No. 658,011. Patented Sept. 18, 1900.

J. H. HOPPER.

COMBINED COMPASSES AND CALIPERS.

(Application filed Dec. 11, 1899.)

(No Model.)

Fig. 2.

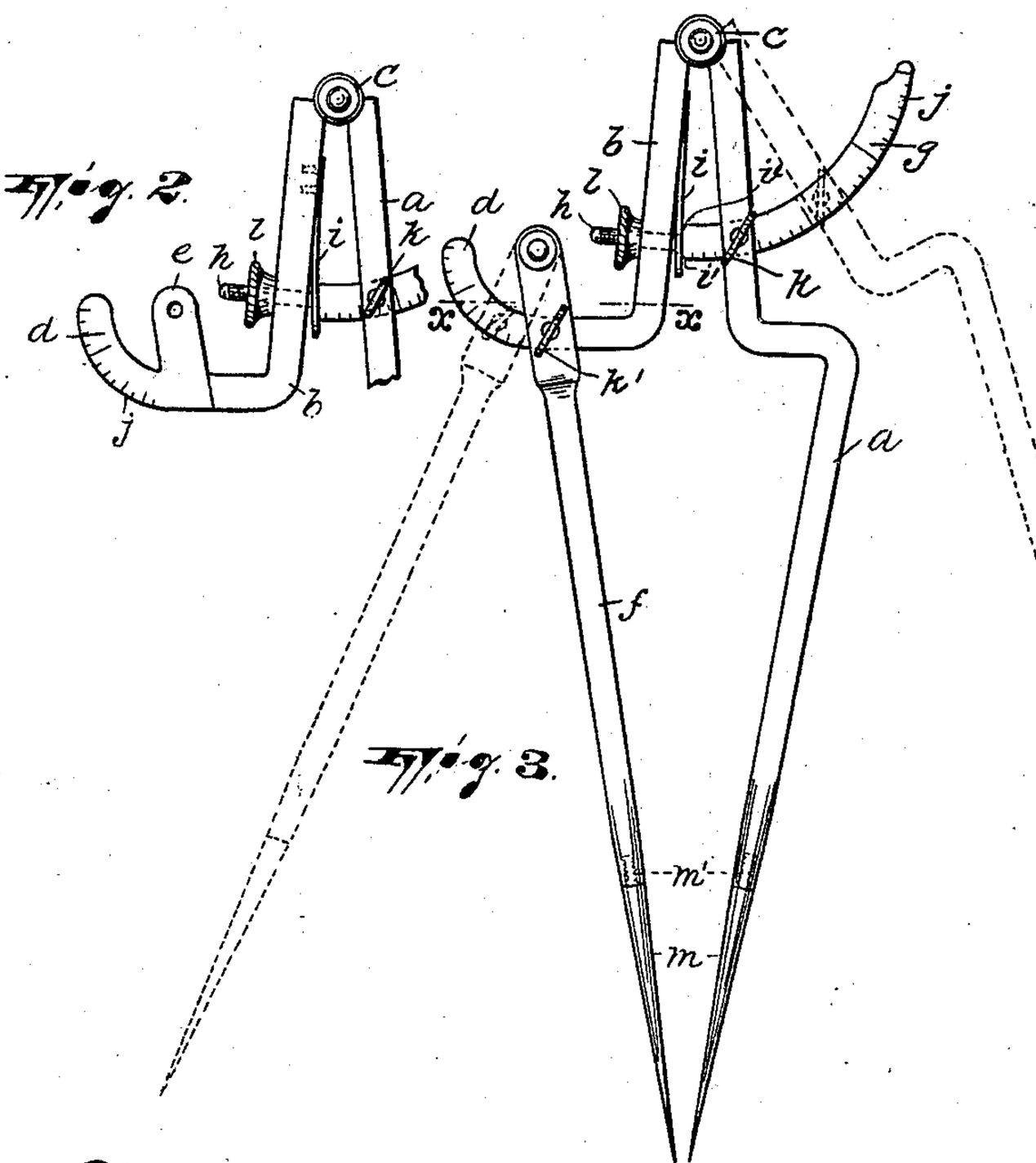


Fig. 3.

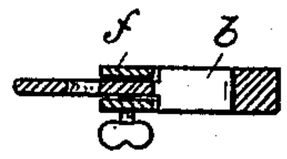


Fig. 5.

Fig. 4.

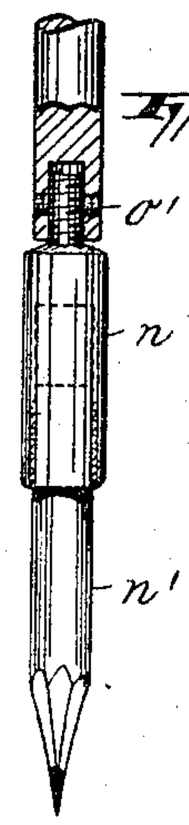
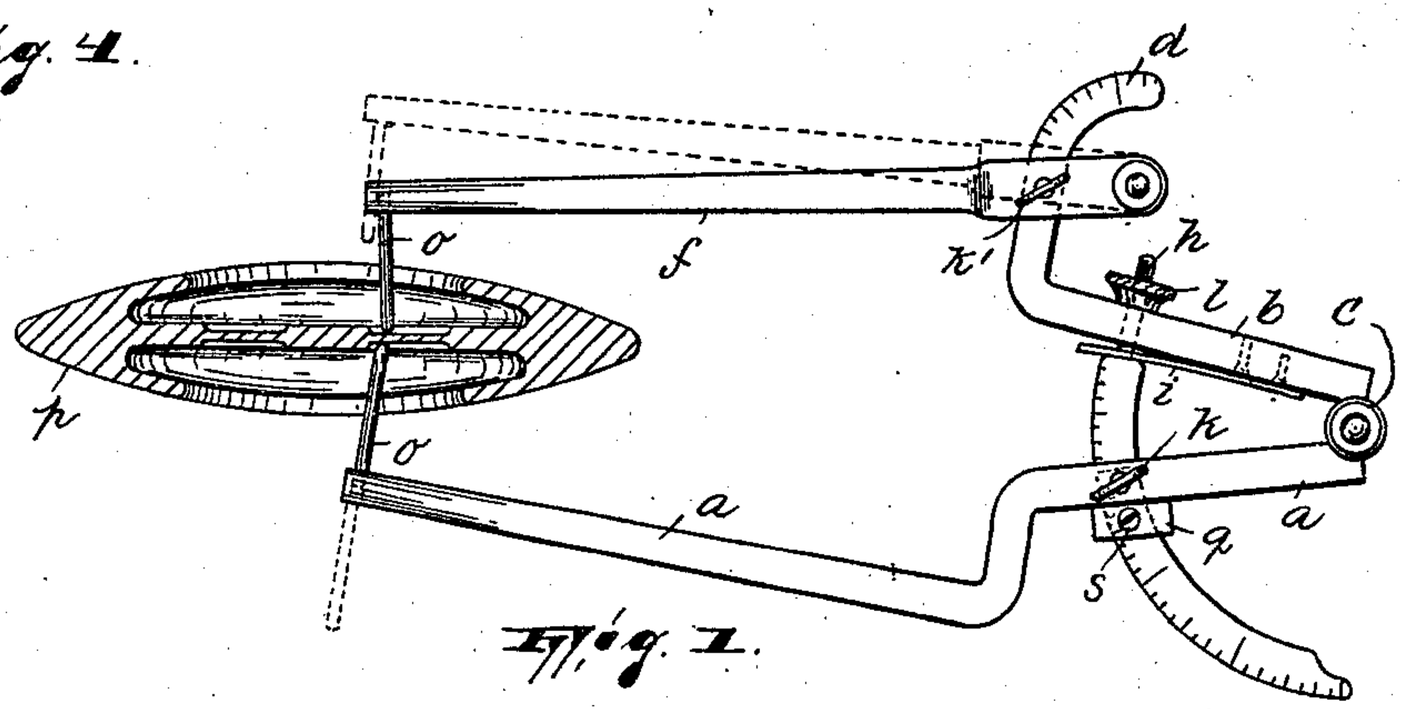


Fig. 1.



WITNESSES:

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UNITED STATES PATENT OFFICE.

JOHN H. HOPPER, OF PATERSON, NEW JERSEY, ASSIGNOR OF ONE-HALF TO W. LAKE BORELAND, OF SAME PLACE.

COMBINED COMPASSES AND CALIPERS.

SPECIFICATION forming part of Letters Patent No. 658,011, dated September 18, 1900.

Application filed December 11, 1899. Serial No. 739,885. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. HOPPER, a citizen of the United States, residing in Paterson, county of Passaic, and State of New Jersey, have invented certain new and useful Improvements in a Combined Compasses and Calipers; 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, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention consists in an improved instrument adapted as compasses, dividers or the like, and calipers; and the object of the invention is not only to provide an instrument of this nature that is susceptible of extended adjustment, but when used as calipers is further capable of being removed from the object measured and quickly and accurately reset to the position indicating the measurement, whether such measurement is to be taken between interior or exterior points.

I have fully illustrated my invention in the accompanying drawings, wherein—

Figure 1 is a view of my improved instrument when used as calipers, the instrument being shown as taking the measurement of the thickness of a wall in an object having opposing concavities which said wall separates. Fig. 2 is a view of the upper portion of the instrument, one leg thereof being shown as partially broken away and a portion of the other leg being removed. Fig. 3 is a view of the instrument used as dividers. Fig. 4 is a detail view showing the extremity of one of the legs of the dividers and a pencil-socket removably secured thereto, and Fig. 5 is a detail sectional view taken on the line $x\,x$ in Fig. 3.

In said drawings, $a\ b$ designate the legs of a pair of compasses, dividers or the like, or calipers, the same having the usual pivotal joint c at their upper ends. The leg a is shown in the drawings as being bent outwardly a short distance from its upper end; but this is not essential. The leg b is jointed. This leg is also bent outwardly at the point corresponding to the bend in the leg a, its extremity d being bent upwardly, extending in the arc of a circle. This extremity is reduced in thickness, being substantially a curved blade, and at the point where it joins the leg b it is provided with an upwardly-extending projection or arm e. To said arm is pivotally connected the member f of the leg b of the instrument, the point of pivotal connection being a common center for the arc-shaped extremity d and the arc of movement of the member f, the upper end of this member being bifurcated, as shown in Fig. 5, to receive the extremity.

The two legs a and b are connected above their respective bends by a curved adjusting-blade g. This blade penetrates the leg a, and one of its ends consists of a reduced threaded extension h, which penetrates the leg b and which also projects through a plate-spring i, that is secured upon the inner face of said leg a and acts against shoulders i'. It should be remarked that the outer edge of the blade g, as well as the corresponding edge of the curved extremity d, is provided with a graduated scale j.

The leg a and the lower member f of the leg b are each provided with a thumb-screw $k\ k'$, respectively, whose end bears against the corresponding face of the blade or of the extremity to firmly secure the leg a or the member f in any predetermined position. The threaded extension h carries a milled adjusting-nut l, whereby with the assistance of the plate-spring i it will be seen that after having adjusted the instrument approximately such adjustment may be reduced to most delicate accuracy.

The lower end of the leg a and the member f of the leg b may be constructed either with or without removable points or adapted to receive a pen or pencil, &c. In Fig. 3 removable needle-points m are shown as secured to the parts $a\ f$ by means of threaded extensions m', which are screwed into their ends. In Fig. 4 a socket n for a pencil n' or any other similar instrument is provided, the same being secured to the end of either of the parts $a\ f$ in the same manner as the needle-points m.

Where the instrument is used as calipers, pins o are screwed into threaded transversely-extending orifices o' in the extremities of the

parts *a f*. They may be secured in position, so as to extend either inwardly or outwardly, as shown in Fig. 1.

For measuring an object (such as the object *p*, shown in Fig. 1) in which the thickness of a wall that separates opposing concavities is required to be taken it is only necessary to first secure the member *f* in its extreme inward position—that is to say, in the position shown in Fig. 1—and then place the points of the pins *o* in contact with the opposite surfaces of the wall whose thickness is to be measured, whereupon the leg *a* can be firmly secured from movement by tightening the thumb-screw *k*. Thereupon the thumb-screw *k'* may be released, so that the member *f* can be swung away from the leg *a* to remove the instrument from the object being measured. Having removed the instrument, it is only necessary to swing the member *f* back to its initial position as far as it will go, and the thickness of the wall will be represented by the distance between the points of the pins *o*. Thus it will be seen that the adjustment of the instrument by means of the thumb-screw *k* is not disturbed, and all that is necessary is that before and after removing the instrument from the object measured the member *f* should be forced to its extreme inward position.

In order to adapt the calipers for the measurement of the distance between inside surfaces of a concave object, a stop *q* may be adjustably secured upon the blade *g* by means of a set-screw *s*. In using the instrument for such work therefore, the stop *q* having been secured at some suitable point upon the blade, the leg *a* is set and secured against it, the instrument applied to the object until the measurement has been taken by adjusting the member *f* relatively to its scale and securing it, and then releasing the leg *a*, so that it may be swung inwardly to remove the instrument, whereupon said leg may be again set against the stop to show between the points of the pins the measurement that has been taken.

It will be seen that the stop *q* and the end of the leg *a*, against which the member *f* impinges, form abutments which when a measurement is taken virtually constitute rigid portions of the leg *b*. The leg *b* in fact constitutes a third or intermediate member between the parts *a* and *f* therefore, upon which one of these parts may be adjusted relatively to the other.

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

An instrument adapted for use as calipers, compasses and the like, and consisting essentially of an intermediate member and two other members pivotally connected together, graduated blades comprised in the structure of the intermediate member, one end portion of said intermediate member constituting one of said blades and being reduced to form an abutment on said member, and a block adjustably arranged on the other blade, said abutment and the block providing stops against which either of said other members is adapted to abut while the latter are being relatively adjusted, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand this 5th day of December, 1899.

JOHN H. HOPPER.

Witnesses:
ALFRED GARTNER,
MARGARET BRITTON.