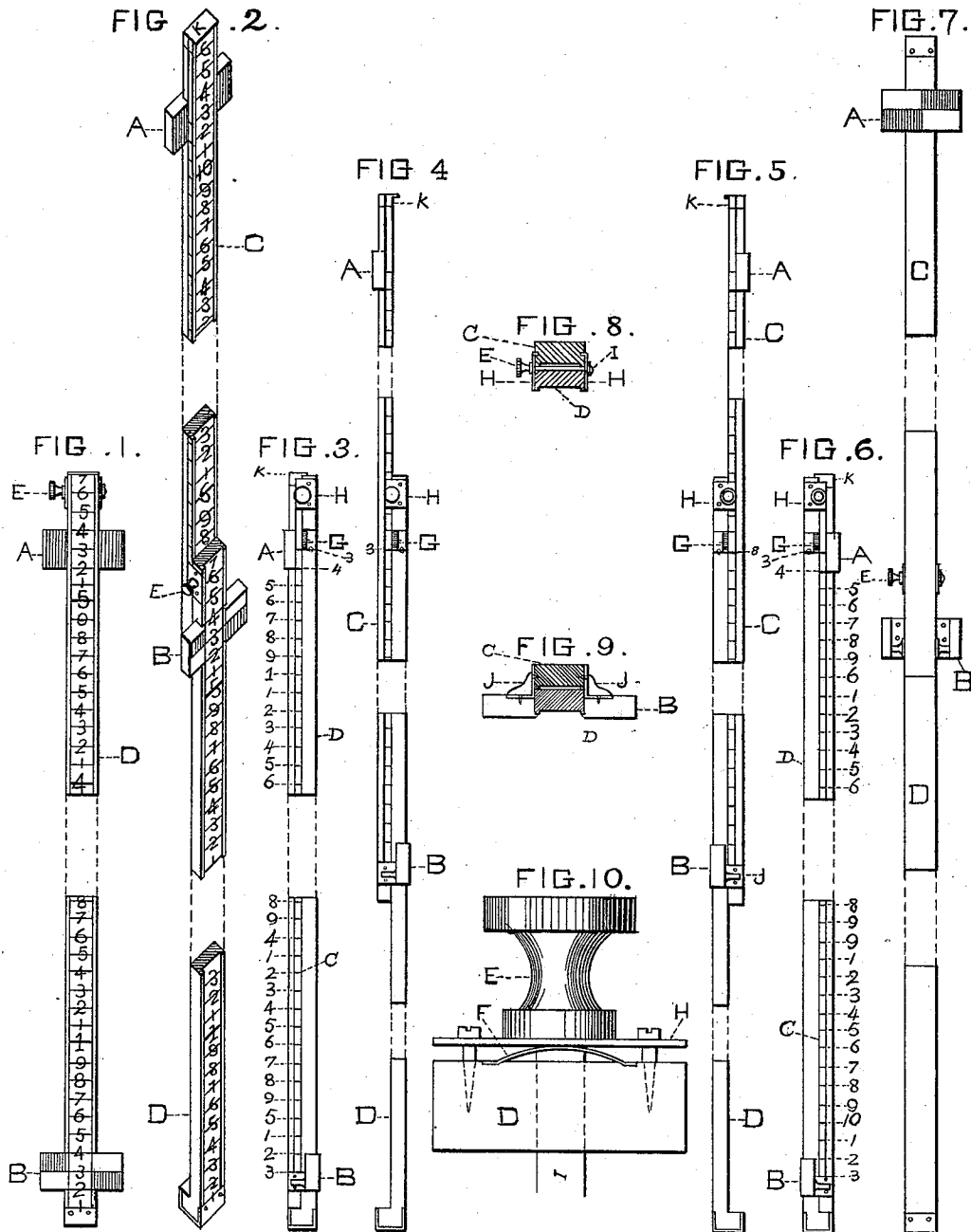


(No Model.)

J. BEERS.
CIVIL ENGINEER'S LEVELING ROD.

No. 468,864.

Patented Feb. 16, 1892.



WITNESSES.

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CIVIL ENGINEER'S LEVELING-ROD.

SPECIFICATION forming part of Letters Patent No. 468,864, dated February 16, 1892.

Application filed February 18, 1891. Serial No. 382,009. (No model.)

To all whom it may concern:

Be it known that I, JOHN BEERS, of Greenville, in the county of Darke and State of Ohio, have invented a new and useful Engineer's Leveling-Rod; and I do declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters marked thereon, making a part of this specification.

Figure 1 is a front view with the rod closed or shoved together. Fig. 2 is a front view with the rod extended its full length. Fig. 3 is a side view with the rod closed. Fig. 4 is a side view with the rod partly extended. Fig. 5 is a view of the opposite side of the rod partly extended. Fig. 6 is a view of the latter side of the rod shoved together. Fig. 7 is a rear or back view of the rod extended full length. Fig. 8 shows the cross-section through the thumb-screw E. Fig. 9 shows the cross-section through target B. Fig. 10 is a full size nearly of thumb-screw E, showing the spring F.

Said leveling-rod is constructed of the targets A and B, bars C and D, thumb-screw E, spring F, verniers G G, plates H and H; bolt I, brackets J J. The targets A and B can be made of wood or suitable metal. The bars C and D are made of wood. All other parts are made of suitable metal. The front of the bars C and D (shown in Figs. 1 and 2) is divided into feet and tenths of a foot from bottom up on a white ground. The red figures are feet and the black figures are tenths of a foot, the figures being about a tenth of a foot square. The edges of the rod are also divided into feet and tenths of a foot in Fig. 3, from three-tenths of a foot at the center of target A down to five feet, and three-tenths of a foot at the center of target B, and Fig. 6 is divided three-tenths of a foot at the center of target A down to ten feet and three-tenths of a foot at the center of target B, the red figures on both edges being feet and the black figures tenths of a foot, but smaller than the figures on the front views of Figs. 1 and 2, the scale being rather small to show them marked on the edges. These latter figures on the edges are to be read by the party holding the rod.

In Figs. 4 and 5 the feet are only marked

in order to show more clearly how the rod is operated.

The bars C and D are constructed with grooves, as shown in Fig. 8, the plates H H fitting loosely into the grooves in the edges of bar C to hold the rod together, as shown in Fig. 8.

G is a vernier one-tenth of a foot long and divided into one hundredths of a foot. The lower end of the verniers, when the rod is closed is even with the center of target A. The tenths on the edges of the rod can also be divided into one-hundredths of a foot, and the verniers G G should then be nine-hundredths of a foot long and divided into ten equal parts, and the rod could then be read to feet, tenths, hundredths, and thousandths of a foot. The spring F is used to raise one of the plates H when the thumb-screw is released, so the bars C and D will move easily past each other in lengthening the rod.

The bolt I, to which the thumb-screw is fastened, extends through plates H H, as shown, and the target A is fastened with screws to the rear of bar C, and target B is fastened to bar C with brackets J J as the latter are shown in Fig. 9. The rod can also be made longer than the length shown in the drawings.

The rod is operated as follows: The figures on the front of the rod in Fig. 1 can be read at a distance with an engineer's level until the level is above the rod represented in Fig. 1, when the rod is extended, as in Fig. 2, the center of target B being set to the lower end of vernier G, when the figures can be similarly read to the top of the rod, and so used in that way as what is commonly called a "self-reading" rod. When the rod is to be used for greater accuracy, it is operated as follows: When target B is raised or lowered by sliding bar C up or down until the center of B is level with the center of the engineer's level, then the exact distance from the center of target B to the bottom of the rod is shown on the edge that is represented in Fig. 3, and as shown at G, Fig. 4, in which latter case it is three feet. Then by turning the rod around the exact position of target A is similarly obtained, so it is level with the center of the engineer's level. Then the exact reading is shown on the edge, as represented in Fig. 6 and as shown at G, Fig. 5, in which latter case it is

eight feet from the center of target A to the
bottom of the rod, and likewise the feet and
divisions of a foot can be obtained by noting
the position of the verniers G G for targets A
5 and B.

The rod is shod at the ends with metal, as
shown.

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

10 An engineer's leveling-rod formed of the

targets A and B, facing in opposite directions,
bars C and D, thumb-screw E, spring F, ver-
niers G, plates H H, bolt I, brackets J J, and
stop K, constructed and combined substan-
tially as herein shown and described.

JOHN BEERS.

Witnesses:

J. H. BRANDON,
G. W. PORTER.