

(No Model.)

L. B. WOODRUFF.
CALIPERS.

No. 252,410.

Patented Jan. 17, 1882.

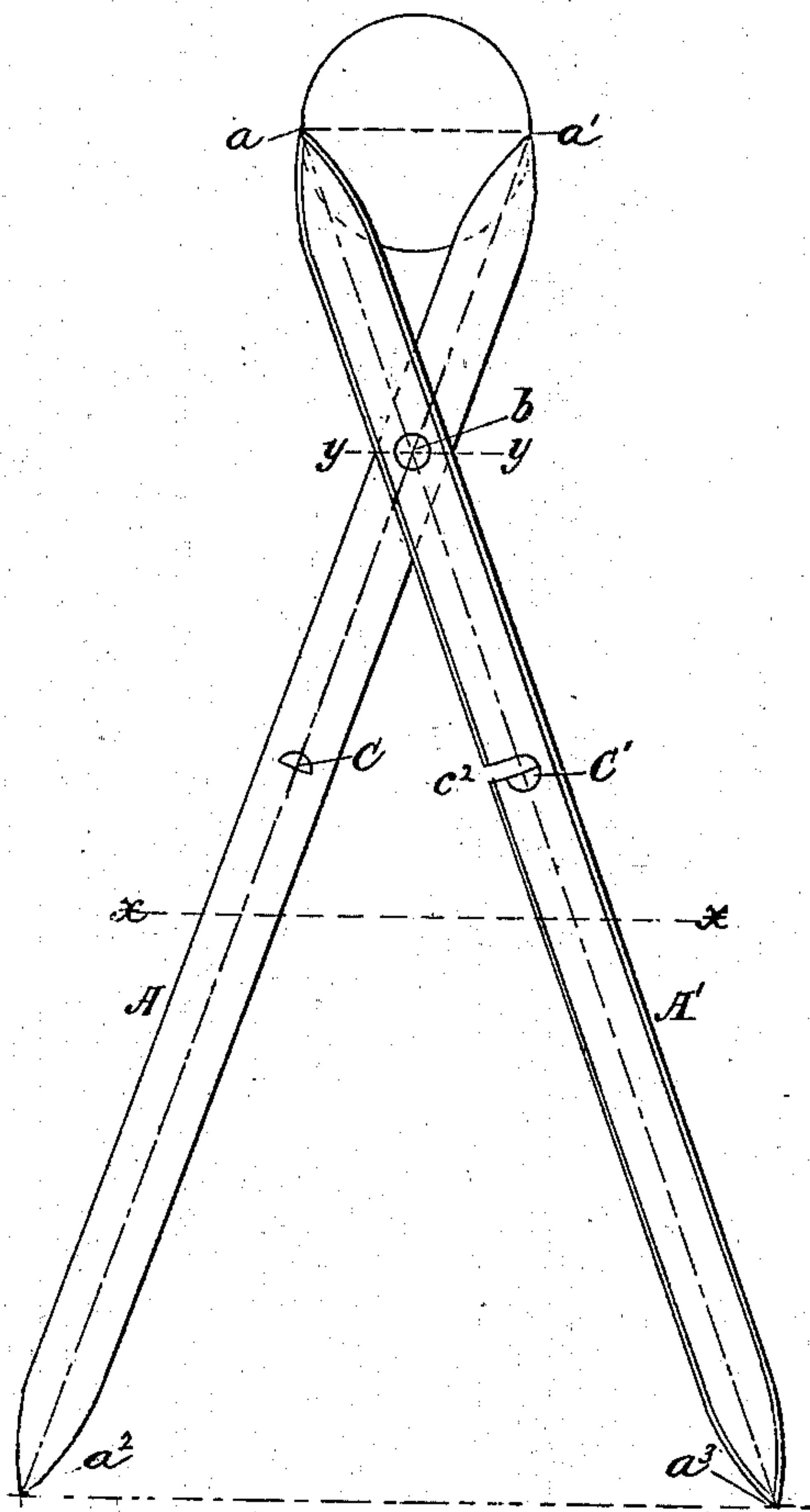


Fig 1

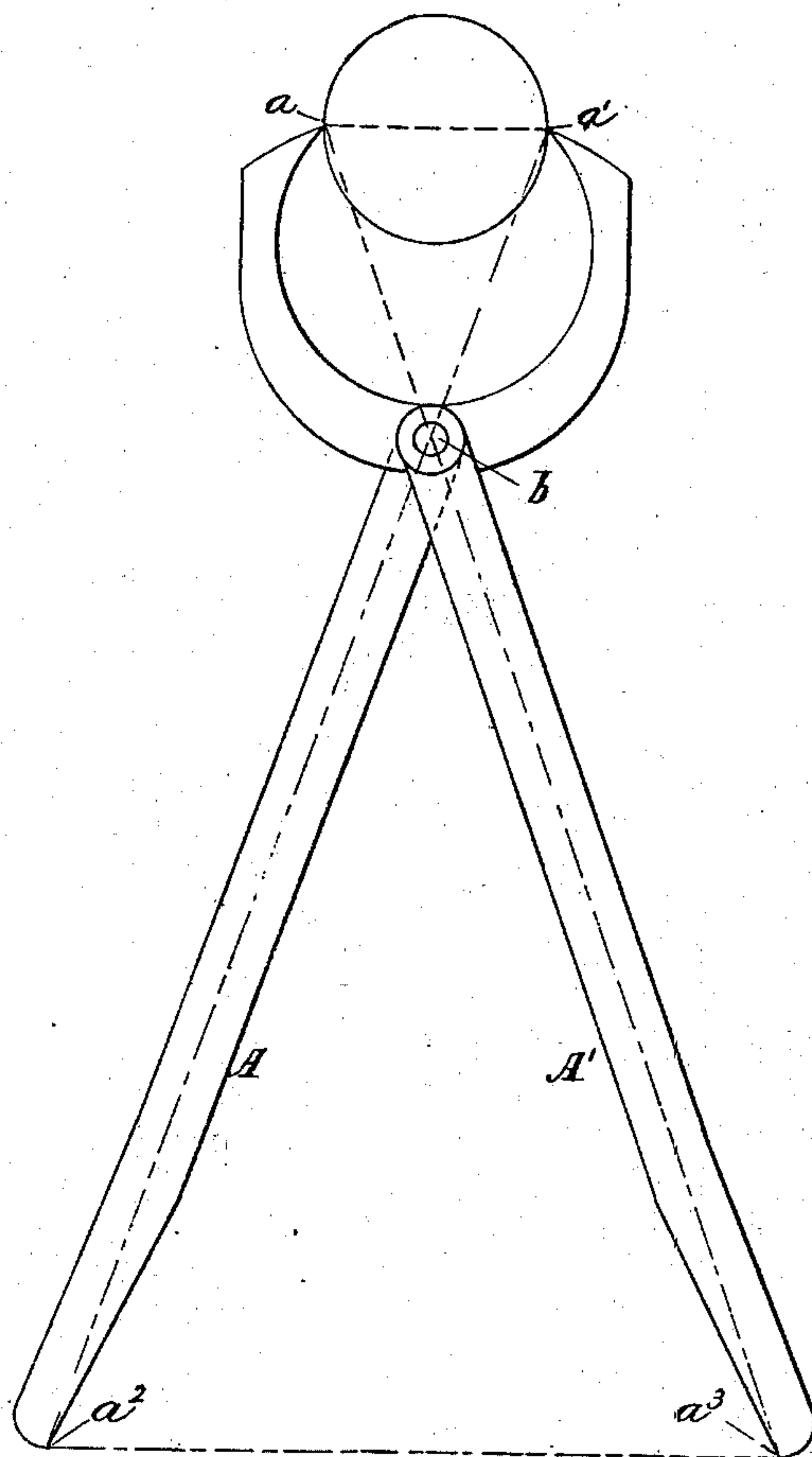


Fig 2

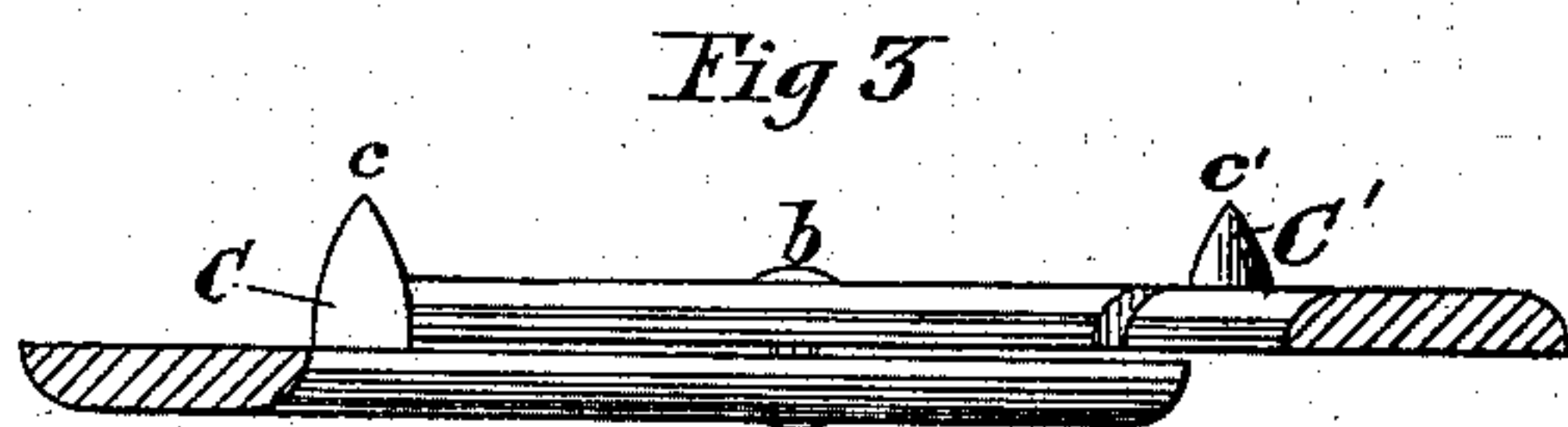


Fig 3

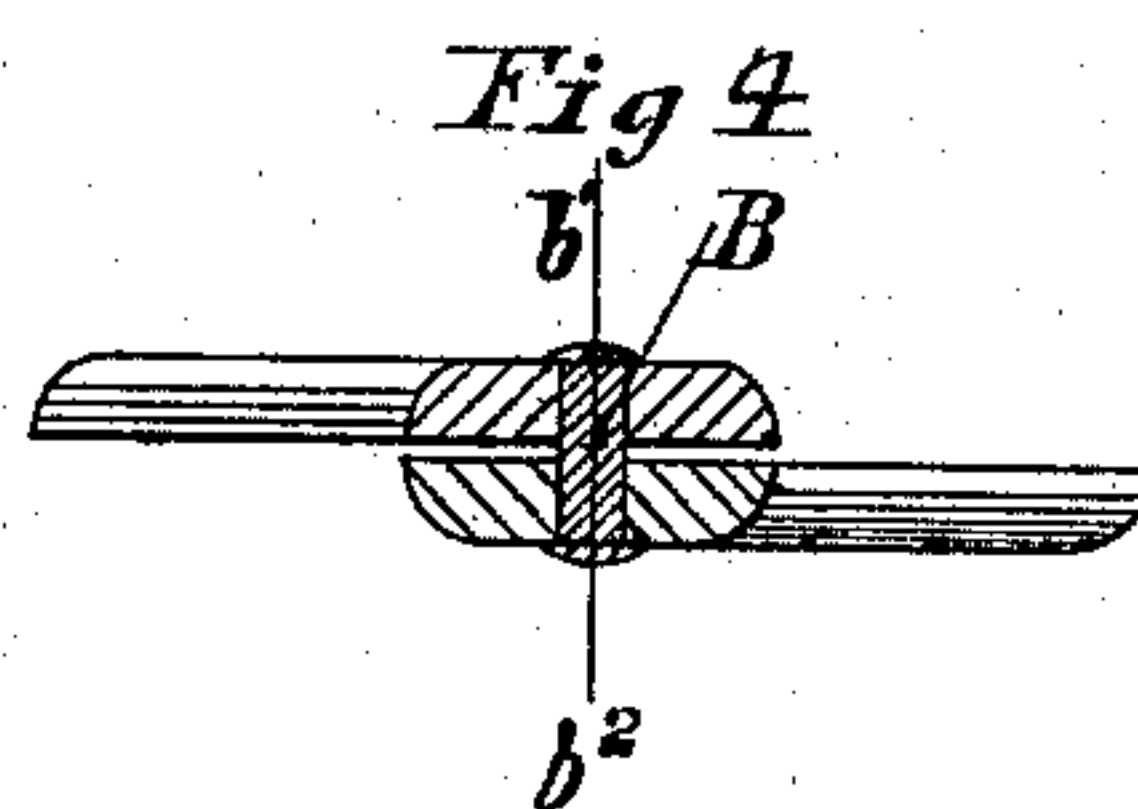


Fig 4

Witnesses

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LESLIE B. WOODRUFF, OF CHICAGO, ASSIGNOR TO HIMSELF, AND JAMES SHAW AND ALBERT J. HOPKINS, OF AURORA, ILLINOIS.

CALIPERS.

SPECIFICATION forming part of Letters Patent No. 252,410, dated January 17, 1882.

Application filed May 18, 1881. (No model.)

To all whom it may concern:

Be it known that I, LESLIE B. WOODRUFF, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Compasses, Calipers, &c., set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a plan view of my invention as applied to dividers; Fig. 2, a plan view of the same applied to calipers; Fig. 3, a cross-section taken on the line $x x$ in Fig. 1, and Fig. 4 a cross-section taken on the line $y y$ in Fig. 1.

My invention relates to an instrument for determining the diameter and circumference of a body simultaneously.

The invention consists in providing the instrument, which is one having its two parts freely adjustable on a fixed pivot, with two sets of legs or measuring-points, one of which sets being adjusted to indicate the diameter of any object, the other will at the same time be adjusted to indicate the circumference corresponding thereto, and vice versa.

In the following description the term "leg" will be used to indicate the whole piece of metal from the point a^2 to the point a' , or from the point a^3 to the point a , as the case may be.

In the drawings, $A A'$ represent a pair of dividers pointed at each end $a a' a^2 a^3$, said four points, $a a' a^2 a^3$, being as nearly as possible in the horizontal plane in which the adjacent surfaces of said legs $A A'$ lie, and having their legs fastened in a suitable manner with a pivot, b , the center line, $b' b^2$, of which passes vertically through the point B , which point B is in said horizontal plane and at the intersection of the vertical planes through the dotted lines terminating respectively in points $a^2 a'$ and $a^3 a$.

On each of the legs $A A'$, respectively, are placed the pointed knobs $C C'$, having respectively points $c c'$. The points $c c'$ are in the respective vertical planes of the respective dotted lines, which terminate respectively in the points $a^2 a'$ and $a^3 a$.

The upper leg, A' , is provided with a slot,

c^2 , of such shape and position that said leg A' in closing over the leg A will not be interfered with by the knob C , the two pointed knobs $C C'$ being at such distance from the vertical line $b' b^2$, through point B , and in such position in relation to their respective legs that when the dividers are thus closed said knobs will together have in plan view the appearance of a single knob, and their points will be practically equidistant from the said vertical line through point B .

The distance between the points $a a'$ always bears the same proportion to the distance between the points $a^2 a^3$ whatever may be the angular adjustment of the dividers. Diameters and circumferences increase and decrease in direct proportion to each other, and in my invention the points $a a'$ are equidistant from point B , and at any given adjustment of the legs $A A'$ in their relation to each other are at such a distance from each other that the ratio of this distance to the distance between points $a^2 a^3$ (which are also equidistant from point B) is equal to the ratio of a diameter to its circumference. Moreover, at any given angular adjustment of said legs $A A'$ the ratio of the distance between points $c c'$ (which are equidistant from said vertical line through point B and in a plane parallel to said horizontal plane) to the distance between the points $a^2 a^3$ equals the ratio of a diameter to its circumference. When the points $c c'$, respectively, are set on the ends of a diameter, the points $a^2 a^3$ are thereby set at a distance from each other equal to the length of the corresponding circumference, and, vice versa, when the points $a^2 a^3$, respectively, are set on the ends of a line representing the length of a circumference, the points $c c'$ will thereby be set at a distance from each other equal to the length of the corresponding diameter, the object of the points $c c'$ being the same as that of points $a a'$.

The foregoing description is equally applicable to calipers or other similar instruments.

Obviously parts of this apparatus may be changed in details of construction without departing from the main principle of construction by means of which the operation above described is secured, this principle being that

the instrument embodying my invention must be one on each leg of which are marked off distances from the point B, the ratio between which distances on a given leg is equal to the ratio between a diameter and its circumference, the points c c' being merely offsets from points which are perpendicularly below them and which come within the statement of principle just given. I do not wish to be understood, therefore, as limiting my invention to the apparatus in all its details as herein shown and described. For example, although the pointed knobs C C' and their accompanying slot have been shown only in one figure, of course these or their equivalents may be supplied, when desired, in other forms of instruments embodying my invention; and as to the pair of knobs C C' and the pair of points a a' , either one of the pairs may be omitted from any instrument provided it has the other pair or their equivalents. Again, the points with which measurements are taken or transferred need not necessarily be of the exact description shown and above described; but scale marks or other suitable devices may of course answer the same purpose.

A wing and set-screw for the purpose of securing the legs at any desired adjustment, or scales for indicating the distance apart of the points, may be used when desired.

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

1. Compasses, calipers, or other similar instruments freely adjustable on a fixed pivot, on each leg of which instrument are indicated, in any suitable manner, (including offsets,) distances from the point B, the ratio between which distances on a given leg is equal to the ratio between a diameter and its circumference, substantially as and for the purpose described.

2. Compasses, calipers, or other similar instruments freely adjustable on a fixed pivot, and provided with two sets of points, a a' and a^2 a^3 , arranged and operating substantially as and for the purposes set forth.

3. Compasses, calipers, or other similar instruments freely adjustable on a fixed pivot, and provided with two sets of points, c c' and a^2 a^3 , located on the same side of the pivot and arranged and operating substantially as and for the purposes set forth.

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Witnesses:

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