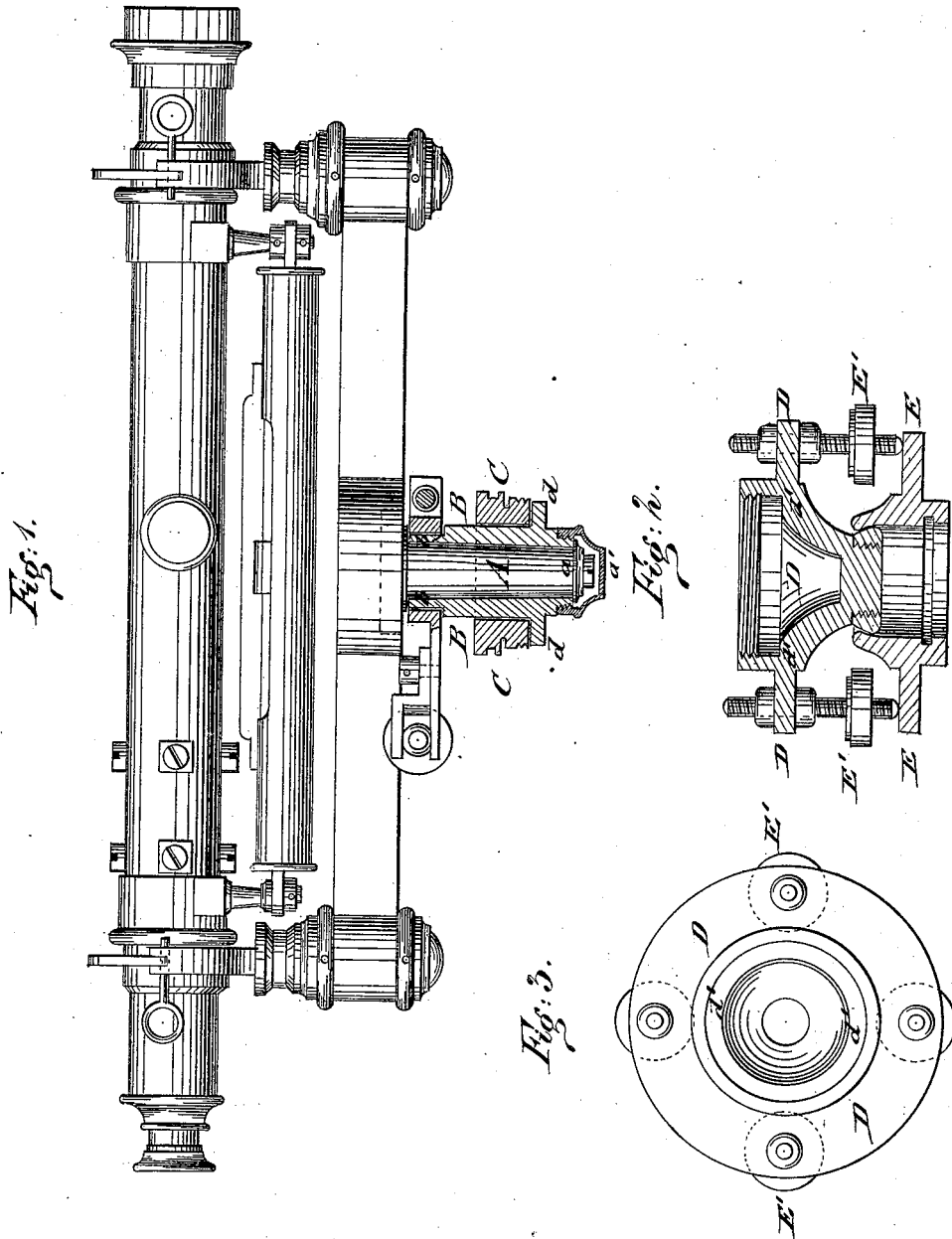


F. E. BRANDIS.
 Spindle-Attachment for Surveying Instruments.
 No. 201,155. Patented March 12, 1878.



WITNESSES:

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FREDERICK E. BRANDIS, OF BROOKLYN, E. D., ASSIGNOR TO BRANDIS & TECKRITZ, OF NEW YORK, N. Y.

IMPROVEMENT IN SPINDLE ATTACHMENTS FOR SURVEYING-INSTRUMENTS.

Specification forming part of Letters Patent No. **201,155**, dated March 12, 1878; application filed January 29, 1878.

To all whom it may concern:

Be it known that I, FREDERICK E. BRANDIS, of the city of Brooklyn, E. D., county of Kings, State of New York, have invented a new and Improved Spindle Attachment for Surveyors' Instruments, of which the following is a specification:

In the accompanying drawing, Figure 1 represents a side elevation of a Y-level with my improved attachment in section. Fig. 2 is a vertical central section of the socket-plate, parallel plates, and adjusting-screws; Fig. 3, a top view of the socket-plate and parallel screws.

Similar letters of reference indicate corresponding parts.

This invention relates to an improved spindle attachment for levels, transits, and other surveying-instruments, by which the upper cone on the parallel rods of the tripod is done away with, the vertical distance between center of ball-and-socket joint and bubble reduced, and the biasing of the center by the parallel screws dispensed with.

The invention consists of the connection of the spindle of the instrument with the adjustable socket-plate of the tripod by a revolving nut, that slides on a sleeve of the spindle and screws into an interior screw-thread of the socket.

Referring to the drawing, A represents the spindle of a level or other surveying-instrument, which is secured in the customary manner to a center socket at the under side of the bar of the instrument. On the spindle is arranged a sleeve, B, that is free to turn axially, but is secured against vertical displacement by a washer-plate and fastening-screw, *a*, at the lower end of the spindle. The screw *a* is covered by a screw-cap, *a'*, that prevents the dust from entering between spindle and sleeve.

The sleeve B has an annularly-turned-off part and shoulder, *b*, at the upper end, by which the clamp and tangent-screw are supported in position on the bar, as shown in Fig. 1. The lower part of sleeve B is provided with a flange, *d*, that serves to retain a

sliding and revolving nut, C, so as to prevent its getting detached therefrom. The nut C has an exterior screw-thread, that screws into an interior thread of the socket-plate D on the tripod. The flange *d* fits onto a seat, *d'*, of the socket-plate, and forms, when the nut is screwed in, a reliable, steady, and compact connection of spindle and socket-plate. The socket-plate D is connected by the usual ball-and-socket joint with the parallel plates E, that are attached to the tripod and adjusted by the parallel screws E'.

The screw-nut connection of spindle and socket-plate dispenses with the old upright cone on the parallel plates, so that they may be left on the tripod without the slightest fear of injury, and without affecting in the least the center and tangent-screw. As the clamp and tangent-screw are transferred to the under side of the bar they turn with the telescope, as heretofore, so that thereby the annoyance of looking or feeling for the same while making an observation is obviated.

The main point of advantage of this spindle attachment to the socket-plate consists, however, in the shortening of the vertical distance between the center of the ball of the socket-joint and the bubble, so that the bubble is more quickly adjusted; and also in the doing away with the biasing or straining of the center by the parallel screws, which is a source of trouble and inaccuracies in the present instruments. This spindle attachment allows the use of a very sensitive bubble, as the instrument is more easily and quickly set, while a greater steadiness is secured for the bubble when the instrument is once adjusted.

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

1. The combination, in a surveying-instrument, of the spindle, having flanged sleeve and revolving screw-nut, with the adjustable threaded socket-plate on the tripod, substantially as described, and for the purpose specified.

2. The combination, in a surveying-instrument, of the spindle of the same, having

flanged sleeve retained thereon and a revolving screw-nut sliding on sleeve, with the adjustable socket-plate on tripod, the socket-plate having thread and seat, respectively, for nut and flange of sleeve, substantially as specified.

3. The combination, with the seat on flanged

sleeve, of the clamp and tangent-screw, arranged below the base-bar, as and for the purpose specified.

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