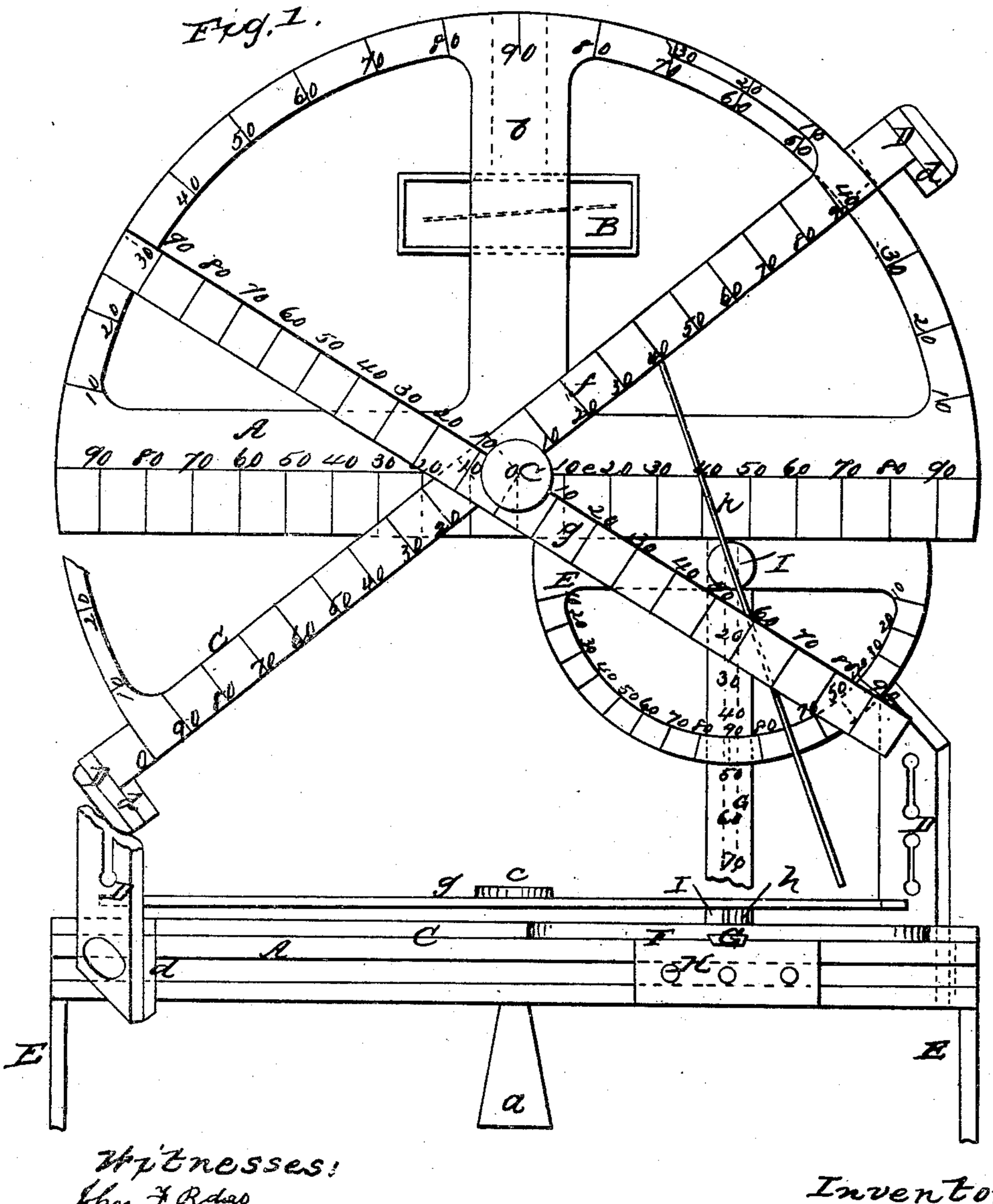
G. W. DICKINSON, Jr.

Surveyor's Compass.

No. 27,210. Patented Feb. 21, 1860.

Fig. 1.



Witnesses:
John F. Ridgo
Thos Ahlquist.

Inventor:
Geo. W. Dickinson Jr.

UNITED STATES PATENT OFFICE.

GEO. W. DICKINSON, JR., OF BRECKENRIDGE, VIRGINIA.

IMPROVED SURVEYING-COMPASSES.

Specification forming part of Letters Patent No. **27,210**, dated February 21, 1860.

To all whom it may concern:

Be it known that I, GEORGE W. DICKINSON, Jr., of Breckenridge, in the county of Henry and State of Virginia, have invented a new and Improved Surveyor's Compasses; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 represents a plan or top view of my invention. Fig. 2 is a side elevation of the same.

Similar letters of reference in both views indicate corresponding parts.

The object of this invention is to arrange a surveyor's compasses in such a manner that the same, by means of a series of adjustable scales, serves to solve all triangles, and consequently all rectilinear figures, which may occur in the various operations of a surveyor, and to facilitate the drawing of the same.

This object is obtained by arranging on the base of the main semicircle an additional semicircle, the base-line of which coincides with or is parallel to the base-line of the frame on which the main semicircle turns, and which has a double sliding motion, one in the direction of the base-line and the other at right angles to it. A scale that slides in and turns with a pivot in the center of the additional semicircle, together with a scale turning on the center of the main semicircle and scales marked on the base-line of the frame as well as that of the main semicircle, serves to solve the various triangles which may occur, as will be hereinafter more fully explained.

To enable those skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A represents a semicircular frame, arranged with sockets *a b* to fit on a pivot supported by a common three-legged standard, such as are generally used for surveyors' instruments. The socket *a* is used when it is desired to use the compasses in a horizontal position, and the socket *b* is used when it is desired to take altitudes. A needle, B, and a spirit-level serve to bring the compasses into the required position.

The frame A supports a semicircle, C, the center of which coincides with the center of the frame A, and which turns on a pivot, *c*, in this center. The base of this semicircle is prolonged beyond the frame A, so that a line drawn through them coincides exactly with the base-line of the frame. By means of these sights, therefore, and by the aid of the needle B, the base-line can be brought in any desirable direction, and the angle which another line makes with this base-line is determined by turning the semicircle C until a line drawn through the sights D coincides or is parallel with said line, and in order to be able to ascertain the number of degrees of such angles the semicircular side of the frame A is divided into one hundred and eighty degrees, in the usual manner.

The base-line of the frame A and also that one of the semicircle C are both marked with like indications, commencing in the center, so as to form scales *e* and *f*, each mark on which indicates a foot, or a yard, or a pole, or any known distance; and on the top of the semicircle, and turning in its center, is the additional scale *g*, furnished with marks equal to the marks on the scales *e* and *f*.

F is the additional semicircle, that slides on a bar, G, at right angles to the base-line of the frame A. The bar G is secured to a slide, H, which moves in a groove in the side of the frame A and parallel to its base-line. The center of the additional semicircle F is provided with a swivel-head, I, which turns in the center of said semicircle, and which serves as a socket for the sliding scale *h*. The marks on this scale are equal to the marks on the scales *e*, *f*, and *g*, and the semicircle F is divided into one hundred and eighty degrees, so that the angle of the scale *h* with the base-line of the frame can always be ascertained. The bar G, which I denominate the "protractor," is also furnished with a scale equal to the scales *e*, *f*, *g*, and *h*, so that the distance of the additional semicircle F from the base-line of the frame A or the distance at which the scale *g* intersects with the protractor G can be ascertained at a glance.

The operation is as follows: A triangle can be determined if the following parts are known, first, the three sides; second, two sides and the inclosed angle; third, two sides and the angle opposite to the largest of the two known sides; fourth, one side and two angles. In order to determine a triangle by the aid of my compasses, if the three sides are known, one being forty, the other forty, and the third twenty-five poles, place the compass before you, shift the

additional semicircle F and the scale *h* until it intersects the scale *e* at 40, and push the scale *h* out until the mark 25 on the same coincides with the mark 40 on the scale *e*, and turn the semicircle C and the scale *h*, always, however, keeping the mark 25 on the mark 40 of the scale *e*, until the mark 40 on the scale *f* coincides with the scale *h*, and the triangle is ready. The angle between the scales *e* and *f* is determined by the division on the additional semicircle F, giving the number of degrees of the third angle by subtracting the sum of the two former angles from one hundred and eighty degrees, so that all the pieces of the triangle are known. The height of the triangle is found by shifting the semicircle F and by turning the scale *h*, always keeping its end on the mark 40 of the scale *f* until it stands at right angles with the scale *e*, and the point at which the scale *h* intersects with the scale *e* gives the height. By multiplying the height with one-half of the base-line the area of the triangle is found. If two sides of the triangle are given, together with the inclosed angle—one side to be sixty poles, the other fifty poles, and the angle to be thirty degrees—and it is desired to find the other parts, turn the semicircle C until the scale *f* incloses an angle of thirty degrees with the scale *e*, and the slide *h* is now shifted until it intersects with the scale *e* at the mark 60 and with the scale *f* at the mark 50. The length of the third side is now given by the scale *h*, and the angle inclosed by the scales *e* and *h* is found by the intersection of the scale *h* with the division on the additional semicircle F. From these two examples it will be understood how, by the aid of my compasses, every triangle may be determined if a sufficient quantity of its parts are known. In many cases it will be found more convenient to use the scales *f*, *g*, and *h* instead of the scales *e*, *f*, and *h*, and in many cases it becomes necessary to draw out the additional semicircle F on the protractor G in order to be able to adjust the scale *h* to the proper position.

The solution of right-angular triangles is also greatly simplified by the aid of my compasses, and it is therefore particularly adapted to determine the altitude of hills, edifices, poles, &c. The operation of my compasses in solving right-angular triangles, however, is essentially the same as above described, and no further explanation will be needed.

What I claim as new, and desire to secure by Letters Patent, is—

The arrangement of the scales *e*, *f*, *g*, and *h*, in combination with the main semicircle C, and with the additional semicircle F and protractor G, constructed and operating substantially as and for the purpose specified.

GEO. W. DICKINSON, JR.

Witnesses:

THOS. E. DENIGAN,

JOHN F. PEDIGO.