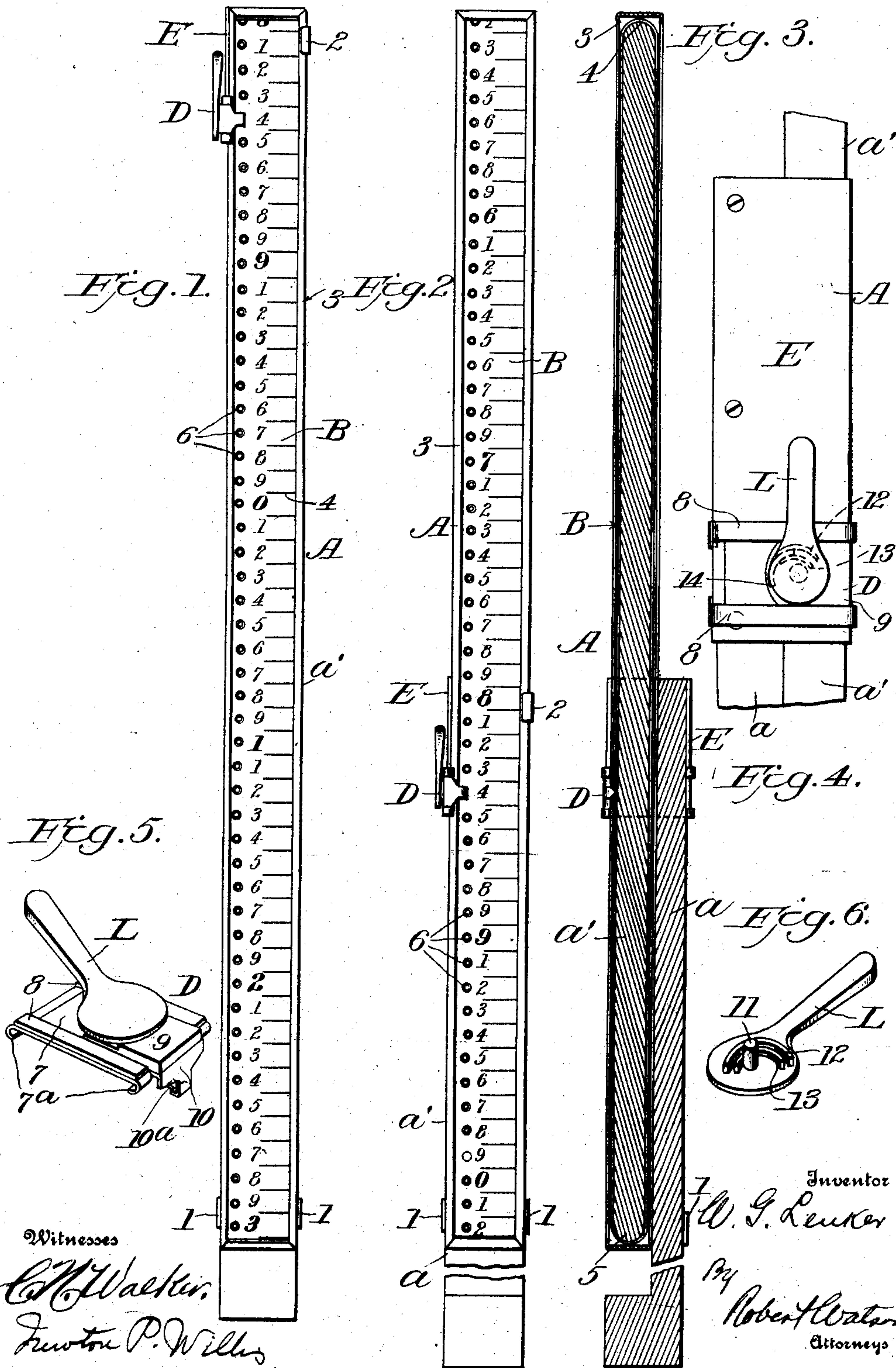


W. G. LENKER.
LEVELING ROD.
APPLICATION FILED AUG. 1, 1907.

905,442.

Patented Dec. 1, 1908.



UNITED STATES PATENT OFFICE.

WILL G. LENKER, OF SUNBURY, PENNSYLVANIA.

LEVELING-ROD.

No. 905,442.

Specification of Letters Patent.

Patented Dec. 1, 1908.

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To all whom it may concern:

Be it known that I, WILL G. LENKER, a citizen of the United States, residing at Sunbury, in the county of Northumberland and State of Pennsylvania, have invented certain new and useful Improvements in Leveling-Rods, of which the following is a specification.

My invention relates to improvements in leveling rods, the construction and advantages of which will be clear from the following specification, taken in connection with the accompanying drawing, in which,

Figure 1 is a front view of the leveling rod with the two sections telescoped or closed upon one another; Fig. 2 is a similar view of the rod, partly extended, the lower section being broken away; Fig. 3 is a vertical section through the rod taken on a line with the row of perforations in the scale band, in Fig. 2, the perforations being omitted; Fig. 4 is an enlarged side view of the guide plate, which is secured to the upper end of the lower section of the rod, and the adjustable clamping device for engaging the scale band; Fig. 5 is a perspective view of the clamp, and Fig. 6 is a similar, inverted, view of the lever which operates the clamp.

Referring to the drawing a and a' indicate what may, for convenience, be called the lower and upper sections, respectively, of the leveling rod A. These sections are held in sliding engagement with one another by suitable sheet metal guides 1, secured to the sides of the section a' , near its lower end, and bent over at the rear of the section a , and by a similar guide 2, secured to the section a near its upper end and bent over one of the front edges of the section a' , and also by the guide plate E, which is secured to one side of the section a , near its upper end. An endless scale band B extends around the ends of the rod section a' and is suitably held in place upon said rod by a metal frame or casing 3 having flanges which turn inwardly over the edges of the band or tape, as shown. This scale band is movable lengthwise upon the rod section a' and the ends 4 and 5 of the section are rounded as shown, in order to permit the band to move thereover without undue friction.

The numerals on the scale band for indicating the units and fractions of units, read downwardly on the front side of the band, in regular order, as shown in Figs. 1 and 2, so that, as hereinafter explained, direct read-

ings may be taken from the band. The scale band has a series of perforations near one edge in which are inserted eyelets 6. In the drawing one eyelet is shown for each fractional division of the scale but a less number would suffice. The guide plate E is a little wider than the thickness of the two rod sections, and its lateral edges project slightly at the front and rear of the rod, as shown in Figs. 3 and 4. These projecting edges form guideways for a slide 7, having inturned hooks or flanges 7^a which extend around said edges and hold the slide upon the plate. The slide 7 has parallel guideways 8 extending from front to rear, and within these latter guideways is another slide 9, having its end portion 10 bent over at a right angle so as to engage the front edge of the plate E, and having a backwardly turned tooth 10^a of proper size to fit into the eyelets 6. The slide 9 is movable into and out of engagement with the eyelets in the scale band and with the plate E by means of a cam lever L, having a pivot 11 which is journaled in the plate or slide 7 midway between the guide strips 8. The lever L has two parallel cams, 12 and 13, which engage a curved projection 14 on the slide 9, as indicated in dotted lines in Fig. 4. These cams are so arranged that when the lever is in the position indicated in Figs. 1, 2 and 4, the slide 9 will be held with its end 10 bearing firmly against the front edge of the plate E and the reduced end or tooth 10^a of the slide will be in engagement with one of the eyelets in the scale band. When the lever is given a quarter turn, or less, the slide 9 will be moved outwardly so that its end portions will be disengaged from the band and the plate. In Fig. 5 the slide 9 is shown in its outer position.

The clamp, consisting of the slide 9 and the lever L, when tightened, does not prevent relative movement of the rod sections. These are held frictionally together by the guides 1 and 2 so that they will stay in any position of adjustment. When the clamp is set, as it remains stationary with respect to the lower section a of the rod, and the tooth 10^a engages the band, it will be seen that when the upper section a' is moved up or down relatively to the lower section, the band will slide around on the upper section.

The scale band shown in the drawing is represented as being 10 feet or units of measurement in length, the units being indicated

by numerals in heavy type and the fractions being indicated by numerals in smaller and lighter type, and both the unit indicating numerals and the fraction indicating numerals read downwardly in regular order on the front face of the rod.

In Fig. 1 of the drawing the two rod sections are shown in closed positions and in Figs. 2 and 3 the sections are represented as being moved outwardly relatively to one another. In operation, assuming that the rod is placed upon a bench mark of known elevation, 109 feet for instance, the rod man will, while the clamp is loose, turn the scale band by hand to bring the unit numeral 9 on to the front side of the rod and adjust it to the sight taken through the leveling instrument. The slide 7 carrying the clamp will then be moved on the plate E to bring the tooth 10^a on the clamp opposite one of the eyelets in the band and the clamp will then be tightened. If the rod is then moved to points successively one foot higher than the bench mark, readings will be taken at points successively one foot lower on the rod, until the last unit numeral on the face of the rod is reached when, of course, it will be necessary to move the leveling instrument. As will be seen from an inspection of Fig. 1 these readings will be direct readings giving the actual elevations. If, instead of moving the rod to points higher than 109 feet, the rod is moved to points successively 1 foot lower than that elevation, the section α' of the rod is moved upwardly relatively to the section α , without releasing the clamp, and as the latter connects one point of the band with the lower section α of the rod, thereby holding that part of the band stationary, the latter will turn on the section α' and bring into view, the unit numerals 7, 6, etc. as indicated in Fig. 2 so that direct readings can be taken as the rod is moved onto successively lower points. By moving the sections together again, as the rod is moved onto higher points the numerals for indicating higher elevations will be brought into view on that part of the section α' which is below the clamp.

It will be evident that the band will be useful on a rod which is not extensible, since the band may be turned to bring any desired numerals into view and direct readings may be taken.

What I claim is,—

1. An extensible leveling rod comprising two relatively movable sections, an endless flexible scale band carried wholly by one of said sections and adjustable lengthwise thereon, and means for holding one part of the band stationary with respect to the other section of the rod.

2. An extensible leveling rod comprising two relatively movable sections, an endless flexible scale band carried wholly by one of

said sections and adjustable lengthwise thereon, and a clamp for holding one part of the band stationary with respect to the other section of the rod.

3. An extensible leveling rod comprising two relatively movable sections, an endless flexible scale band carried wholly by one of said sections and adjustable lengthwise thereon, the numerals on said band reading downwardly on the front side of the rod and means for holding one part of the band stationary with respect to the other section of the rod.

4. An extensible leveling rod comprising two relatively movable sections, an endless flexible scale band carried wholly by one of said sections and adjustable lengthwise thereon, the numerals on said band reading downwardly on the front side of the rod and a clamp for holding one part of the band stationary with respect to the other section of the rod.

5. A leveling rod comprising two relatively movable sections, the upper one of said sections having an endless flexible scale band adjustable lengthwise thereon, the unit indicating numerals on said band reading downwardly on the front side of the rod, said band having a series of perforations extending lengthwise thereof, and a device adjustably connected with the lower section of said rod adapted to engage said perforations.

6. A leveling rod comprising two relatively movable sections, an endless flexible scale band carried wholly by the upper section and adjustable lengthwise thereon, the unit indicating numerals on said band being arranged in regular order throughout the length of the band and reading downwardly on the front of the rod, and means at the upper end of the lower section for engaging a part of the band and holding said part stationary with respect to the lower section when the sections are adjusted relatively to one another.

7. A leveling rod comprising two relatively movable sections, the upper section having an endless flexible scale band adjustable lengthwise thereon, said band having a series of perforations extending lengthwise thereof, and a clamping device arranged at the upper end of the lower section and having a tooth for engaging said perforations.

8. An extensible leveling rod comprising two relatively movable sections, and an endless flexible scale-band carried wholly by the upper section and adjustable lengthwise thereon, said band having the successive unit-indicating numerals arranged in regular order throughout the length of the band and reading downwardly on the front of the rod, and having fraction-indicating numerals arranged in regular order between

successive unit-indicating numerals and reading downwardly on the front of the rod.

9. An extensible leveling rod comprising two relatively movable sections, an endless
5 flexible scale band carried wholly by the upper section and adjustable lengthwise thereon, the unit-indicating numerals on said band being arranged in regular order
10 throughout the length of the band and reading downwardly on the front of the rod and

means for holding one part of the band stationary with respect to the lower section while the sections are being moved relatively to one another.

In testimony whereof I affix my signature, 15
in presence of two witnesses.

WILL G. LENKER.

Witnesses:

J. E. LENKER,
M. G. LENKER.