No. 754,723. PATENTED MAR. 15, 1904.

G. G. TOWNSEND.

LEVELING INSTRUMENT.

APPLICATION FILED JUNE 16, 1903.

NO MODEL.

Fig. 1.

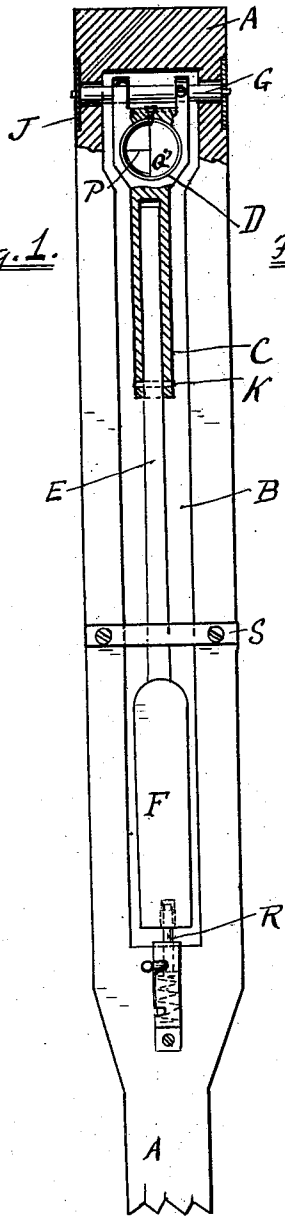


Fig. 2.

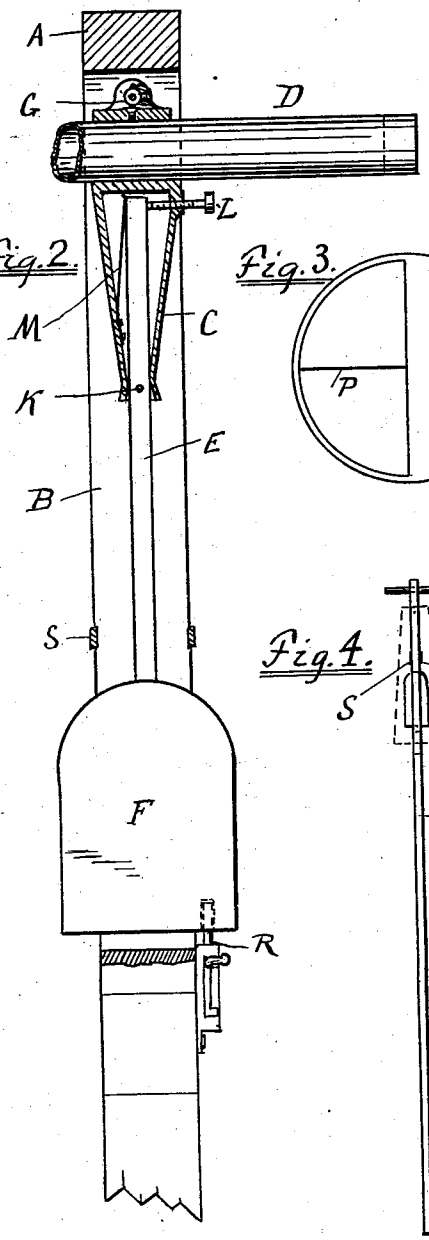
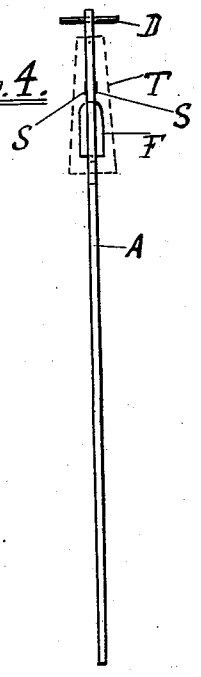


Fig. 3.

Fig. 4.



WITNESSES:

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No. 754,723. Patented March 15, 1904.

UNITED STATES PATENT OFFICE.

GEORGE GALE TOWNSEND, OF FROSTBURG, MARYLAND.

LEVELING INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 754,723, dated March 15, 1904.

Application filed June 16, 1903. Serial No. 161,706. (No model.)

To all whom it may concern:

Be it known that I, GEORGE GALE TOWNSEND, a resident of Frostburg, in the county of Allegany and State of Maryland, have invented certain new and useful Improvements in Leveling Instruments; 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 pertains to make and use the same.

The invention relates to surveying instruments or hand-levels, and has for its object to provide a simple, convenient, easily-manipulated, approximately accurate, and economical instrument.

The invention consists in the construction hereinafter described and pointed out.

In the accompanying drawings, Figure 1 is a partial central longitudinal section. Fig. 2 is a similar view taken at right angles to the first. Fig. 3 is an enlarged plane of an eyepiece, and Fig. 4 is an elevation of the instrument on a reduced scale.

The letter A denotes a staff or rod, preferably long enough to support the sight-tube about five feet above the surface upon which it stands. It has near what in use will be its upper end a slot B, in which is suspended a hollow frame or casting C, having fixed in one end by a screw or otherwise a sight-tube D about one foot in length and three-fourths or more inches in diameter. Within the frame C, constituting the tube-support, is suspended a rod E, provided at its free end with a weight F, having by preference a width greater than that of the main rod or staff A.

The frame C is fixed in any suitable manner, as by a screw, to a spindle G, journaled in bearings J in the upper end of the rod A, the frame being free to swing with the spindle in said bearings.

The weighted rod is pivoted to the frame at K and is adjustable with reference to the frame and its tube D by means of an adjusting-screw L, opposed by a spring M. The weighted rod suspended by means of the casting C from the staff by means of the spindle G is a pendulum for leveling the tube D.

In the direction transverse to the adjusting-screw and spring the rod practically fills the opening in the frame C, and swinging of the pendulum or weighted rod in that plane is thereby prevented.

When the instrument is not in use, the weight can be held within the slot B by any suitable catch, spring-bolt, or the like R capable of being moved to an inoperative situation. S denotes stops, which limit the movement of the pendulum in the plane of the sight-tube.

T (see Fig. 4) denotes a wind-guard, which, if desired, can be used to further inclose the pendulum.

Within each end of the sight-tube D is an eyepiece O, one part of which has a closed part provided with a peep-hole Q, the other part being open and provided with a cross-wire P.

The instrument can be made of any suitable material, brass being suitable for most of the parts. A one-fourth-inch steel rod is suitable for the pendulum-rod. The main rod may be made of wood. The invention is not limited as to the materials to be used, nor as to the proportions and sizes indicated, nor as to details of construction not particularly claimed. A flat spring M is illustrated for convenience; but any usual or suitable form of spring may be used.

Since each end of the sight-tube is provided with a similar eyepiece, it is immaterial which end is next the eye in practice. This construction also facilitates the adjustment of the instrument. To adjust it for work, so that the tube D and the line of sight shall be horizontal, the screw L is suitably manipulated until the sight-line strikes the same point whether the view be through one eyepiece or the other.

In use the staff is grasped below the weight and held in an approximately vertical line. The tube D under the influence of the pendulum will then instantly assume a horizontal position, and the sight can be taken, the operation being much speedier than by the use of the ordinary hand or liquid levels. The staff held in the hand can be easily turned to look through either end of the tube at a given object, which tube being provided in each end with a peep-hole and sight-line enables adjustment for the horizontal line before referred to.

The instrument is suitable for general use

in running grade-lines, ascertaining levels, and like work whenever speed and convenience combined with approximately accurate results are required, and more expensive instruments are unnecessary or undesirable.

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

1. In a leveling instrument, a slotted staff, a sight-tube support suspended within the staff-slot, and a pendulum suspended from the tube-support and situated in said slot, and a screw and opposing spring for adjusting the relation of the pendulum to the said support.

2. In a leveling instrument, a slotted staff, a sight-tube support suspended within the staff-slot, and a pendulum suspended from the tube-support and situated within said slot, and means for preventing the pendulum swinging in a plane transverse to the length of the tube, said means consisting of the parts of the staff immediately adjacent the slot.

3. In a leveling instrument, a slotted staff, a sight-tube support suspended within the staff-slot, and a pendulum suspended from the tube-support and situated in said slot, and means for preventing the pendulum swinging in a plane transverse to the length of the tube, said means consisting of the parts of the staff immediately adjacent the slot, and stops S to limit the swing of the pendulum within the slot in a direction lengthwise the tube.

4. In a leveling instrument, a slotted staff, a sight-tube support suspended within the staff-slot, and a pendulum suspended from the tube-support and situated in said slot, and means for preventing the pendulum swinging in a plane transverse to the length of the tube, said means consisting of the parts of the staff immediately adjacent the slot, and a wind-guard embracing the staff and also embracing the pendulum situated within the staff.

5. In a leveling instrument, a slotted staff, a sight-tube support suspended within the staff-slot, and a pendulum suspended from the tube-support and situated in said slot, and a spring-stop R to hold the pendulum immovable.

6. In a leveling instrument, the slotted staff, the hollow tube-support suspended in the staff-slot, the pendulum having a rod extending into the hollow of the support and filling the same in a direction transverse to the length of the tube and pivoted therein near the mouth of said hollow, the support having a hollow flared-in shape to permit the rod to swing on a pivot in a direction lengthwise the tube, and having walls fitting the pendulum-rod to prevent transverse oscillation.

7. In a leveling instrument, the slotted staff, the hollow tube-support suspended in the staff-slot, the pendulum having a rod extending into the hollow of the support and filling the same in a direction transverse to the length of the tube and pivoted therein near the mouth of said hollow, the latter being flared in shape to permit the rod to swing on a pivot in a direction lengthwise the tube, and an adjusting-screw and opposing spring bearing on the rod within the hollow.

8. In a leveling instrument, the rotatable staff, the sight-tube suspended in said staff, and similar eyepieces, one in each end of the tube, said eyepieces each comprising a partially-closed end of the tube provided with a peep-hole and an opening beside the closed part provided with a cross-wire.

9. In a leveling instrument, a supporting-staff, a sight-tube, a sight-tube support, suspended in the staff, and a pendulum suspended from said support, the support being pivoted in the staff above the situation of the tube.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

GEORGE GALE TOWNSEND.

Witnesses:
CLAYTON PURNELL,
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