E. A. GIESELER.

SURVEYORS' LEVELING TARGET.

No. 173,938. Patented Feb. 22, 1876.

Fig: 3

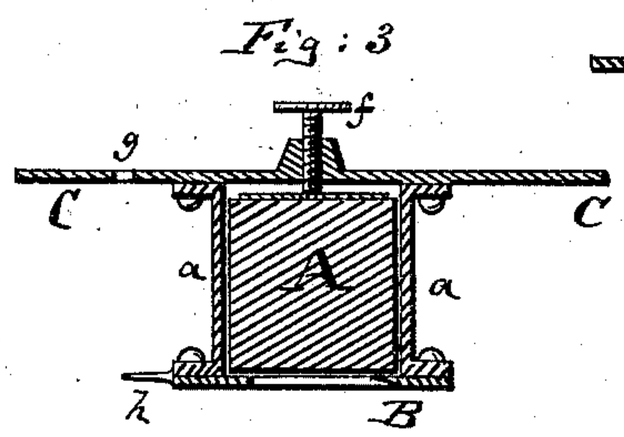


Fig: 1

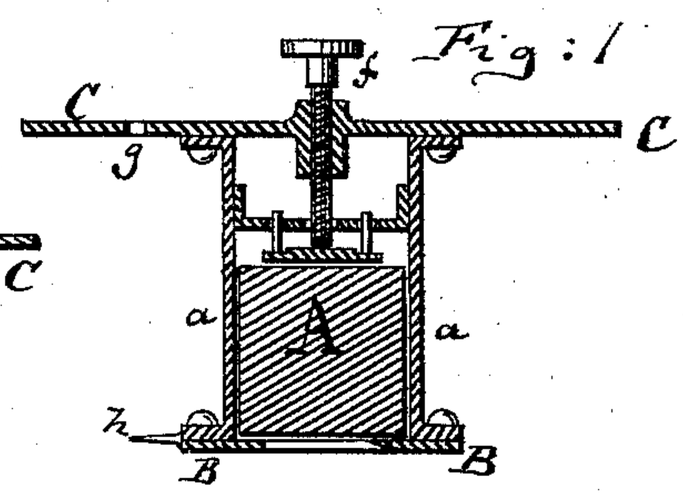


Fig: 2

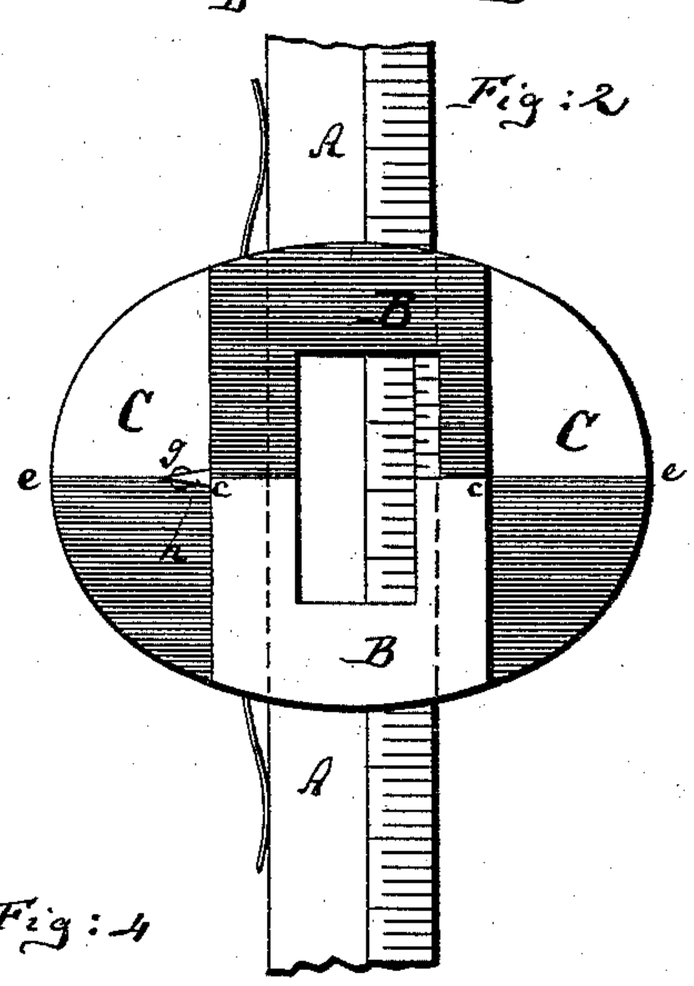


Fig: 4

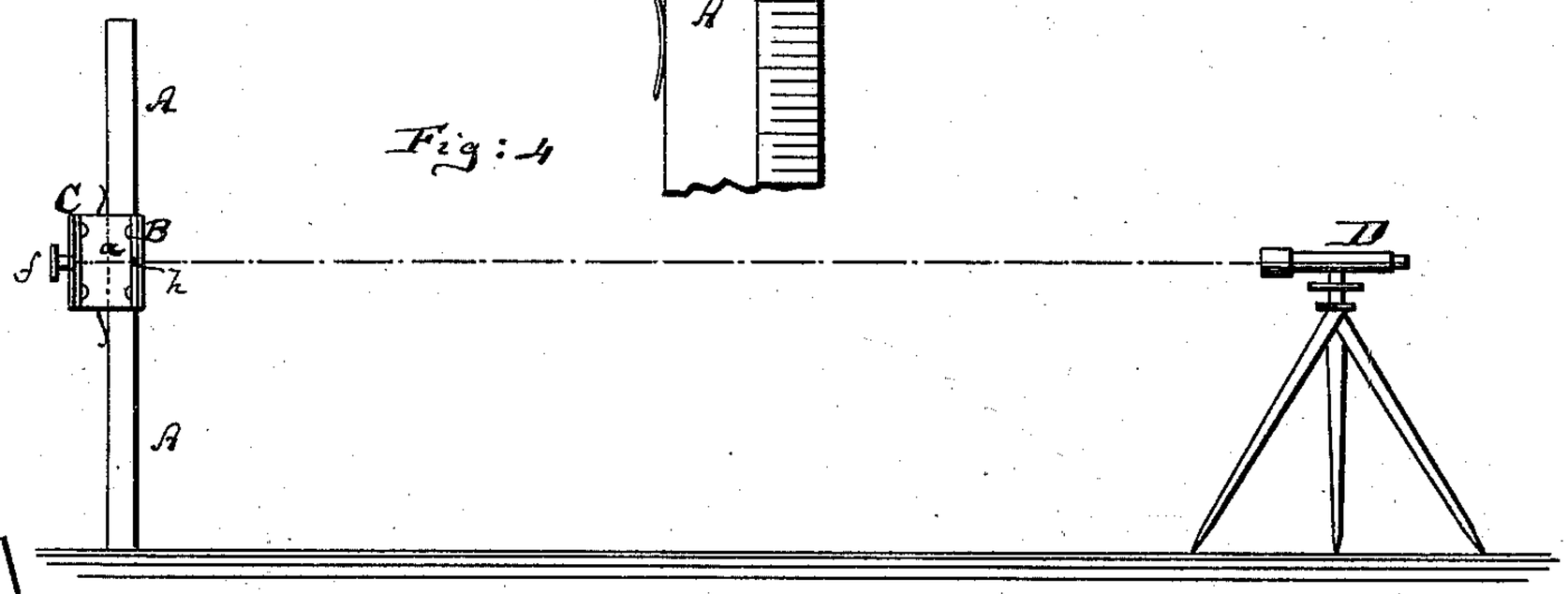
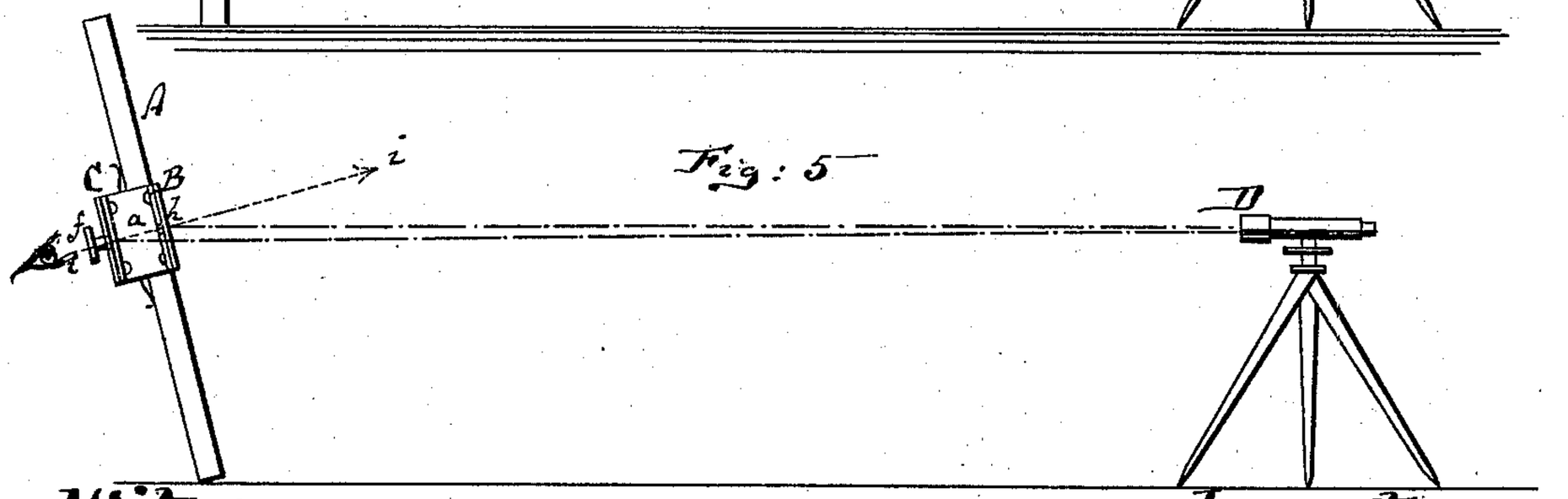


Fig: 5



Witnesses:

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by his attorney

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UNITED STATES PATENT OFFICE.

ERNST A. GIESELER, OF NEW YORK, N. Y.

IMPROVEMENT IN SURVEYORS' LEVELING-TARGETS.

Specification forming part of Letters Patent No. **173,938**, dated February 22, 1876; application filed January 15, 1876.

To all whom it may concern:

Be it known that I, ERNST AUGUST GIESELER, of New York city, in the county and State of New York, have invented a new and Improved Surveyor's Leveling-Target, of which the following is a specification:

This invention relates to an improved leveling-target for surveyors, which will enable the surveyor to ascertain whether the leveling-rod is held perpendicular, or whether it is inclined toward or away from the instrument.

Heretofore in taking levels the surveyors, although able to ascertain whether the leveling-rods were inclined sidewise, could not discern with certainty whether the rods leaned toward the leveling-instrument or away from the same, and serious errors were, therefore, frequently made, as every observation is incorrect unless the rod is held absolutely plumb.

The present invention consists, principally, in combining with the ordinary perforated target of the leveling-rod a second larger target placed behind said rod, and provided with a horizontal center-line, which, when the rod is plumb, will coincide with a similar dividing-line on the front target, and the observer will, when the two lines do not coincide, be thereby informed that the rod is not vertical.

The invention also consists in the combination of said two targets with a diopter, by which the rod-man himself will be enabled to place the rod plumb, and yet always keep the observer properly in view.

In the accompanying drawing, Figure 1 is a horizontal transverse section of my improved leveling-target. Fig. 2 is a face view thereof; Fig. 3, a horizontal transverse section of a modification thereof. Fig. 4 is a side view, on a reduced scale, of the rod and instrument, showing the rod to be provided with my improved target, and held perpendicular. Fig. 5 is a similar view as Fig. 4, but showing the rod inclined.

Similar letters of reference indicate corresponding parts in all the figures.

The letter A represents a leveling-rod of suitable or convenient construction, and graduated in the usual manner. *a* is the slide or sleeve embracing the rod A, and attached to the perforated target B, which is situated in front of the graduated side of the rod A in the usual manner. The target B is, as always, divided into an upper and lower field by a horizontal line, *c c*, which line enables the observer at the instrument to ascertain the length of the rod below the line of vision. The slide *a* is of ordinary or suitable construction, and may be provided with a set-screw, *f*, by which it can be clamped to the rod at the desired height. The target B should be made shorter than usually—*i. e.*, in horizontal direction. The slide *a* carries also the rear target C, which is longer than the front target B, and behind the rod A its greater length horizontally allowing it to be seen at either or both sides of the target B, as clearly shown in Fig. 2. The rear target C may be perforated to admit the set-screw *f*, as shown. The face of the rear target C is also bisected by a horizontal line, *e e*, which, whenever the rod is held quite plumb, will be in line with the line *c c*, as shown in Fig. 2. If, however, the rod is inclined, as in Fig. 5, the lines *c c* and *e e* will not coincide, and the operator will thus be informed of the wrong position of the rod.

I prefer to set the target C as far away from the target B as practicable, and rather to extend the slide *a* backward for that purpose, as in Fig. 1, than bring the target C close to the rod, as in Fig. 3, for the reason that the greater the distance between the two targets the more readily will the operator observe the slightest degree of inclination of the rod.

That the height of the target on the rod is read off by the line *c c* on the scale of the rod is unnecessary to specify.

In order to give the rod-man an opportunity to control the proper position of the rod, and yet at the same time to keep the observer or operator always in view, I apply a diopter to the double target B C by perforating the target C in the line *e e*, as at *g*, and forming a point, line, or mark, *h*, on the target B directly in front of the hole *g*, and in the line *c c*. The rod-man in looking through the hole *g* toward the point or mark *h* will sight the instrument D only if the rod is plumb; otherwise he will look down or up, as at *i i* in Fig. 5. The diopter may be formed by two holes, one in

each target, that in the target B having by preference a horizontal string or line across it.

It is well known that the rod-man should always keep the man at the instrument D in view, to receive his signs and act accordingly, and the diopter in the double targets serves, therefore, a double purpose.

When an extension-rod is used, on which the targets are carried above reach of the rod-man a spirit-level should be used on the connecting-slide of the rod-sections, if it is desired to give the rod-man an opportunity of knowing when the rod is absolutely vertical.

I claim as my invention—

1. The perforated leveling-target B, combined with the larger rear target C, having line *e e*, substantially as and for the purpose herein shown and described.

2. In combination with the two targets B and C of a leveling-rod, the diopter *g h*, applied substantially as specified.

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Witnesses:

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