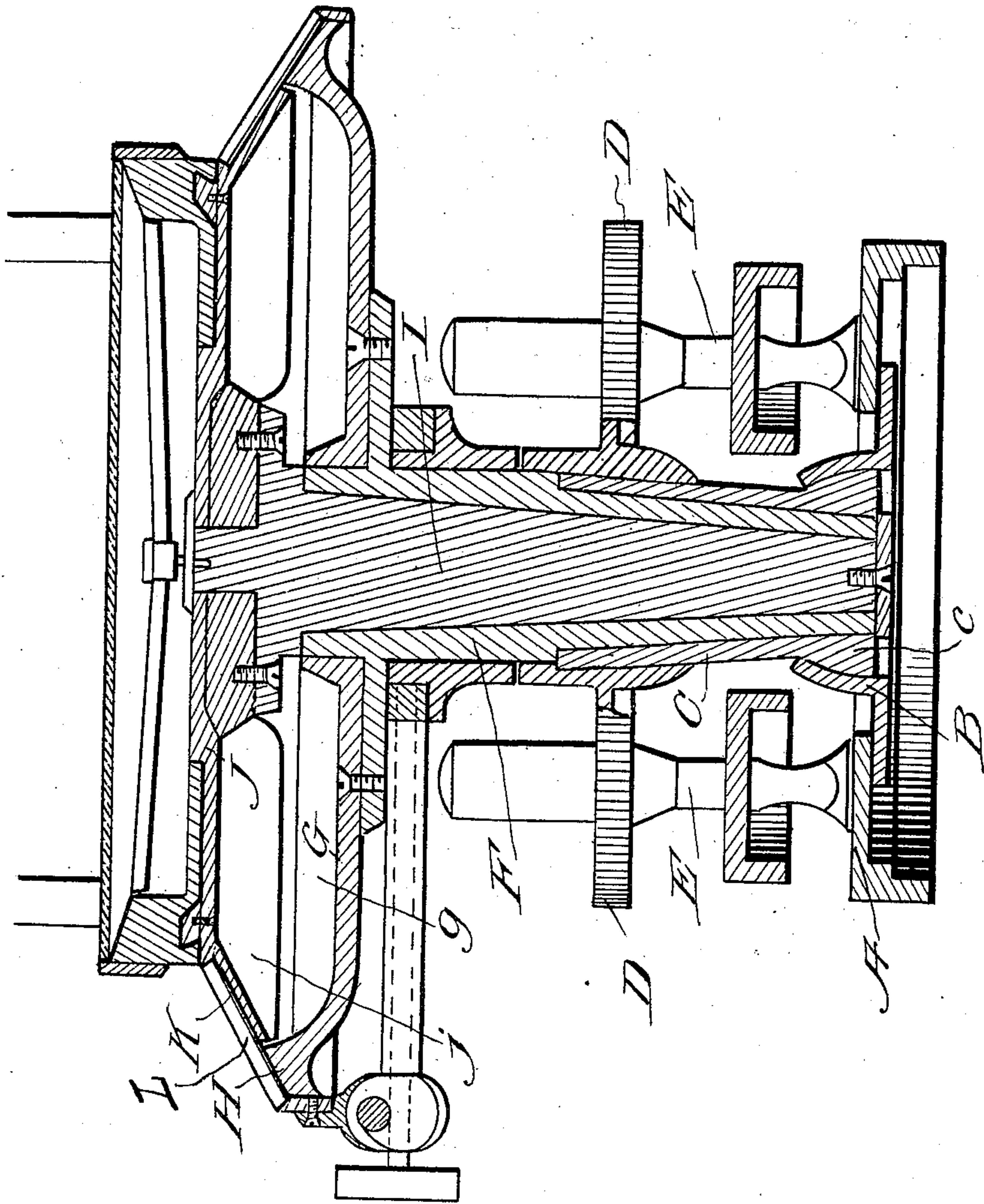


No. 840,923.

PATENTED JAN. 8, 1907.

J. A. EARLY.
ENGINEER'S TRANSIT.
APPLICATION FILED APR. 13, 1904.



Witnesses

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UNITED STATES PATENT OFFICE.

JOHN A. EARLY, OF BATCHTOWN, ILLINOIS.

ENGINEER'S TRANSIT.

No. 840,923.

Specification of Letters Patent.

Patented Jan. 8, 1907.

Application filed April 13, 1904. Serial No. 203,006.

To all whom it may concern:

Be it known that I, JOHN A. EARLY, a citizen of the United States, residing at Batchtown, in the county of Calhoun and State of Illinois, have invented new and useful Improvements in Engineers' Transits, of which the following is a specification.

This invention relates to surveying instruments—such as transits, theodolites, and similar instruments which are provided with a limb and verniers for ascertaining horizontal angles—the main object being to so construct and arrange the parts that the horizontal scale and verniers will always lie in a plane at right angles to the line of sight, such arrangement permitting the easy and accurate reading of the angles indicated without the use of reflectors or change of position by the observer.

Another object of my invention is to increase the strength and rigidity of the plates carrying the scale and verniers.

The accompanying drawing represents a vertical central section through my improved surveying instrument.

A indicates the base-plate, which is attached to the head of a supporting-tripod in the usual manner. To the center of the plate A is attached a socket B, in which the head of a vertically-disposed tapered bearing-sleeve C is seated, the connection forming a joint of the ball-and-socket type. A plate D is fastened to the tapered bearing-sleeve C, into which the adjusting-screws E are tapped, said adjusting-screws bearing on the base-plate A and tending to level the plate D when the screws are turned in a manner well known in the art. Supported in the tapered bearing-sleeve C is a tapered tubular pivot F, carrying a plate G, screwed thereto, the peripheral edge of said plate forming the limb H or graduated horizontal circle of the instrument. A tapered shaft I, fitted into the tapered pivot F, has fixed to its upper end the top plate J, on which the verniers K are oppositely secured. As at present constructed the limb and verniers lie in a horizontal plane, whereas in my invention they are inclined from the horizontal at an angle of

about thirty to forty degrees. By this arrangement the scales are more easily and accurately read and errors reduced to the minimum. The angular arrangement is such that reflectors are unnecessary, the line of sight being substantially at right angles to the limb and verniers. A further advantage of inclining the limb and verniers is the increased amount of room gained between the top plate J and bottom plate G, whereby each plate may be formed with larger, stronger, and an increased number of ribs, respectively.

I wish it to be understood that the plate J is fixed to the upper end of the shaft I and rotatable therewith, by means of which the said plate is adjustable on the limb H, said limb being capable of having on its inclined face portion graduations which are readily discernible through slots L, oppositely arranged in the inclined face of the plate J.

Having thus described my invention, I claim—

In an instrument of the character described, a limb comprising a lower horizontal circular plate having a central opening with a collar or flange extending upwardly therefrom, an upwardly-curved peripheral edge provided with a scale-face inclined to the plane of the plate, and strengthening ribs or flanges extending radially between said collar and upwardly-curved edge, and an upper horizontal plate provided with a downwardly-inclined edge carrying a vernier, said scale-face and vernier thus lying in a conical surface and the plates being thus spaced to an increased degree, and radial ribs upon the bottom of the upper plate and connected to and strengthening said inclined edge, said ribs occupying the deepened space between the proximate faces of the plates, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN A. EARLY.

Witnesses:

ROLAND HEFFINGTON,
A. G. ZIGRANG.