

No. 647,387.

Patented Apr. 10, 1900.

J. E. EVANS.

PROTRACTOR.

(Application filed Aug. 22, 1899.)

(No Model.)

Fig. 1

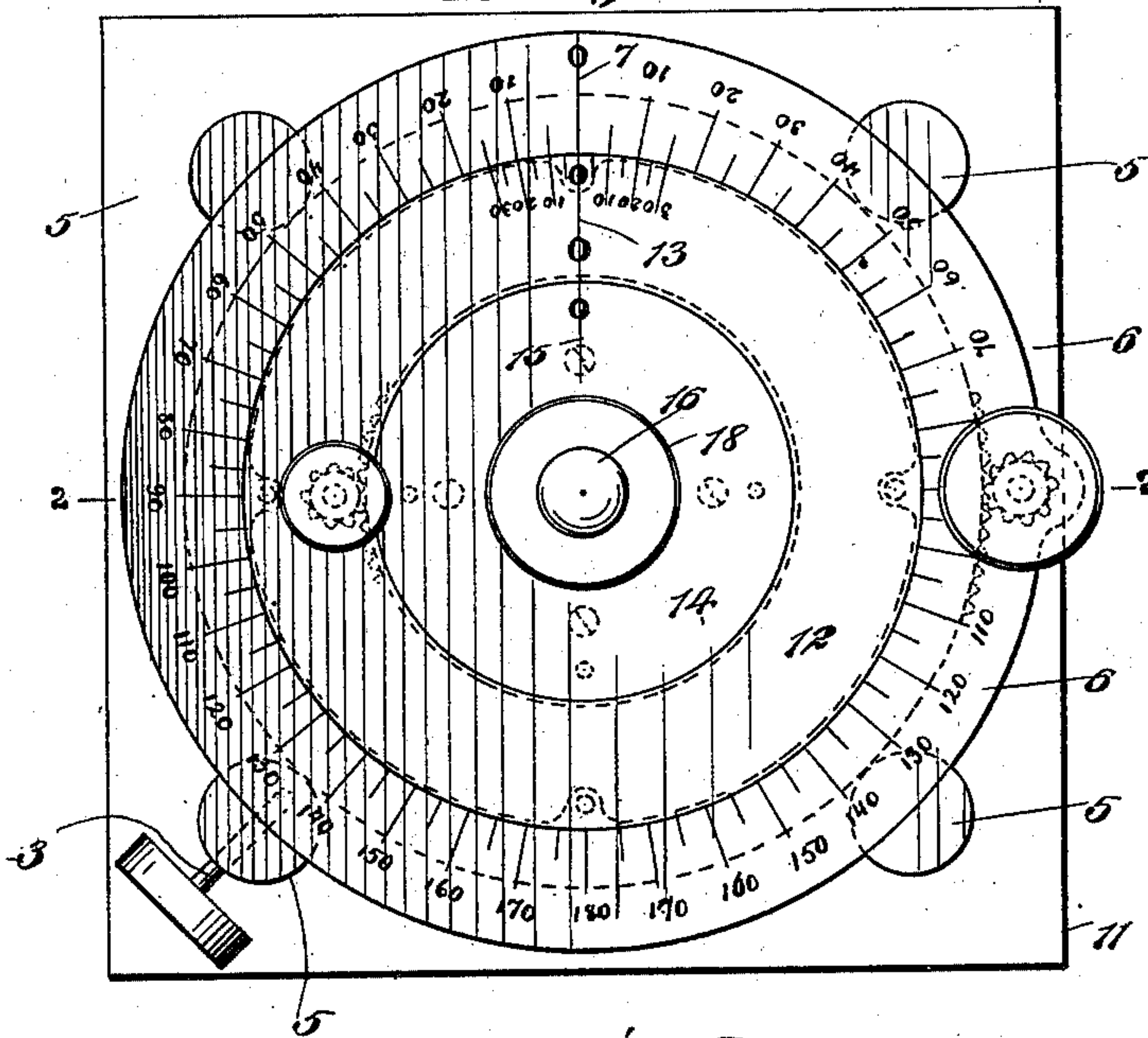
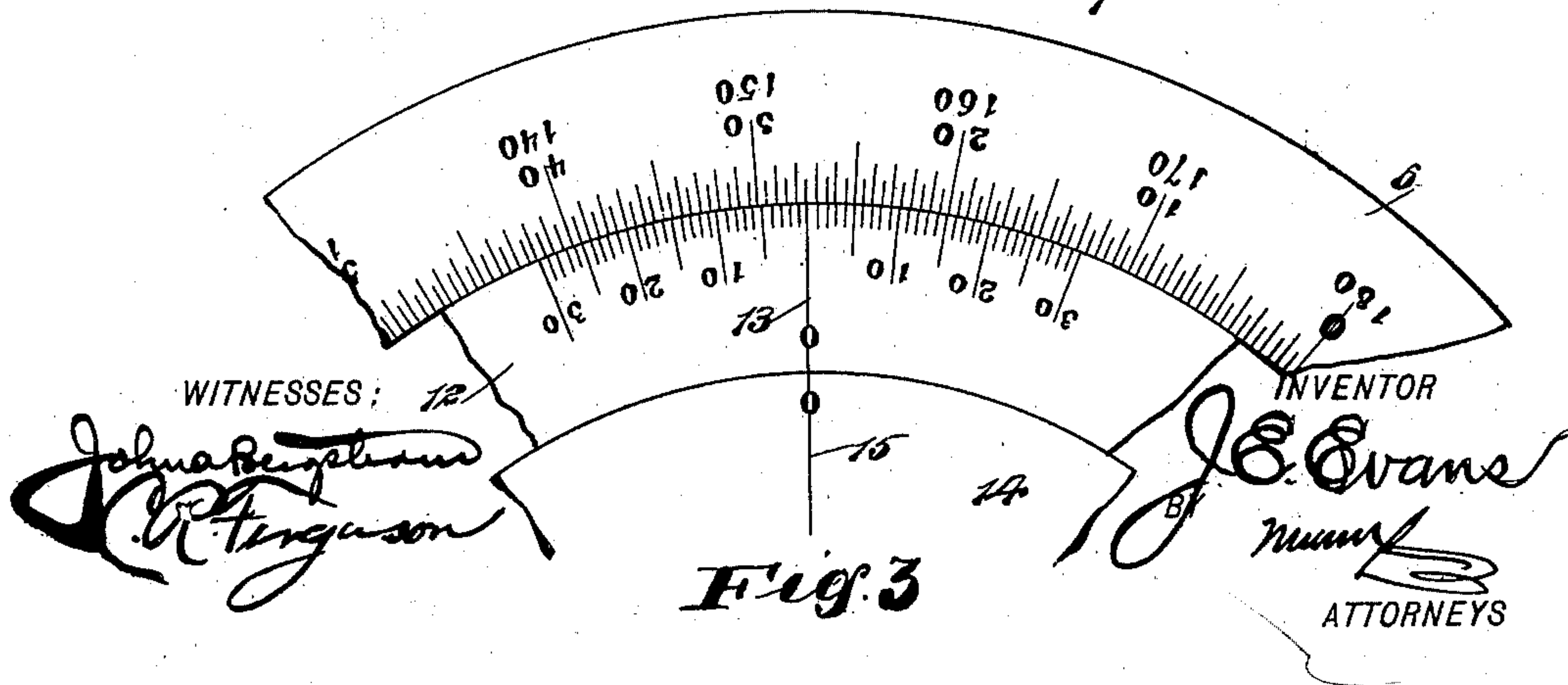
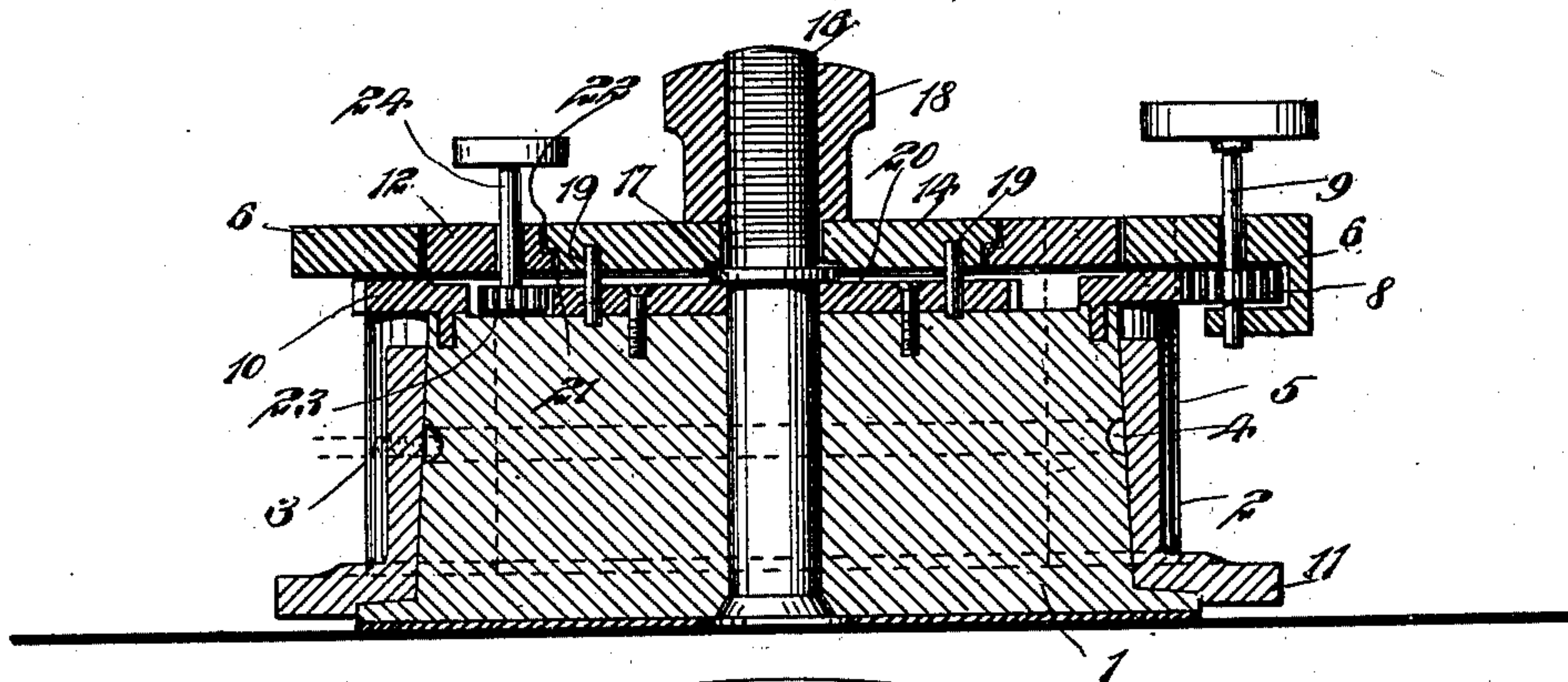


Fig. 2





# UNITED STATES PATENT OFFICE.

JOHN EVAN EVANS, OF WILKES-BARRÉ, PENNSYLVANIA.

## PROTRACTOR.

SPECIFICATION forming part of Letters Patent No. 647,387, dated April 10, 1900.

Application filed August 22, 1899. Serial No. 728,114. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN EVAN EVANS, of Wilkes-Barré, in the county of Luzerne and State of Pennsylvania, have invented a new and Improved Protractor, of which the following is a full, clear, and exact description.

This invention relates to improvements in protractors used for platting maps, charts, or the like; and the object of this invention is to provide a protractor of simple construction, by the use of which any number of degrees and minutes at either side of a meridian or other starting line may be marked off without mental calculation; and a further object is to provide a protractor of sufficient weight to retain its position on the work, and therefore not requiring clamps or extra weight, such as are usually found necessary.

I will describe a protractor embodying my invention and then point out the novel features in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a top view of a protractor embodying my invention. Fig. 2 is a section on the line 2 2 of Fig. 1, and Fig. 3 is a fragmentary plan view.

The protractor comprises a base-block 1, upon which is mounted to rotate a casing 2. A screw 3 has screw-thread engagement in the casing and has its end projected into an annular channel 4, formed in the base-block. This screw serves to clamp the casing 2 as adjusted relatively to the block, and it also serves by passing into the channel 4 to prevent an upward movement of the casing relatively to the base-block.

Attached to the casing 2 by means of posts 5 is a degree-ring 6. The inner edge of this ring is graduated into three hundred and sixty degrees, which are subdivided into half-degrees. It will be noted that from the zero-line 7 on the ring 6 one hundred and eighty degrees are marked in each direction. The casing 2 and the ring 6 are rotated relatively to the base-block 1 by means of a pinion 8, mounted on a shaft 9, carried by the ring 6 and meshing with a rack-ring 10, secured to the upper side of the base-block. The casing

2 has an outwardly-extending base-flange 11, the opposite sides of which are parallel.

Mounted to rotate within the ring 6 is a vernier-ring 12. This vernier-ring has a double-number vernier reading from the center or zero line 13 to each extreme thirty divisions—that is, there are thirty vernier divisions at each side of the zero-line, a scale being used in which the direction of the numbering corresponds to the direction in which the limb is numbered and read. The center plate 14 has no marks on it other than a zero or meridian line 15. This plate 14 is mounted on a screw-threaded post 16, extending upward through the base 1, and its under side is adapted to engage with a collar 17 on the post. The plate may be clamped against the collar by means of a clamping-nut 18, engaging the thread of the post 16. The plate 14 is prevented from rotary motion relatively to the base-block, but is allowed a slight vertical motion relative thereto by means of pins 19, extending from the plate into holes formed in a rack-ring 20, secured to the top of the base-block. The vernier-ring is prevented from upward motion relatively to the plate 14 by means of a flange 21 on its lower inner edge engaging with a flange 22 on the upper outer edge of the plate. The vernier-ring is moved relatively to the plate and also relatively to the ring 6 by means of a pinion 23, engaging with the rack-ring 20, the said pinion being mounted on a shaft 24, passing upward through the ring 12.

In using the instrument the zero-marks or radial lines are to be brought in line, and then the plate 14 is to be clamped by the nut 18, and then the instrument is to be set with the side of the flange 11 that is parallel with the radial lines on the meridian or any other base line that the work is to be platted from. Now to turn off any number of degrees and minutes release the clamping-screw 3 and turn the degree-ring 6 with the casing and flange by means of the pinion 8 to the desired markings. For instance, referring to Fig. 3, the figures read  $27^{\circ} + 25' = 27^{\circ} 25'$  from left to right and  $152^{\circ} 30' + 05' = 152^{\circ} 35'$  from right to left.

If it is desired to turn off any number of degrees and minutes from the above, in order



to do so without mental calculation the screw 3 must be turned to clamp the casing in position, then release the nut 18, and turn the zero of the vernier-ring to the zero of the outer ring. After this the nut 18 is to be turned to clamp the vernier-ring by means of the overlapping flanges. Then upon again releasing the screw 3 the instrument is ready to turn off any number of degrees and minutes from that point, and so on, as the case may require.

It is to be understood that I do not confine myself to any particular method of marking the graduations, as they may be marked to suit the surveying instrument used.

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

1. A protractor comprising a base-block, a plate on said base-block and having a radial line on it, a vernier-ring concentric with and movable around the center plate, a degree-ring movable around the vernier-ring, a casing to which the degree-ring is attached, the said casing being mounted to rotate on the base-block, and an outwardly-extending flange on said casing, said flange having opposite parallel sides, substantially as set forth.

2. A protractor comprising a heavy base-

block, a casing mounted to rotate on the said base-block and having an outwardly-extending flange, the opposite sides of said flange being parallel, a degree-ring carried by the casing, a pinion carried by the degree-ring, a rack-ring attached to the base-block and engaging with said pinion, a vernier-ring arranged within the degree-ring, a pinion carried by said vernier-ring, a rack-ring on the base-block with which the said pinion engages, a plate arranged within the vernier-ring and having a radial line, and means for clamping said plate in engagement with the vernier-ring and with the base-block, substantially as specified.

3. A protractor, comprising a base-block, a plate on said base-block and having a radial line on it, a vernier-ring concentric with and movable around the center plate, a degree-ring movable around the vernier-ring, a casing to which the degree-ring is attached, and means for rotating the rings relatively to each other and relatively to the base, substantially as specified.

JOHN EVAN EVANS.

Witnesses:

ROBERT P. ROBINSON,  
GEORGE A. REED.