W. GURLEY.

Tripod Head for Surveying Instruments.

No. 209,255. Patented Oct. 22, 1878.

FIG. 1.

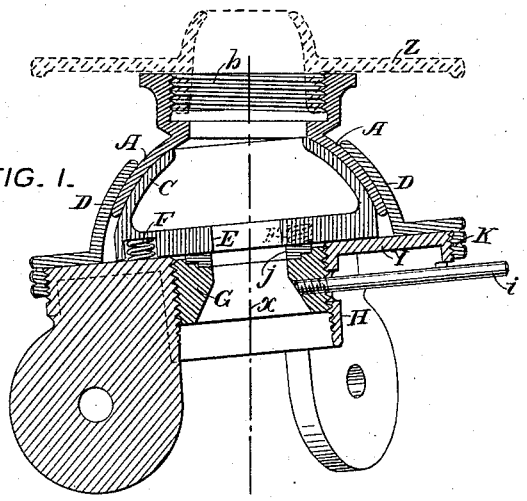


FIG. 2.

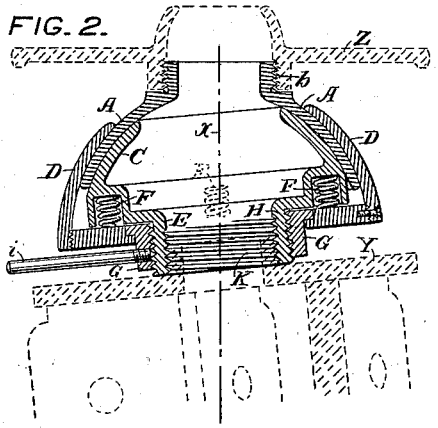


FIG. 3.

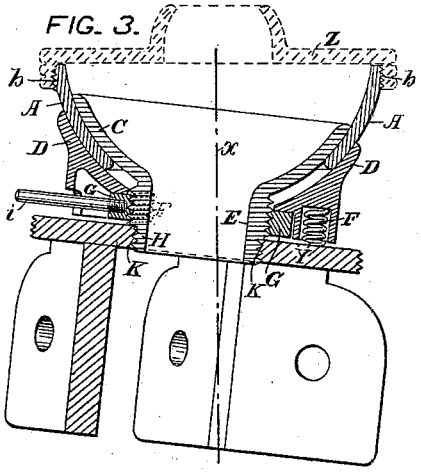
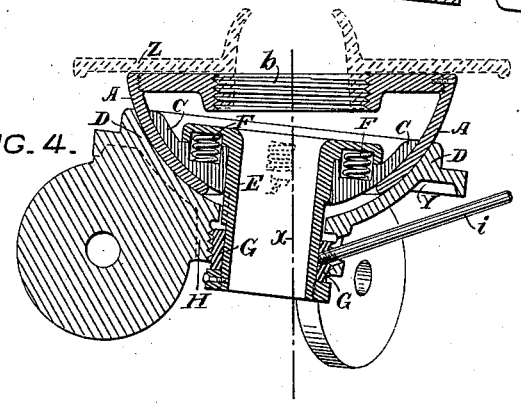


FIG. 4.



WITNESSES:

Paul Cook

Robert Gregg Jr

INVENTOR:

William Gurley

UNITED STATES PATENT OFFICE.

WILLIAM GURLEY, OF TROY, NEW YORK, ASSIGNOR TO W. AND L. E. GURLEY, OF SAME PLACE.

IMPROVEMENT IN TRIPOD-HEADS FOR SURVEYING-INSTRUMENTS.

Specification forming part of Letters Patent No. **209,255**, dated October 22, 1878; application filed September 25, 1878.

To all whom it may concern:

Be it known that I, WILLIAM GURLEY, of the city of Troy, in the county of Rensselaer and State of New York, have invented certain new and useful Improvements in Leveling-Supports for Surveying, Engineering, and other Instruments, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figures 1, 2, 3, and 4 are central vertical sections of various forms of this invention for quickly leveling and firmly supporting a surveying, engineering, or analogous instrument upon a tripod or similar support.

A is a concentrically concavo-convex plate, which is to be formed or furnished at its top with a screw, *b*, or other suitable means, adapted to firmly engage with a corresponding base, Z, of a surveying or other instrument. C is a convex segment, concentric with and fitting into and against the concave surface of the plate A, and D is a concave segment, concentric with and fitting upon and against the convex surface of the same plate. One or the other of the two segments C and D is a part of or is adapted to be firmly secured to the top Y of a tripod or other suitable support for a surveying, engineering, or other instrument. The two segments C and D are connected together and held closely against the concave and convex surfaces of the plate A by suitable means, substantially as illustrated in the drawing, so that the plate A, with an instrument thereon, shall be securely supported between and by the segments C and D, and be capable of being slid to and fro in every direction across those two connected segments, to thereby level the instrument mounted on the said concavo-convex plate.

In order that a plumb-line, suspended from the center of the base of an instrument on the plate A, may hang free and be adjustable laterally through this improved leveling-support, I make the plate A and segments C and D each with a central aperture, and secure the segments C and D to each other by an interior tubular connection, E, substantially as represented in the drawing, wherein the plumb-line is indicated by the broken line *x*.

By having the sliding concavo-convex plate A and the convex and concave segments C and D fitted together very accurately, and held very closely together with some slight degree of elasticity by the aforesaid connecting devices, (represented in the drawing,) the plate A can be readily slid by hand to and fro across and between the two segments C and D in leveling an instrument mounted on that plate, and the latter plate will be retained with considerable stability in its adjusted position.

In order to avoid all necessity for very great accuracy in fitting and securing together the plate A and segments C and D, and to render the movements of the plate A more smooth and even between the two segments in leveling an instrument mounted on that plate, and to assist in retaining that plate in position when adjusted with an instrument thereon, I combine a compressed spring or springs, F, with the connected segments C and D and intervening instrument-plate A, substantially as shown in the drawing, so that the spring or springs F shall press one of these two segments against the sliding plate A, and shall thereby also press the plate A against the other and stationary segment. For this purpose one compressed spring, encircling the interior connection E, can be used; but I generally prefer three or more small spiral springs, F, arranged at equal distance apart, as indicated in the figures.

In order to provide means whereby the concavo-convex sliding plate A can be instantly clamped fast and released in every adjusted position between the connected convex and concave segments C and D, I combine with all these parts a screw-like clamp, G, arranged below and concentric with the axis of the segments C and D, and in or on a stationary stock, H, which supports the stationary segment, substantially as represented in the drawing, so that by merely turning the clamp G to and fro a very little the plate A will be fastened and released in every position in which it can be placed between the two segments C and D.

The clamp G can be turned by means of a lever, *i*, secured thereto, or by other suitable means, and a washer, *j*, Fig. 1, can be applied to the clamp when desired.

The combination of the sliding concavo-convex plate A, connected convex and concave segments C and D, spring or springs F, and clamp G constitutes the most complete form of this leveling-support, whereby a surveying or engineering instrument mounted on the plate A can be very easily and quickly leveled and firmly secured in such adjustment.

In carrying out this invention I often make the stock of the stationary segment with a male or female screw, K, adapted to engage with a corresponding screw in or on tripods in common use, substantially as indicated in Figs. 1, 2, and 3.

What I claim as my invention is—

1. The combination of the annular concavo-convex sliding plate A, the centrally-open convex and concave segments C and D against opposite sides of the said sliding plate, and the tubular connecting device E, substantially as described.

2. The combination of the connected convex and concave segments C and D, the intervening concavo-convex sliding plate A, and the spring or springs by which the two segments and sliding plate are all pressed together, as set forth.

3. The combination of the connected convex and concave segments C and D, the intervening concavo-convex sliding plate A, and the screw-clamp G, as described.

4. The combination of the connected convex and concave segments C and D, the intervening concavo-convex sliding plate A, the spring or springs F, and the screw-clamp G, substantially as described.

In testimony whereof I hereunto set my hand in the presence of two subscribing witnesses this 21st day of September, 1878.

WILLIAM GURLEY.

Witnesses:
PAUL COOK,
ROBERT GREGG, Jr.