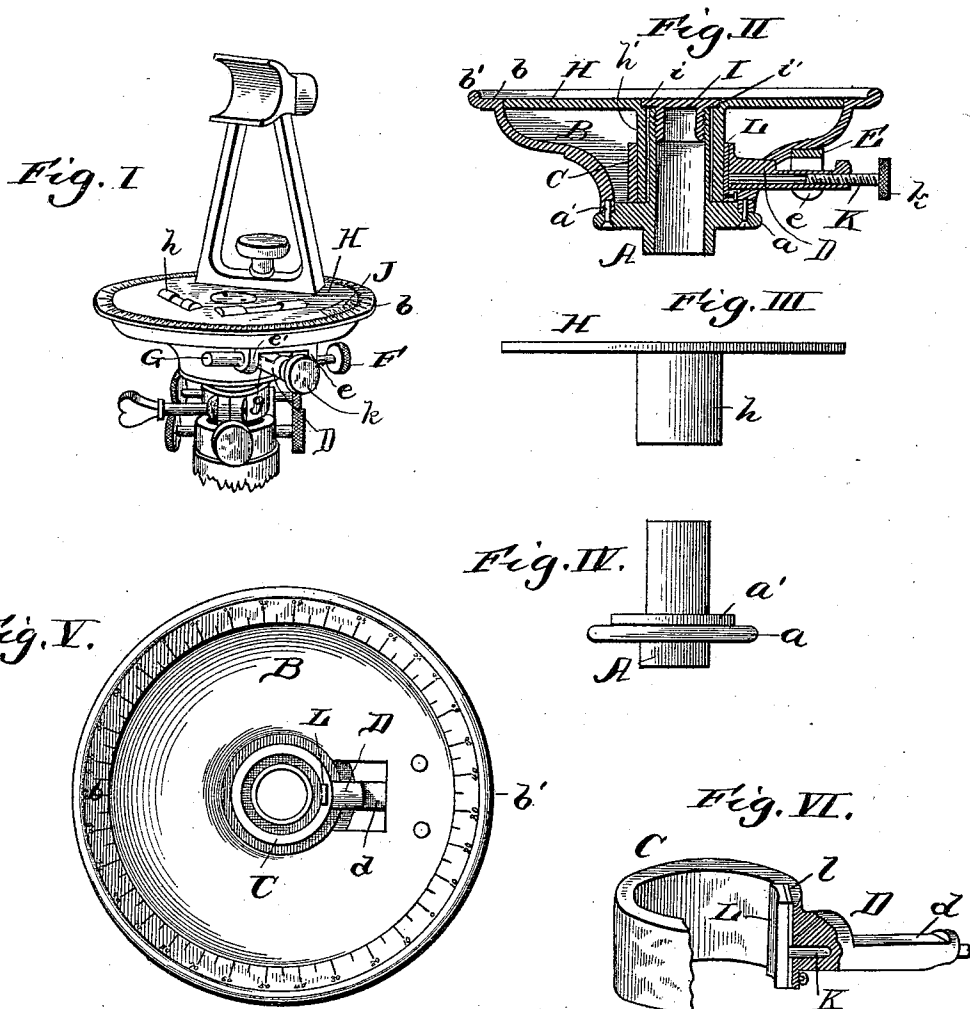


(No Model.)

T. F. RANDOLPH.
TRANSIT.

No. 470,076.

Patented Mar. 1, 1892.



Witnesses:
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UNITED STATES PATENT OFFICE.

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TRANSIT.

SPECIFICATION forming part of Letters Patent No. 470,076, dated March 1, 1892.

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To all whom it may concern:

Be it known that I, THEODORE F. RANDOLPH, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Transits; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in transits; and the object is to provide a simple, light, and convenient instrument especially adapted for use by surveyors, architects, and engineers in leveling and taking horizontal angles with or without the magnetic-needle attachment; and a further object is to provide simple and effective means for accurately adjusting the instrument and partially inclosing the same within the outer plate or socket of the transit.

With these ends in view my invention consists in the combination of an external shell or plate, a clamping-ring arranged within the external shell or plate and covered thereby, and the clamping-arm and screw passing through said shell or plate.

To enable others to more readily understand my invention, I have illustrated the same in the accompanying drawings, in which—

Figure I is a perspective view of my invention omitting the tripod and telescope. Fig. II is a longitudinal sectional view of the same, taken through the center of the clamping-arm. Figs. III and IV are detail views of the top or main plate and the tripod-socket, respectively. Fig. V is a top plan view of the outer plate or shell with the tripod-socket and clamping-ring in position, and Fig. VI is a perspective view of the clamping-ring partly broken away.

Referring to the drawings, in which like letters of reference denote corresponding parts in the several figures, A designates the tripod-socket in which the spindle of the tripod is inserted, which spindle has the usual leveling and adjusting mechanisms; but as they do not constitute a part of my present invention I have not deemed it necessary to illustrate the same herein. This socket A is provided with an annular flange *a*, projecting outwardly just above the lower end thereof, and above

this flange and integral therewith is another concentric flange *a'* of less diameter than the flange *a*, or the flange *a* may be simply provided with a shoulder *a'* on its upper surface, as desired. This annular flange *a* supports the outer plate or shell B, which is flared, as shown, and said shell is secured to the flange *a*, tightly against the flange or shoulder *a'* by suitable screws or rivets. The upper edge of this outer plate or shell B is provided with a flat projection *b* on its inner side, and it has a graduated limb or circle thereon about four and one-half inches in diameter and divided in five degrees, or this may be otherwise graduated, as desired. This limb is protected by a flange *b'*, extending entirely around the outer edge thereof on the top of the plate B.

The tripod-socket A extends upwardly in the center of the plate B almost to the top thereof, and a space is left between said socket and the lower contracted portion of the plate B. A clamping-ring C is fitted loosely around the socket A within the plate B, and it rests on the flanges *a* and *a'*, so that a limited movement thereof is permitted. This clamping-ring has a laterally-projecting arm D integral therewith and extending out through an opening in the outer plate B almost in a vertical plane with the upper edge thereof, said arm D having a recess *d* on its upper side. Secured on the plate B just over the recessed arm is a small plate E, having the depending lugs *e* and *e'* on either end thereof, which lugs partially inclose the arm D. In one of these lugs *e*, preferably the one on the right-hand side of the arm D, a screw-bolt or tangent-screw F is arranged to operate and bear horizontally against the arm D for the purpose of adjusting the vernier on the main plate. In the other lug *e'* and projecting outwardly therefrom is a socket G, in which a spring-actuated bolt *g* slides horizontally and bears against the opposite side of the arm D. This bolt operates to hold the arm steady and permits an easy and precise adjustment, which is absolutely necessary in instruments of this class.

The main plate H is constructed, as usual, with the levels *h* arranged at right angles to each other, so that they can level either direction from where the instrument stands, and on the other side of this plate is clamped the

usual support for the telescope. In the center of this plate is a downwardly-projecting sleeve *h'*, which is of the same length as the upward extension of the tripod-socket A within the shell, and this sleeve *h'* is fitted snugly over the tripod-socket for the purpose of holding the main plate in a practically rigid and precise position. To secure the plate II in place, a nut I is screwed in the upper end of the tripod-socket, and the projecting head *i* thereof fits in an annular sleeve *i'* in the main plate around the sleeve *h'* and holds the parts from vertical or lateral displacement; but the construction of the sleeve or tripod-socket and the plates II and B is so precise and true that an easy circular movement of the main plate II is permitted. All the parts of said main plate fit snugly within one another, and it presents an even surface throughout, so that the vernier J may be accurately adjusted by the tangent-screw F and read with the graduated limb on the projection *b*.

In order to obtain a more precise and accurate measurement by the vernier after the transit has been primarily adjusted, I provide the clamping-ring C, arranged to fit comparatively loose around the sleeve *h'* on the main plate after it has been placed in position on the tripod-socket, and the clamping-ring C rests on the flanges *a a'* on the tripod-socket between the contracted lower end of the outer plate or shell B and the socket *h'*. The laterally-projecting arm D, rigid with the clamping-ring, has a clamping-screw K operating longitudinally throughout the arm, and said screw has an enlarged head *k*, which is just beyond the vertical plane of the plate E normally. This screw extends entirely through the arm D and is adapted to bear against a loose plate L, fitted in a recess *l* in the inner side of the clamping-ring, which plate is secured in place loosely by a pin at its extreme lower end. When the main plate has been adjusted in position and operated to measure as near as possible without the vernier, the clamping-screw is tightened, which presses the plate E firmly against the socket *h'* on the main plate and thus clamps it in a practically rigid position, the entire instrument being then substantially rigid; but in order to obtain a more exact measurement the tangent-screw is then operated, and as this presses against the arm D, rigid with the clamping-ring C, said ring, which is clamped firmly with the sleeve *h'* by the clamping-screw K and plate L, turns gradually and almost imperceptibly and adjusts the main plate in an accurate position, and the vernier thereon records the movement of the plate after it has been clamped.

This instrument is especially useful for the purpose specified because of its simple construction, easy manipulation or adjustment, and lightness of weight, as it is made in a neat and compact form adapted for accurate operation. The arrangement of the outer

plate or shell is important, as it conceals and protects the sockets and clamping-ring from outside influences.

I am aware that changes in the form and proportion of parts and details of construction can be made without departing from the spirit or sacrificing the advantages of my invention, and I therefore reserve the right to make such changes as fall within the scope of my invention.

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

1. In a transit, the combination of a tripod-socket, the outer plate or shell, the horizontal main plate fitted in the outer plate and having a depending sleeve fitting snugly on the tripod-socket, and a clamping-ring inclosing the sleeve on the main plate, substantially as described.

2. In a transit, the combination, with a tripod-socket and a sleeve on the main plate, of a clamping-ring having a laterally-extending arm, a longitudinal clamping-screw passing through the arm, and a clamping-plate on the clamping-ring in line with the clamping-screw, substantially as described.

3. In a transit, the combination of a tripod-socket, the outer plate or shell, the main horizontal plate fitted in the upper flared end of said outer plate and having a downwardly-projecting sleeve fitted snugly on the tripod-socket, a clamping-ring fitted around the sleeve and socket and having an arm, a clamping-plate on the inner face of the clamping-ring in line with the arm, and a screw passing through the arm and adapted to press the plate against the ring to clamp the horizontal plate to the outer plate, substantially as described.

4. In a transit, the outer plate or shell having its lower contracted portion secured on the tripod-socket and the horizontal plate fitted in its upper flared portion, the sleeve on said horizontal plate, the clamping-ring fitted around said sleeve and having a laterally-extending arm, a clamping-plate on the inner face of said ring, a clamping-screw operating longitudinally in the arm and bearing against said plate, the tangent-screw arranged to bear against said plate, the tangent-screw arranged to bear against the arm at right angles thereto, and the spring-actuated bolt on the opposite side of said arm, substantially as described.

5. In a transit, an external shell or plate, a clamping-ring arranged within the external shell or plate and covered thereby, and the clamping arm and screw passing through the external plate or shell, substantially as described.

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

THEODORE F. RANDOLPH.

Witnesses:

W. D. DUDLEY,
WM. F. BROOKS.