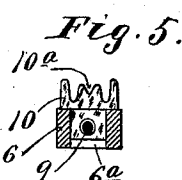
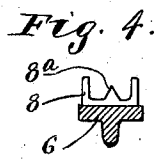
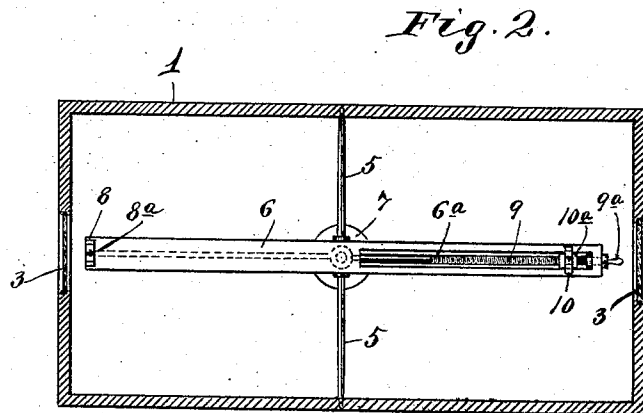
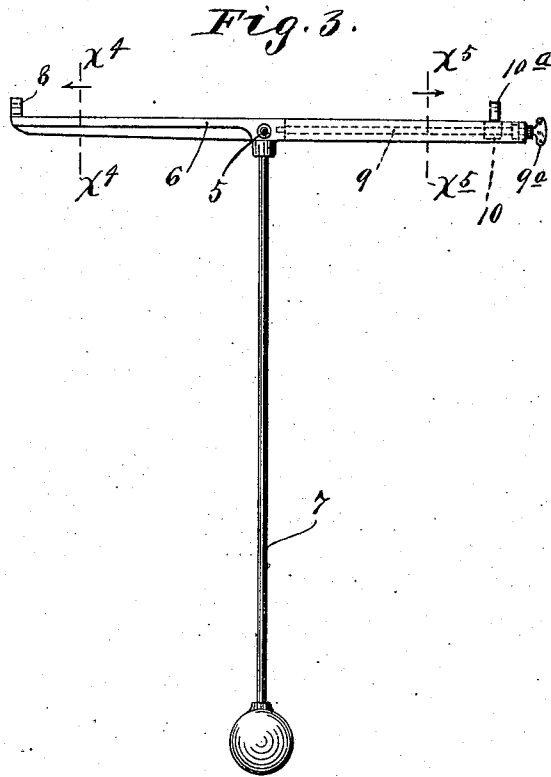
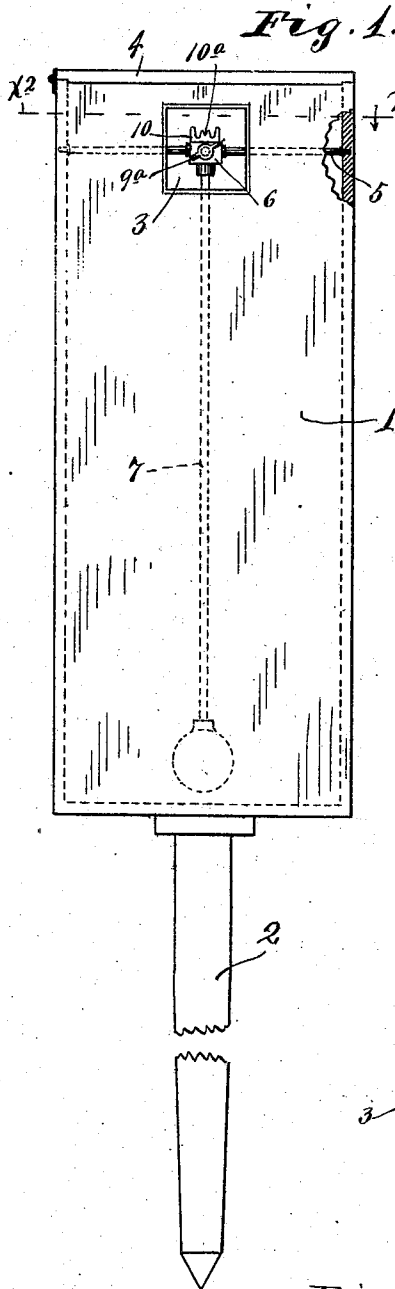


No. 854,796.

PATENTED MAY 28, 1907.

A. A. BROTHEN.
SURVEYING INSTRUMENT.
APPLICATION FILED FEB. 4, 1907.



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UNITED STATES PATENT OFFICE.

ANDREW A. BROTHEN, OF MOUNTAIN HOME, IDAHO.

SURVEYING INSTRUMENT.

No. 854,796.

Specification of Letters Patent.

Patented May 28, 1907.

Application filed February 4, 1907, Serial No. 355,603.

To all whom it may concern:

Be it known that I, ANDREW A. BROTHEN, a citizen of the United States, residing at Mountain Home, in the county of Elmore and State of Idaho, have invented certain new and useful Improvements in Surveying 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 appertains to make and use the same.

My invention has for its object to provide a simple and cheap surveying instrument, and to the above ends the invention consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

In the accompanying drawings which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings, Figure 1 is a view in front elevation, with some parts broken away, showing the improved surveying instrument. Fig. 2 is a horizontal section taken on the line $x^2 x^2$ of Fig. 1. Fig. 3 is a detail view in side elevation, showing the so-called "sighting" bar and its pendulum. Fig. 4 is a section on the line $x^4 x^4$ of Fig. 3; and Fig. 5 is a section on the line $x^5 x^5$ of Fig. 3.

Preferably, the movable parts of the instrument are located within a casing 1 that is rigidly secured to the upper end of a supporting base 2, the lower end of which latter is sharpened and adapted to be readily forced into the ground to support the casing 1 in an upright position. The casing 1 is provided near the upper portions of its front and rear walls with inset glass panes 3 and it is preferably provided with a hinged top 4.

A transverse spindle or axle 5 is secured at its ends to the sides of the casing 1, with its intermediate portion in line with the two transparent panes 3. Loosely pivoted on this spindle 5 is a so-called "sighting" bar 6 that is provided at its central portion, to-wit, just below the spindle 5, with a depending weighted rod 7 that acts as a pendulum to maintain the sighting bar 6 in a horizontal position or at an angle to a horizontal, as will presently more clearly appear.

On one end, the sighting bar 6 is provided with a sight piece 8, shown as provided with a pointed intermediate sighting lug 8^a. The other arm of the sighting bar 6 is provided with a long slot 6^a in which is located a

threaded rod 9, the ends of which are swiveled to the said bar, and the extreme outer end of which is preferably provided with a thumb piece 9^a, by means of which it may be turned. Working in the slot 6^a and having threaded engagement with the adjusting rod 9 is a sight block 10 which, as shown, is provided with an intermediate V-shaped sighting notch 10^a.

The construction and arrangement of the parts described is such that when the sighting block 10 is adjusted approximately as shown in Fig. 3, the pendulum or weighted rod 7 will hold said sighting bar 6 in a horizontal position. When, however, the sighting block 10 is moved nearer to the fulcrum or pivot spindle 5 of the bar 6, the right hand end of said bar, as viewed in Fig. 3, will be lightened or over-balanced slightly by the left hand end of said arm, so that the pendulum 7 will be swung slightly toward the right, and the right hand end of said sighting bar 6 will be slightly raised. It is thus evident that by proper adjustments of the sighting block 10 the sighting bar 6 may be set at the proper angle to get a rising or declining grade. It is, of course, evident that the "sighting" may be taken looking into either end of the casing. The sighting should, of course, be taken with the point of the sighting lug 8^a alined with the point of the sighting notch 10^a.

The obvious purpose of inclosing the parts of the instrument in the casing 1 is to protect the same from the elements, such as rain, dust and snow.

The instrument described is of very small cost and may be used by all persons, whether or not they are skilled in the art of surveying. It is especially adapted for use by persons not skilled in the art of surveying and was particularly designed for use by farmers and other in the irrigated sections of the country. It will enable them in the first instance and without experiment to accurately run their ditches and laterals so that they will carry water; and by its use the farmer or other person can also readily determine where his ground is improperly leveled and unfit for irrigation, and this without waiting, as has been customary, for a year, more or less, in order to see where water will flow and where it will not flow. In this way, the farmer may be insured a good crop the first year, on much ground which would, under the old practice, not have been productive because not properly leveled for irrigation. The instrument

will also save farmers and others surveyors fees and, furthermore, will be at hand when needed.

What I claim is:

5 1. In an instrument of the kind described, the combination with a suitable support, of a weighted oscillatory sighting bar provided on opposite sides of its pivotal point of suspension with sighting pieces, one of which is ad-
10 justable longitudinally of said sighting bar to vary the inclination of said bar with respect to a horizontal, substantially as described.

2. In an instrument of the kind described, the combination with a suitable support hav-
15 ing a depending leg or means for anchoring the same to the ground, of a weighted oscillatory sighting bar 6 intermediately pivoted to said support and provided at the end of one of its arms with a sighting piece 8, the other
20 arm thereof being slotted and provided with an adjusting screw, and an adjustable block 10 working in the slot of said bar having

screw threaded engagement with said adjust-
ing screw 9 and provided with a sighting
piece 10^a, substantially as described. 25

3. The combination with the casing 1 hav-
ing a depending supporting leg 2 and the op-
posite transparent panes 3, of the sighting
bar 6 intermediately pivoted within said cas-
ing and provided with a depending weighted
30 pendulum 7, a sighting piece 8 secured to one end of said sighting bar, the other arm of said bar being slotted and provided with an ad-
justing screw 9, and a block 10 working in the
slot of said bar, having screw threaded en-
35 gagement with said screw 9 and provided with a sighting piece 10^a, substantially as de-
scribed.

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

ANDREW A. BROTHEN.

Witnesses:

T. J. LA FOREST,
C. C. MORTRUDE.