

W. H. Robinson.
Levelling Staff.

N^o 90,025.

Patented May 11, 1869.

Fig 1

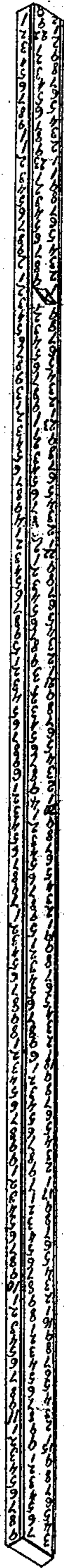


Fig 2

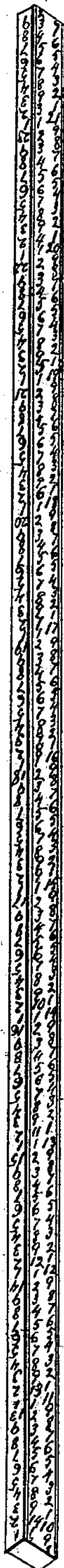
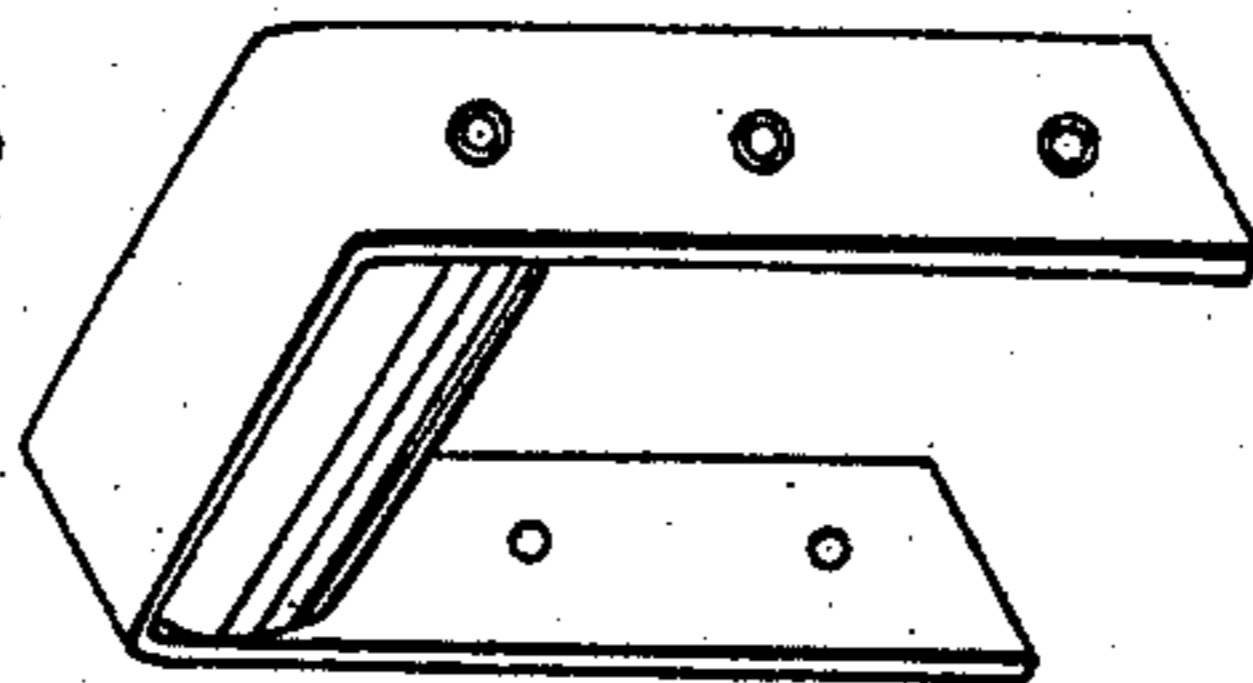


Fig 3



Witnesses,
Ballard Hobart -
By: A. Watthley,

Inventor,
W. H. Robinson

United States Patent Office.

WILLIAM H. ROBINSON, OF VERMONT, ILLINOIS.

Letters Patent No. 90,025, dated May 11, 1869.

IMPROVEMENT IN LEVELLING-STAFF.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, WILLIAM H. ROBINSON, of Vermont, in the county of Fulton, and State of Illinois, have invented a new and valuable Improvement in Levelling-Rods, (device for cross-sectioning earth-work;) and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1, of the drawings, is a representation of the rod, showing the face and the side, which is used as an ordinary levelling-rod.

Figure 2 is a representation of the rod, showing the back and the side opposite the one used in ordinary levelling.

Figure 3, a pulley, one of which is attached to each end of the rod.

My mode of constructing the rod is as follows:

I take a straight rod of light wood, about one and a quarter inch thick, two inches wide, and twelve feet long, and, in order to make it as light as possible without diminishing the width, I make it hollow.

A pulley, fig. 3, is attached to each end of the rod.

A band of leather, or some other flexible non-elastic material, of the same width as and twice the length of the rod, is passed over the pulleys, drawn perfectly tight, and the ends fastened firmly and smoothly together, forming the face and back of the rod.

It is then painted white, and graduated into feet and tenths of a foot.

The graduations on the fixed part of the rod, are numbered in a continuous series, from the bottom up the side, (see fig. 1,) thence down the opposite side, (see fig. 2,) to the bottom.

The graduations on the movable part or band, are numbered both ways, one series running from the zero or target down the face to the bottom, (see fig. 1;) thence up the back, (see fig. 2,) to the top; thence down the face again, (see fig. 1,) to the place of beginning.

The other series runs up the rod, on the face, to the top, (see fig. 1;) thence down the back, (see fig. 2,) to the bottom; thence up the face, (see fig. 1,) to the place of beginning, as before.

The figure on the fixed part of the rod, (see right-hand sides of figs. 1 and 2,) representing tenths, are painted black, and those representing feet are painted red.

The figures on the band are also painted black and red, but the black figures represent tenths from the target, both ways, to twelve feet, or half the length

of the band, while the red ones represent feet, and from thence, around to the target again, the black figures represent feet and the red ones tenths.

The manner of using the rod is as follows:

Ascertain, by using the rod as an ordinary levelling-rod, the height of the instrument, (the common engineer's level,) above or below the given grade at the station where the observations are to be made, and set the target or zero accordingly.

The number on the face of the rod which coincides with the line of collimation of the instrument, is then the cut or fill, as the case may be, at that station.

If the number is below the target, it represents a cut, and if it is above the target, it represents a fill.

If the instrument is more than twelve feet, or the length of the rod above grade, the target should be set by the figures on the side of the rod, opposite to the side used in ordinary levelling. (See right-hand side of fig. 2.) It should be on the back of the rod.

The above rule is somewhat modified by the following, which the operator should be careful to remember:

When the target is on the face of the rod, the black figures are the only ones noticed as representing the tenths.

When the target is on the back of the rod, by reason of the instrument being more than twelve feet, or the length of the rod above grade, the numbers running from the top of the rod downward, are the only ones noticed, and they invariably represent a cut.

When the target is on the back of the rod, by reason of the instrument being below grade, the numbers running from the bottom of the rod upwards, are the only ones noticed, and they invariably represent a fill.

If the instrument is more than the length of the rod below, or more than twice the length of the rod above grade, the target may be set on the back of the rod, ten, twenty, or thirty feet, as the case may be, less above or below grade than the calculations show that it should be set, and the ten, twenty, or thirty added to the numbers read from the rod.

What I claim as my invention, and desire to secure by Letters Patent, is—

A levelling-rod, having a travelling-band, as described, moving around the same longitudinally, when said rod and band are graduated and operate substantially as and for the purposes specified.

In testimony that I claim the above, I have hereunto subscribed my name, in the presence of two witnesses.

WILLIAM H. ROBINSON.

Witnesses:

BALLARD HOBART,

BENJAMIN ARMITAGE HATTERSLEY.