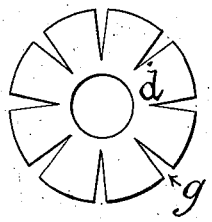
(No Model.)

W. C. HOLMES.

LEVELING INSTRUMENT.

No. 381,243. Patented Apr. 17, 1888.

Fig. 3



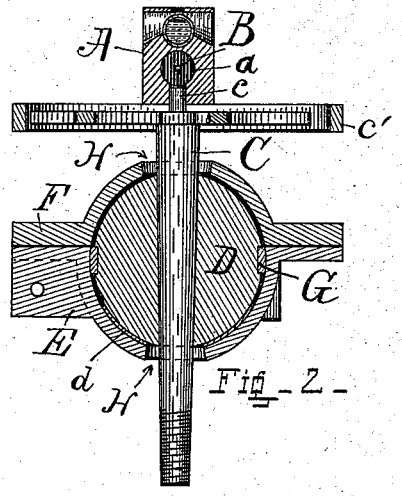
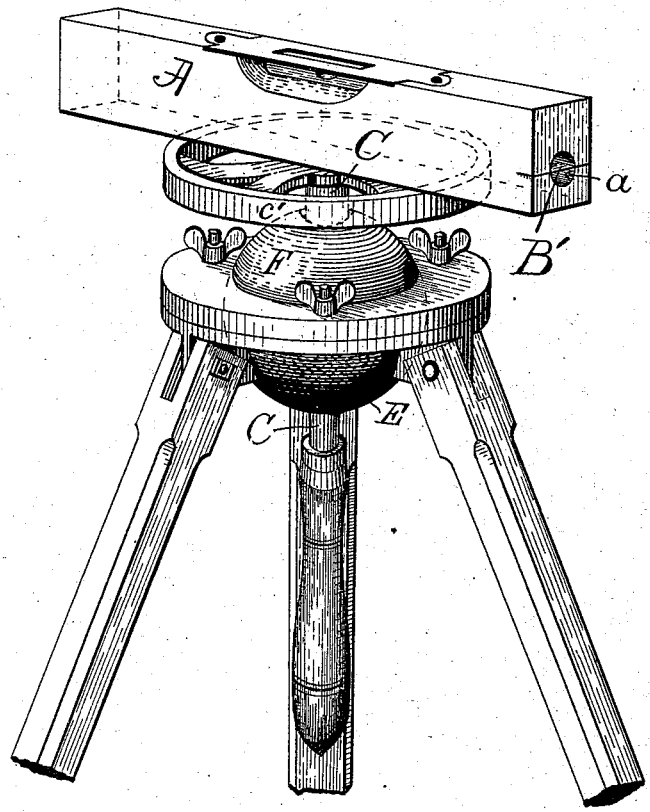


Fig. 2.

Fig. 1.



Witnesses:

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UNITED STATES PATENT OFFICE.

WILLIAM C. HOLMES, OF ATLANTA, GEORGIA.

LEVELING-INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 381,243, dated April 17, 1888.

Application filed November 19, 1887. Serial No. 255,664. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM C. HOLMES, a citizen of the United States, residing at Atlanta, in the county of Fulton and State of Georgia, have invented a new and useful Leveling-Instrument; 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, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

The general class of leveling-instruments to which this invention relates is that used for running ditches and terracing and leveling land; but it may be applied to instruments for other purposes, the object being to cheapen the construction and to make it more substantial and more simple and correct in its operation.

The invention therefore consists of certain details, which will be hereinafter fully described.

In the drawings, Figure 1 is a perspective view of the instrument, showing most of the details. Fig. 2 is a vertical section through the center, showing those details of construction that are not shown in Fig. 1; and Fig. 3 is a view of the washer, of leather or other elastic material, that forms a cushion for the spherical joint by which the instrument is adjusted and held in position.

In the figures, like reference-marks indicating corresponding parts in the several views, A is a level, preferably a spirit-level, through which is a hole, *a*. In one end of this opening is the small aperture or sight-hole B, and in the other end the thin horizontal bar B′. The bar B′ is sufficient for leveling purposes; but under some circumstances a similar bar may be inserted in a vertical position also, as will be hereinafter described. The level A turns on the pivot *c* and rests on the top of the ring or disk *c′*. The pivot *c* and the ring *c′* are carried by and are preferably made integrally with the spindle C. The spindle C has a slight taper and fits a corresponding hole through the ball D, as shown in Fig. 2. The spindle C may be continued downwardly a sufficient distance to form a handle; but it is preferable to attach the handle, as shown in Fig. 1, in order to avoid the necessity of making the hole through the ball of so large a size as to allow the handle to pass through. The spindle and ball might be made integrally; but I prefer the construction shown, for reasons that will be apparent, it being only necessary that the ball, the spindle, the pivot, and the ring be rigidly connected. The ball D is in the spherical recess partly formed in the plate E, which forms the apex of the tripod, and partly in the cap F. The plate E is preferably formed of metal and the cap F of wood or other material, the two being bolted or screwed together. Somewhat more than one-half of the spherical opening should be in the part E, in order that the leather or other elastic ring, *d*, which is inserted in an equatorial groove around the ball and slightly projecting beyond its periphery, may have a bearing in that part E. The ball is cushioned at its bottom on the washer *d*, which is interposed between it and the bottom of the hemispherical opening in the plate E. In order to make this washer more readily conform to the spherical shape that it assumes, V-shaped openings *g* are formed in its outer edge, as shown in Fig. 3. Openings H are made at the top and bottom of the spherical casing E F of the ball of sufficient size to permit the adjustment of the surface on which the level rests, an approximate adjustment being previously made by the legs of the tripod. The washer *d*, the ring G, and the cap F produce a light but certain friction between the ball D and its casing E F, that permits it to be easily moved and causes it to remain stationary when adjusted.

The operation of this device is as follows: By the legs of the tripod the instrument is first adjusted to an approximately-level position, after which, by moving the handle on the spindle C and by turning the level to different angles across it, the surface on which the level rests may be brought to a perfectly-level position and the level may be turned in any direction, and by sighting through the aperture a horizontal plane will be indicated.

This instrument might be adapted to a more extended use by adding a compass, attaching it to the level, and by inserting a thin vertical strip, crossing the strip B′, thus adapting the

instrument to use in running lines or determining horizontal angles; but it is intended to be used, generally, as a leveling-instrument, and the preferred construction is that above described. It may, however, have a universal joint of any known construction without a deviation from the spirit of this invention.

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

1. In a leveling-instrument, the ball D, provided with a passage through it for the reception of the spindle C, the spindle C having a support for the level at its upper end, and the handle attached to the lower end of said spindle, for the purpose set forth.

2. In a leveling-instrument, the ball D, supported and secured by the plate E and the cap F, said plate and cap being attached to each other by thumb-screws, the leather washer *d*, to give a holding-surface to said ball, the spindle C, secured to the ball D, for the purpose of adjusting the said ball, and the handle attached to said spindle, substantially as shown and described.

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

WM. C. HOLMES.

Witnesses:
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