(No Model.)

# J. M. BOWYER.

## DISTANCE INSTRUMENT.

No. 364,630. Patented June 14, 1887.

Fig. 2

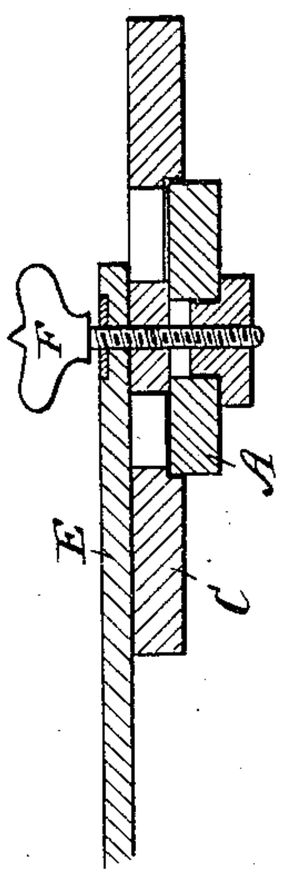


Fig. 1




Fig. 3




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# UNITED STATES PATENT OFFICE.

JOHN M. BOWYER, OF ERIE, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO OSWIN W. LOWRY, OF DETROIT, MICHIGAN.

## DISTANCE-INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 364,630, dated June 14, 1887.

Application filed August 20, 1886. Serial No. 211,401. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN M. BOWYER, U.S.N., of Erie, in the county of Erie and State of Pennsylvania, have invented new and useful Improvements in Distance-Instruments; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to new and useful improvements in distance-instruments of that class wherein the distance of an object is determined by the angles formed by it with a base-line at two different stations; and the principal object of my invention is to devise an instrument of this kind especially adapted for use on board ship to determine its distance while sailing from any stationary object on shore, such as light-houses, thereby enabling the mariner to easily locate the position of his ship on the chart by the use of this distance and the angle of observation.

My invention consists in the peculiar construction of the instrument, all as hereinafter described, and set forth in the claims.

In the drawings which accompany this specification, Figure 1 is a perspective view of my distance-instrument. Fig. 2 is a cross-section on the line *x x* in Fig. 1. Fig. 3 is a diagram showing its application.

A is a slotted base-plate carrying two disks, B C, the former being stationary and the other slidingly secured thereon, the slot in the base-plate engaging with a tenon on the movable disk for the purpose of guiding said disk on the base-plate.

D and E are two legs pivotally secured at one end in the center of the disks B C, respectively, by means of the tightening-screws F. The legs D E and the base A are graduated alike and numbered to facilitate the reading. On the base-plate the numbers run from the stationary disk toward the movable disk, zero corresponding with the center of the stationary disk, and to permit reading from either side the base-plate has two series of graduations with the numbers marked the reverse in relation to each other. The numbering of the graduations on each leg begins at the pivotal point and runs toward the point. The graduation is preferably in inches and usual subdivisions, which, in the operation of the instrument, are intended to represent miles and fractions thereof.

The disks B C are graduated to indicate degrees or "points," and the movable disk is provided with two openings, G, by means of which the distance of the center of the movable disk from the center of the stationary disk may be accurately read on either graduation of the base-plate.

Suitable sights, H H, may be placed near the free ends of the legs, and also at their pivotal points, if desired, as it is necessary in the operation of the instrument to adjust the inner or graduated edge of the legs in line with the object the distance of which it is desired to find. To permit the disk C to approach the disk B as near as possible, the disks are made to overlap each other.

In practice the instrument is placed on the ship on top of a rail or other suitable elevation, where it can be secured in the longitudinal direction of the ship and command a free view for sighting objects. Now, supposing the ship, while sailing on its prescribed course, has sighted a light-house, L, from which its distance is desired to be found, the operator takes his first observation by sighting the leg on the stationary disk in line with the object, and then clamps it firmly in position by means of the pivotal screw F. An interval of time is now permitted to intervene before proceeding with the operation, the ship being kept meanwhile on a straight course, which is carefully noted, together with the distance in miles the ship is making since the time of the first observation. Suppose an hour has elapsed, in which the ship has sailed, as indicated by a log, the distance *o*, equal to fourteen miles, the operator then adjusts the movable disk C on the base-plate A to the graduation-mark 14, and then, after sighting the leg on the movable disk in line with the light-house, tightens the screw F on the pivotal point of the leg. Now the operation is completed, and the distances M N from the light-house to the first and to the second point of observation are directly indicated in miles by the scales on the respective legs at the point of intersection P.

If the course of the ship during the observation has been noted and the angles of obser-

vation are read off on the disks, all the factors necessary to lay down the course of the ship on a chart are known. If the latter object is the principal aim sought, the graphical execution on the chart is greatly facilitated by the use of a similar instrument to the one described, on which the scales correspond with the scale on which the map is drawn, the manner of using such second instrument being self-evident.

My improved instrument is based on the well-known relation of proportional triangles, and it will easily be seen that by the use of my instrument on board ship, which permits the convenient use of a long base-line, more accurate results may be obtained than by the usual means at present employed, while at the same time its operation is so simple that its use does not require any special training, but can be put in the hands of any sailor.

My instrument may be also used on land to advantage whenever the use of a long base-line is at all convenient or made necessary by other circumstances.

I preferably cover all or portions of the legs with luminous paint to permit sighting an object in the dark; but such paint may be used on all or other portions of the instrument, if desired.

What I claim as my invention is—

1. In a distance-instrument, the combination of a graduated base, A, longitudinally slotted and graduated upon each side of said slot, graduated legs D E, pivotally secured thereto—one with a sliding pivot—and the clamp-screws F, substantially as described.

2. In a distance-instrument, the combination of the slotted base A, graduated upon both sides of said slot, the graduated stationary disk B, the graduated sliding disk C, having a tenon engaging into the slot of the base A, the graduated legs D E, pivotally secured to the center of the disks B C, respectively, and the clamp-screws F, all substantially as described.

3. The combination, with the base A, having central longitudinal slot and graduated upon each side of said slot, of the graduated disk C, movable upon said base and provided with two openings, G, substantially as described, and for the purpose specified.

JOHN M. BOWYER.

Witnesses:
HAL M. HODGES,
H. S. SPRAGUE.