

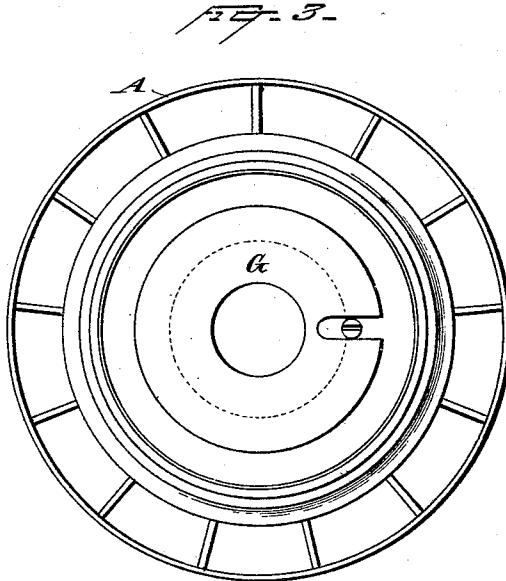
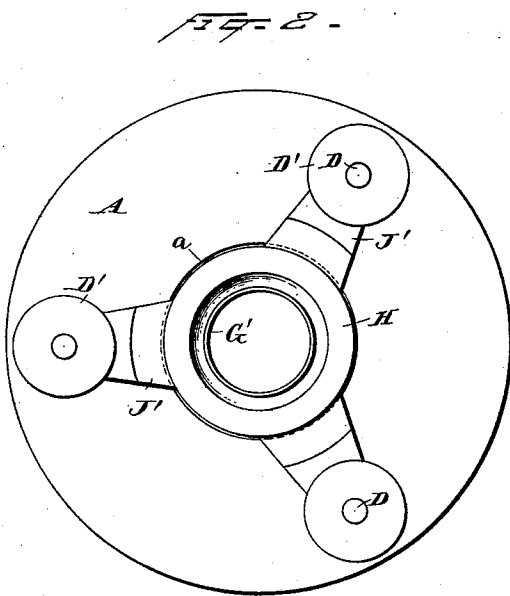
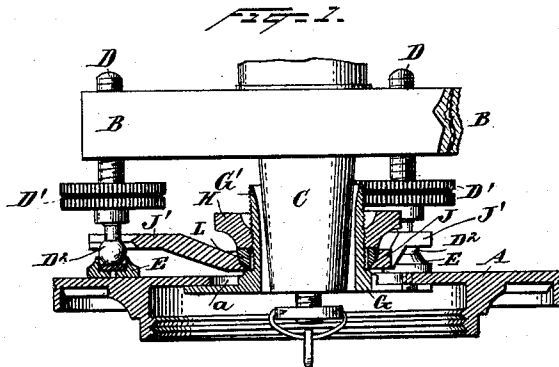
(No Model.)

J. PAOLI.

TRIPOD HEAD FOR ENGINEERS' TRANSITS AND ANALOGOUS INSTRUMENTS.

No. 479,196.

Patented July 19, 1892.



Witnesses
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Charles R. Searle,

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UNITED STATES PATENT OFFICE.

JOHN PAOLI, OF HOBOKEN, NEW JERSEY.

TRIPOD-HEAD FOR ENGINEERS' TRANSITS AND ANALOGOUS INSTRUMENTS.

SPECIFICATION forming part of Letters Patent No. 479,196, dated July 19, 1892.

Application filed November 23, 1891. Serial No. 412,712. (No model.)

To all whom it may concern:

Be it known that I, JOHN PAOLI, a subject of the King of Italy, residing at Hoboken, Hudson county, in the State of New Jersey, have invented a certain new and useful Improvement relating to Tripod-Heads for Engineers' Transits and Analogous Instruments, of which the following is a specification.

The improvement facilitates the adjustment of the instrument laterally in all directions upon the tripod-plate. A single threaded ring or round nut having a suitable milled rim for convenient operation by the thumb and finger surrounds a threaded center which is capable of being moved to a limited extent in all directions laterally and is suitably defended against being revolved by the force applied to turn the nut. The several leveling-screws are, as usual, socketed in suitable shoes resting on the tripod-plate and are readily shifted in all directions as the center is shifted, thus enabling the instrument to be brought directly over a given point by merely setting the tripod approximately and then shifting the instrument until the plumb-bob is exactly over the point. A spider is arranged under the nut, having arms resting on the spheres formed on the lower ends of the leveling-screws. When the central nut is turned in the proper direction, this spider presses forcibly downward on the spheres. When, on the contrary, the nut is turned in the direction to raise it, the force applied through the spider is relaxed, and in this condition the instrument may be shifted laterally in any direction within the limits prescribed by the size of the central hole in the tripod-plate.

The accompanying drawings form a part of this specification and represent what I consider the best means of carrying out the invention.

Figure 1 is a central vertical section, partly in elevation. Fig. 2 is a plan view of the lower portion, the instrument and the leveling-arms being removed; and Fig. 3 is a view of the same parts seen from below.

Similar letters of reference indicate corresponding parts in all the figures where they appear.

A is the tripod-plate, which, it will be understood, is screwed upon a head resting upon

three legs, (not shown,) which support it adjustably in the long-approved manner.

B B B are the leveling-arms firmly attached to the free inner center C, and equipped with leveling-screws D, each of which has a milled collar or wheel D', by which it may be conveniently turned, and a spherical lower end D², which latter rests in a properly-lined pocket in a shoe E, which is capable of sliding laterally on the plane upper surface of the plate A. There is the usual large central hole *a* in the tripod-plate A. Under the plate A is an adjustable plate G, which is larger than the hole *a*, and carries a tubular center G', considerably smaller than the hole *a*. The upper part of the exterior of this tube is screw-threaded and receives a nut H with a milled rim. The lower face of this nut presses down adjustably and sets on a spider-ring J, which is provided with forked arms J', each of which embraces one of the leveling-screws and presses on the upper side of the spherical end D².

In setting the instrument for use the tripod (not shown) is adjusted firmly in the approximately correct position, then the nut H is slackened sufficiently to allow the under plate G G' and its attachments to be moved, and these parts are then shifted laterally to the required extent in any direction, after which the nut H is turned down and the spider J is strongly pressed downward, exerting a corresponding pressure on the spheroidal ends D² of the leveling-screws D. The force thus exerted holds the plate G in strong frictional contact with the tripod-plate A and prevents the instrument being displaced laterally. The same force also exerts a desirable friction on the several leveling-screws and aids to hold them reliably even if they have through any chance become loose in their fit in the several arms B. I have shown these arms as provided with clamping-screws in accordance with my patent of May 26, 1891, No. 453,158; but these are not essential.

L is a ring having a spheroidal under surface loosely surrounding the threaded tube G' arranged under the nut H, and adapted to be pressed downward by the latter. It matches within a corresponding spheroidal cavity or internal rabbet in the spider J and allows the

latter to rock within certain limits while maintaining a firm contact and exerting any required degree of pressure according as the nut H is screwed down.

- 5 It will be understood that the swinging instrument may have any ordinary or suitable provisions for the various adjustments required. The spheroidal bearing-ring L, on which the nut H acts in pressing down in the
10 corresponding spheroidal cavity in the center of the spider, is preferably brass. The leveling-screws D and most of the other parts may also be brass.

- The provisions for mounting the working
15 parts of the instrument above the inner center and for attaching the plumb-bob below may be of any ordinary or suitable character.

- I have shown three leveling arms and screws and a corresponding three-armed
20 spider J and prefer such construction for the reason, among others, that it insures a uniform distribution of the strain on the leveling-screws; but four can be employed, if preferred.

- The invention allows the friction to be applied and varied at will by a single part (the
25 nut H.)

I claim as my invention—

1. In a surveying-instrument, the tripod-plate A, having a central aperture a , and the
30 under plate or plane bearing-piece G, applied below and having the threaded tube G', of smaller diameter, changeable in position in

the hole a , in combination with each other and with the threaded ring or nut H, and suitable connections to the instrument arranged to tighten and relax the hold of the
35 latter on the tripod-plate by a single central adjustment, substantially as herein described.

2. In a surveying-instrument, the arms B and leveling-screws D, adjustable therein and
40 having spheroidal lower ends D², in combination with the shoes E, spider-frame J J', under plate G, having the threaded tube G' and nut H, engaged on the latter, with provisions for communicating pressure at will to the spider-
45 frame, all arranged for joint operation substantially as herein specified.

3. In a surveying-instrument, the spheroidal bearing L, the nut or threaded ring H, acting thereon, and the spider J, with a spheroidal
50 cavity to receive said bearing L, in combination with each other and with the tripod-plate A, having the aperture a , and with the under plate G and screw-threaded tube G', carried thereon, all arranged for joint opera-
55 tion substantially as herein specified.

In testimony that I claim the invention above set forth I affix my signature in presence of two witnesses.

JOHN PAOLI.

Witnesses:

AUGUST MÖLLER,
LOUIS BURKABEND.