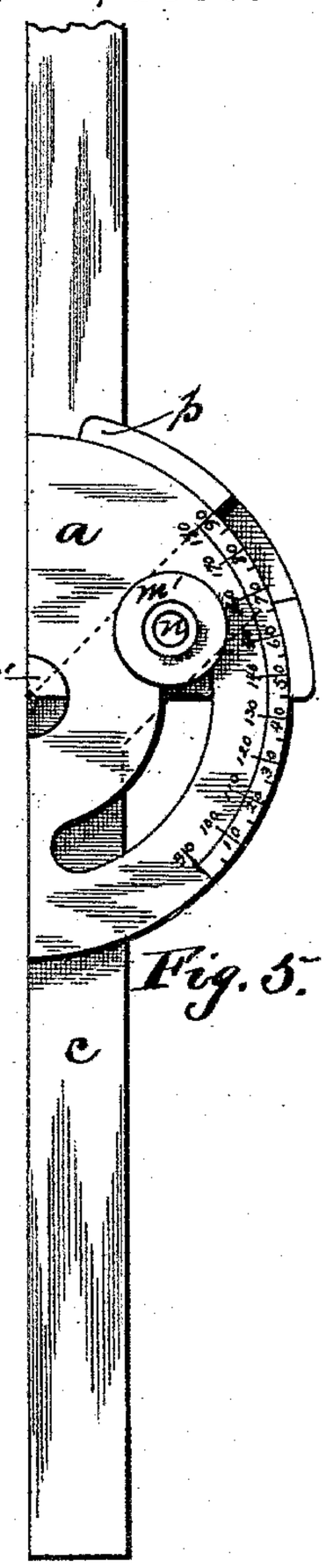


Fig. 5.

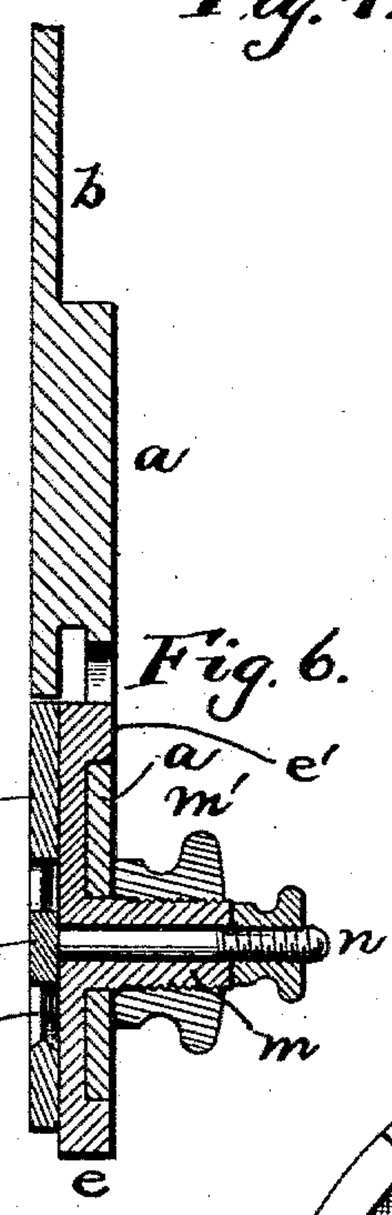


Fig. 6.

Fig. 7.

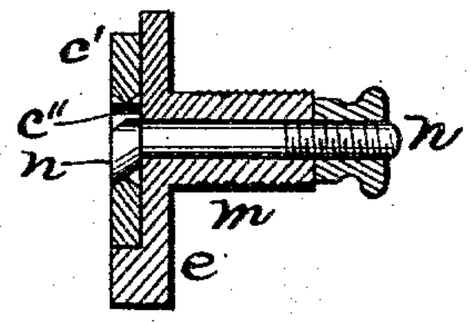


Fig. 8.

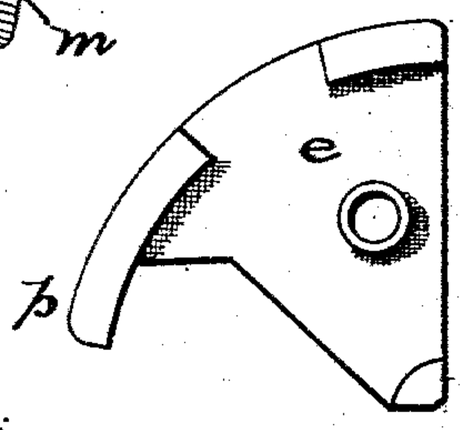
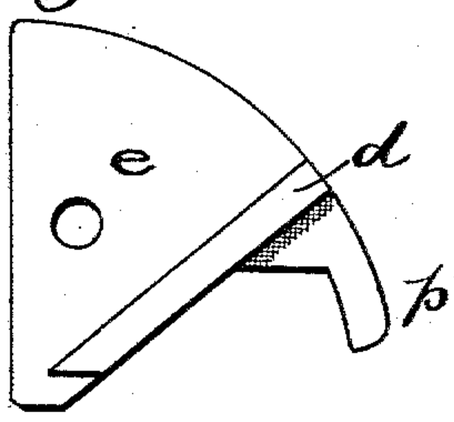


Fig. 9.



WITNESSES:

H. A. Earhart.

Geo. H. Blowers

INVENTOR,

Herbert J. Leighton

BY

Smith & Bruson

ATTORNEYS

UNITED STATES PATENT OFFICE.

HERBERT J. LEIGHTON, OF SYRACUSE, NEW YORK.

PROTRACTOR-BEVEL.

SPECIFICATION forming part of Letters Patent No. 490,121, dated January 17, 1893.

Application filed May 23, 1892. Serial No. 433,941. (No model.)

To all whom it may concern:

Be it known that I, HERBERT J. LEIGHTON, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Bevel-Protractors, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to instruments of precision, and particularly to that class thereof commonly known as bevel protractors.

The object is to produce a bevel protractor in which one blade or arm is stationary and the other movable upon a center, and in which both blades are in the same plane, and can be adjusted relative to each other, at a right angle, or at any angle of departure therefrom; and in which the blade (the removable one) can be changed so as to project from either side of the blade, and thus can be used in conjunction with a T-square upon a drafting board.

My invention consists in the several novel features of construction and operation hereinafter described and which are specifically set forth in the claims hereunto annexed. It is constructed as follows, reference being had to the accompanying drawings, in which

Figure 1, is a top plan showing my device applied to a T-square upon a drafting board. Fig. 2, is a top plan of my device with the movable blade set at a right angle. Fig. 3, is a plan of the reverse side, when the device is set at a right angle. Fig. 4, is another top plan with the blades set at a right angle. Fig. 5, is a top plan with the blades in a direct line. Fig. 6, is a section on line *x x*, Fig. 4. Fig. 7, is a sectional elevation of part of the sector, the stud therein and the blade clamping screw. Fig. 8, is a top plan of the sector detached. Fig. 9, is a bottom plan of the same. Fig. 10, is an enlarged detail of the angular shank of the movable blade.

A—, is a drafting board; and —B— is a T-square, while —D— is my bevel protector. It consists primarily of a head —*a*—, a blade —*b*— fixed thereto, and another blade —*c*—, removably connected thereto. The head —*a*— is of the semi-circular form, and is provided with a curved notch —*a'*— at the center of the arc of the circle of the outer edge of the head, and also having a slotway —*a''*— concentric with said arc, or the center of the circle thereof. This head is a plane piece of metal and the blade —*b*— consisting of a parallel sided plate of metal, is simply secured thereto, with one edge upon a line diametrical to the circle of the head, substantially as shown, and having its inner end beveled as shown in Fig. 3, creating a point —*b'*—, the apex of which is at the center of the notch —*a'*— and at the center of the circle of the head. This inner end is also cut away, (see Fig. 3) so that it will abut against the rib —*d*— secured upon the sector —*e*— concentric with and of the same radius as the head. This sector is also provided with a projection —*e'* upon its point or inner end, consisting of a piece of metal concentric with the circle of the head, secured upon it in such manner that its curved edge will fit the circle of the notch —*a'*— and be flush with the outer face of the head. The rib —*d*— is also flush with the blade —*b*—. A tubular stud —*m*— externally threaded is also secured upon the sector, fitting freely through the slot in the head, and —*m'*— is a lock nut upon said stud, by which the sector is secured at any point. The blade —*c*—, consisting of a plane strip of metal having one end offset to the body of the blade, as at —*c'*—, and provided with a slot —*c''*— in said offset, is detachably secured to said sector, by a bolt —*n*— inserted through it, and the stud thereon, the head of said bolt being adapted to engage with the edges of said slot, and a thumb-screw upon said bolt. This movable blade may be attached to the sector so that the body of the blade will stand outward upon either side of the blade —*a*—, but in whatever position placed, either the inner or the outer angle of the blade —*b*— will be at the center of the circle of the head —*a*— and whichever way the blade is swung, it will simply vary the angle of the intersection of the two blades, and such intersection can always be at the center of said circle. To steady said sector, I show it as provided upon its outer end with a rim or flange, which bears closely against the curved edge of the head.

In Fig. 5 I show the blades adjusted or set at one hundred and eighty degrees, and one scale on the head will indicate the variation of the angle of the blades, between that and ninety degrees, while the other scale will, in

like manner, enable me to set the blades at any point between naught and ninety degrees.

In Fig. 1, the two blades, when closed, will stand parallel to each other; In Figs. 2 and 3, when closed, they will touch each other; and in whatever position they are placed, both blades will lie and be in the same plane and can always, upon one edge be radial to the circle of the head, the center of which circle is always the center upon which they, or either of them, move. In its movements, the sector is further steadied by the point —*p*— which is adapted to slide over on top of the blade, as shown in Figs. 2 and 5.

The head of the securing bolt may be cut away on one side and beveled, as shown, or may be otherwise adapted to engage with and detachably secure the movable blade to the sector.

What I claim as my invention and desire to secure by Letters Patent, is

1. A bevel protractor, comprising a head, a blade secured thereto, a sector adjustably connected to said head, and a blade detachably secured to said sector, in combination as set forth.

2. A bevel protractor consisting of a semi-circular head, a blade secured thereto, a sector adjustably connected to said head and adapted to be swung thereon concentric therewith, and a blade detachably secured to said sector, in combination as set forth.

3. A bevel protractor consisting of a semi-circular head, a blade secured thereto upon a radial line, a sector concentric with and adjustably secured to said head, and a blade, offset at one end as shown, and detachably secured to said sector, both blades being in the same plane, as set forth.

4. The combination with the head and the blade secured thereto, of a sector concentric with said head and adjustable thereon, and a blade, offset as shown, and detachably secured upon said sector, and having one edge in a line radial to the circle of the head and sector.

5. In a protractor, the combination with a semi-circular head and a sector concentric therewith and adjustably connected thereto, of blades secured to said head and sector, respectively, each having an edge upon a line radial to the circle of said head.

6. In a protractor, the combination with a semi-circular head, and a sector concentric therewith and adjustably connected thereto, of a blade secured to the head, and beveled upon its inner end, and another blade, having an angular shank, and detachably secured to the sector, and having one of its angles in contact with the inner end of the other blade.

7. In a protractor, the combination with a semi-circular head, and a sector pivotally connected thereto, and concentric therewith and adjustably secured thereon, of blades secured to said head and sector and lying in the same plane.

8. The combination with a semi-circular head, having a concentric recess at the center of the circle, and a sector concentric with said head and having a lug at its apex concentric thereto and fitting in said recess, and blades secured to said head and sector and lying in the same plane.

9. The combination with a semi-circular head having a concentric recess at the center of the circle, and a concentric slotway in it, and a blade secured to it and having its inner end concentric to said recess, of a sector concentric with said head, and a blade detachably secured to said sector and having one edge upon a line radial to the circle of said head.

10. The combination with a semi-circular head having a concentric recess at the center of the circle and a blade secured to it having one edge on a line radial to said circle, of a sector detachably secured to said head and concentric therewith, and an angular blade detachably secured to said sector and having one edge upon a line radial to the circle of said head, both blades lying in the same plane.

In witness whereof I have hereunto set my hand this 5th day of May, 1892.

HERBERT J. LEIGHTON.

In presence of—

C. W. SMITH,

HOWARD P. DENISON.