

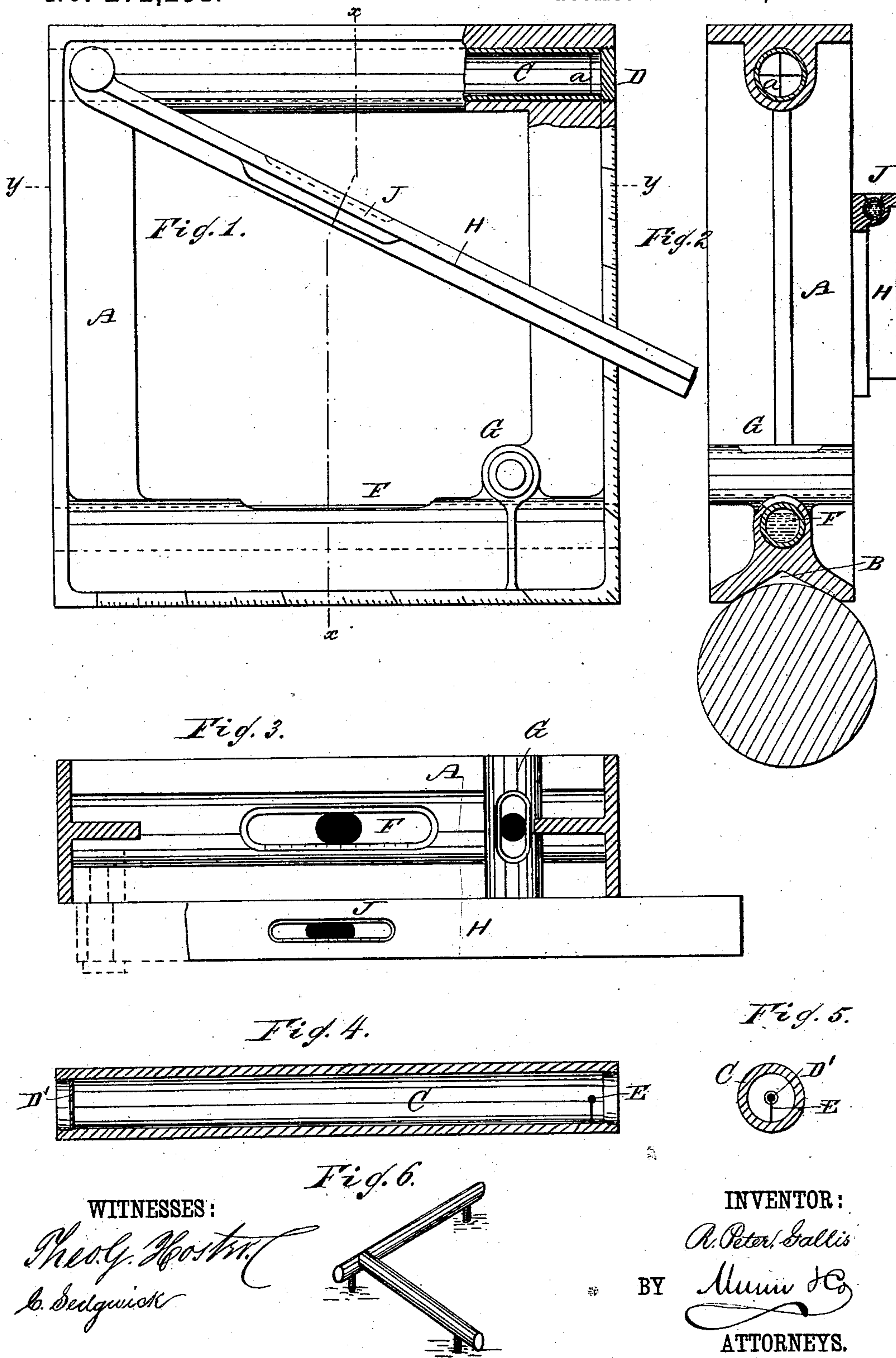
(No Model.)

R. P. GALLIS.

COMBINED INSTRUMENT FOR LEVELING, SURVEYING, &c.

No. 272,231.

Patented Feb. 13, 1883.



UNITED STATES PATENT OFFICE.

RUDOLPH PETER GALLIS, OF HARTFORD, CONNECTICUT.

COMBINED INSTRUMENT FOR LEVELING, SURVEYING, &c.

SPECIFICATION forming part of Letters Patent No. 272,331, dated February 13, 1883.

Application filed October 31, 1882. (No model.)

To all whom it may concern:

Be it known that I, RUDOLPH PETER GALLIS, of Hartford, in the county of Hartford and State of Connecticut, have invented a new and Improved Combined Instrument for Lev-
ing, Surveying, &c., of which the following is a full, clear, and exact description.

The object of my invention is to provide a new and improved instrument or tool for facilitating the determination of the direction, the setting, and erection of horizontal, vertical, and inclined lines of shafting and the like, and of lines of shafting at right angles thereto, or of geometrical lines in any of the above directions in general; also, for setting bases of machinery, parts of bridges, roofs, &c., in any of the above positions; also, for use in the work-shop and other places as a common spirit-level, as a right-angled positive and negative square, as a straight-edge, and as a face-plate, and for similar purposes.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a longitudinal elevation of my improved leveling and surveying instrument, parts being broken out and shown in section. Fig. 2 is a cross-sectional elevation of the same on the line *x x*, Fig. 1. Fig. 3 is a sectional plan view of the same on the line *y y*, Fig. 1. Fig. 4 is a longitudinal sectional elevation of the telescope-tube, showing a modification of the construction of the same. Fig. 5 is a cross-sectional elevation of the same, and Fig. 6 is a perspective view of the detachable foot of the instrument.

The instrument consists of a rectangular frame, A, which is provided in its bottom edge with a longitudinal A-shaped groove, B. In its upper edge the frame A is provided with a telescope-tube, C, which is parallel with the base or lower edge of the frame A and with the sides of the same, which tube is provided at one end with a lens and center of the usual construction, and at the other end with a wire cross, *a*, or some analogous device commonly used in surveying-telescopes. The ends of the telescope C are threaded to permit of disks D being screwed in the said ends to protect the telescope when the same is not being used.

In the modification shown in Figs. 4 and 5 a centrally-apertured disk, D', is secured in one end of the tube C, and a long-range rifle-sight, E, is secured at the other end, said sight consisting of a short rod with a small ball at the end, which small ball must be exactly on the central line of the telescope-tube C.

The telescope-tube may be made integral with the frame A; or it may be otherwise secured on the same; but the longitudinal axis of the telescope-tube must always be exactly parallel with the bottom piece of the frame A.

A spirit-level, F, is secured in the upper edge of the bottom piece of the frame A, the said level being parallel with the bottom piece. A transverse spirit-level, G, is secured on the bottom piece of the frame A at right angles to the same. Both spirit-levels F and G may be provided with graduated scales, if desired.

A straight-edge, H, is pivoted to the frame A at the upper corner and crosses the frame diagonally. The edges of the two sides of the frame A, that can be crossed by the pivoted straight-edge H, are provided with graduations, which are also drawn radially from the center of the pivot of the straight-edge. The said straight-edge, which is shown in section in Fig. 2, may be provided with a spirit-level, J, if desired. The straight-edge H and the scale on the sides of the frame A may be dispensed with; but preferably they are provided, as they adapt the instrument for more uses.

The instrument may be detachably secured to a base support or stand, as shown in Fig. 6, the said support being constructed substantially as described.

The instrument can be used for various purposes—for instance, for leveling and adjusting shafting, in which case the surveyor places the instrument on the shaft in the manner shown in Fig. 2, so that the upper part of the shaft passes into the A-shaped groove B. He then looks through the telescope-tube to a certain mark, and adjusts the shafting until he can see the said mark through the telescope, the shafting then being in the proper position. In the same manner he can find intermediate centers between a shaft already adjusted and certain marks on either the front or rear side of the instrument.

By placing the instrument against upright

shafting the same can be examined as to its being vertical, the spirit-level in the bottom edge of the frame being at right angles to the side of the frame which is placed against the upright shaft—that means, if the shaft is vertical the level is horizontal. In the same way the instrument can be used for setting both horizontal and vertical foundation-plates and other pieces—as, for instance, pieces in the work-shop, parts of bridges, and other constructions.

The instrument can also be used as a common square, all the four sides being at right angles both in and out side.

The instrument can also be used as a straight-edge or rule, if the same is held in an inclined position, so that it stands on the sharp edge.

The sides of the instrument having a certain width and length, they can be used as face-plates on a small scale.

If the telescope is to be used at an angle to the horizon, the adjustable or pivoted straight-edge is laid horizontal, and the telescope is then so adjusted that the surveyor can see the desired point or object through the same, and the graduated scales on the sides of the frame A will then show the number of degrees which the telescope deviates from the horizontal position.

The instrument, in combination with the detachable foot, can also be used for finding the point of intersection of two lines joining at right angles—as, for instance, the point of intersection of the center lines of two intended lines of shafting, the three terminal points of which are shown by certain marks. The foot of the instrument is then placed so that if the surveyor places the instrument first on one of the cylinders forming the detachable foot he can see one of the aforesaid marks through the telescope. If he reverses the instrument without changing the position of the foot, he will see the opposite mark if the telescope is in a straight line between the two marks. He then sets the instrument over to the other cylinder and moves the whole in a straight line between the two first marks until he can see the third mark through the telescope, the point of intersection of the two lines being then formed.

The surveyor can then examine whether any intermediate points between the terminal marks—as, for instance, centers of hangers or pedestals—are in a straight line between the telescope and any of the three terminal points.

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

1. The leveling-instrument made substantially as herein shown and described, and consisting of four straight-edges or face-plates combined into a rectangular frame, provided in the under edge of its bottom piece with a longitudinal A-shaped groove, and provided in the upper edge of its bottom piece with a longitudinal spirit-level, F, and a transverse spirit-level, G, the longitudinal spirit-level F being parallel to the longitudinal A-shaped groove in the straight edge or face-plate forming the bottom of the frame.

2. The combination of the rectangular frame having a A-shaped longitudinal groove in its bottom piece, and being provided in the upper edge of its bottom piece with a longitudinal spirit-level, F, and a transverse spirit level, G, with a telescope-tube in its top piece, as set forth.

3. The combination, with the rectangular frame A, having a longitudinal A-shaped groove, B, in its bottom piece, of the telescope-tube, C, of the transverse spirit-level G, and the straight-edge H, pivoted to one corner of the frame A, substantially as shown and described.

4. The combination, with the frame A, of the spirit-levels F and G, the telescope-tube C, the pivoted straight-edge H, and the spirit-level J on the straight-edge H, substantially as herein shown and described, and for the purpose set forth.

5. The combination, with the frame A, provided in the under edge of its bottom piece with a longitudinal A-shaped groove, of the two spirit-levels F and G, of the telescope-tube C, and a detachable foot consisting of two cylindrical pieces of equal diameters, joining each other at right angles and in the same plane, the said two cylinders being fastened to each other in the above position by any convenient means, and being provided with three adjusting-screws, the said foot being used for the purposes set forth.

RUDOLPH PETER GALLIS.

Witnesses:

THEODORE JEPSON,
LEWIS TRASK.