No. 846,989. PATENTED MAR. 12, 1907.

P. FERBER.

SURVEYING INSTRUMENT.

APPLICATION FILED DEC. 17, 1904.

Fig. 2.

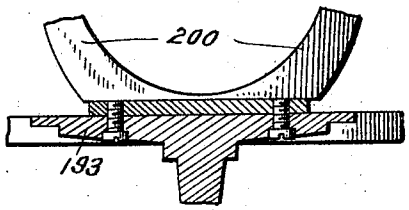
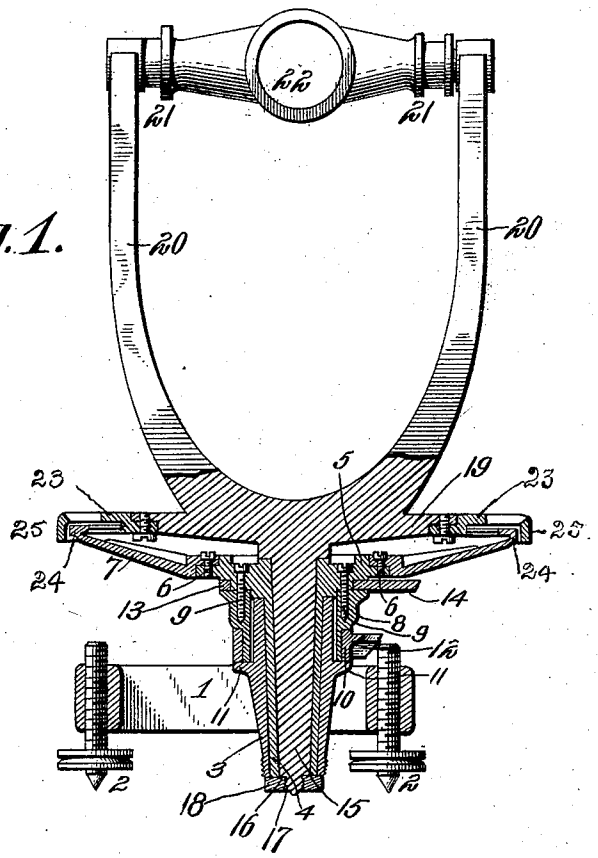


Fig. 1.



Witnesses

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UNITED STATES PATENT OFFICE.

PHILIP FERBER, OF HOBOKEN, NEW JERSEY, ASSIGNOR TO THE KEUFFEL & ESSER COMPANY, OF HOBOKEN, NEW JERSEY, A CORPORATION OF NEW JERSEY.

SURVEYING INSTRUMENT.

No. 846,989. Specification of Letters Patent. Patented March 12, 1907.

Application filed December 17, 1904. Serial No. 237,235.

To all whom it may concern:

Be it known that I, PHILIP FERBER, a citizen of the United States, residing at Hoboken, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Surveying Instruments, of which the following is a specification.

This invention relates to engineers' transits or theodolites, and particularly to the means employed for supporting the telescope-standards. Instruments of this class as commonly constructed and known to me are provided with a socket member in which is seated a tubular spindle, in turn provided with an upper flange, to which is secured a horizontal limb graduated at its edges. Within this tubular spindle is a central or main spindle, which is expanded slightly at its top, and to such attached by screws is an upper plate, which carries the vernier or a number of verniers at its periphery. To this upper plate is in turn attached the telescope-standards. Now it will be observed that in the construction described the standards are attached to the upper plate by screws, and the upper plate is attached to the spindle by screws, affording two sets of opportunities for the connections between the standards and the spindle to become loose. As perfect rigidity is much to be desired in an instrument of this class and as within my knowledge it has not heretofore been secured, in my invention I aim to secure it by eliminating one or both of the connections referred to and doing away entirely with the upper plate and mounting the standards directly upon the spindle-flange or making them integral with it. In this way I secure with the construction last named perfect rigidity, and when the standards are separated from but screwed to the spindle-flange I secure better rigidity than heretofore.

In the drawings, Figure 1 is a view, partly in section and partly in elevation, of a surveying instrument embodying my improvement in which the standards and main spindle are made of one piece; and Fig. 2 is a detailed sectional view showing the standards and spindle made in two pieces and secured together by screws.

Referring specifically to Fig. 1 of the drawing, 1 indicates the main supporting member of the instrument, which is of ordinary form common to such instruments and is arranged in any usual way to rest upon and be supported by a tripod, (not shown,) upon which it is adjustable by means of the usual leveling-screws 2 2. The member 1 is connected in any usual manner (not shown) with what may be termed a "socket" member, as at 3, and in this socket member is seated a tubular spindle 4, which supports an annular flange 5, to which is secured, by means of screws 6, the annular saucer-shaped plate 7, known in the trade as the "horizontal limb." Fitted to revolve around the upper portion of the socket member 3 is a tubular member or sleeve 8, secured to the flange 5 by screws 9. This member 8 forms the support for a sleeve 10, which rests on an annular flange 11 of the socket member 3 and has attached to it an arm 12 (shown partly broken away) for supporting a set-screw (not shown) for adjusting the parts in the socket member to partially adjust the telescope and its supports. Between the sleeve 10 and the flange 5 is seated a ring 13, which carries an arm 14 (partly broken away) for supporting another adjusting-screw. (Not shown.) These parts are of usual construction and form no part of my invention. Within the tubular spindle 4 is seated the main spindle 15, which is shouldered at 16 and provided at its lower end with a threaded termination 17, adapted to receive a nut 18 to hold it in position. Formed integral with the main spindle 15 is a horizontal annular flange 19 and standards 20 20, which form the supports or bearings for the trunnions 21 21 of the telescope 22. An apertured ring 23 is secured to the spindle-flange 19 and carries the verniers. The lower limb 7 is provided with an inturned peripheral flange 24 to receive graduations and the vernier-ring 23 with a downturned peripheral flange 25, which embraces said flange 24. Constructed as thus described all of the parts may be easily and rapidly adjusted with extreme accuracy and when so adjusted will be maintained rigidly in their proper positions.

In the modification shown in Fig. 2 the construction is such that the telescope-standards 200 are made removable from the spindle-plate 193, to which they are secured by means of bolts or screws. By this means, although the intermediate plate common in this class of instruments is eliminated, yet the

standards may be made removable and replaced when required by the exigencies of use or wear.

Having described my invention, what I claim as new is—

An instrument of the character described comprising the usual socket member and the lower limb secured thereto and having an inturned peripheral flange, in combination with the spindle seated in the socket member, the upper limb integral with the spindle, and the vernier-ring secured to the upper limb, and having a downturned peripheral flange embracing the flange of the lower limb, as and for the purpose set forth.

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

PHILIP FERBER.

Witnesses:
WILLIE L. E. KEUFFEL,
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