

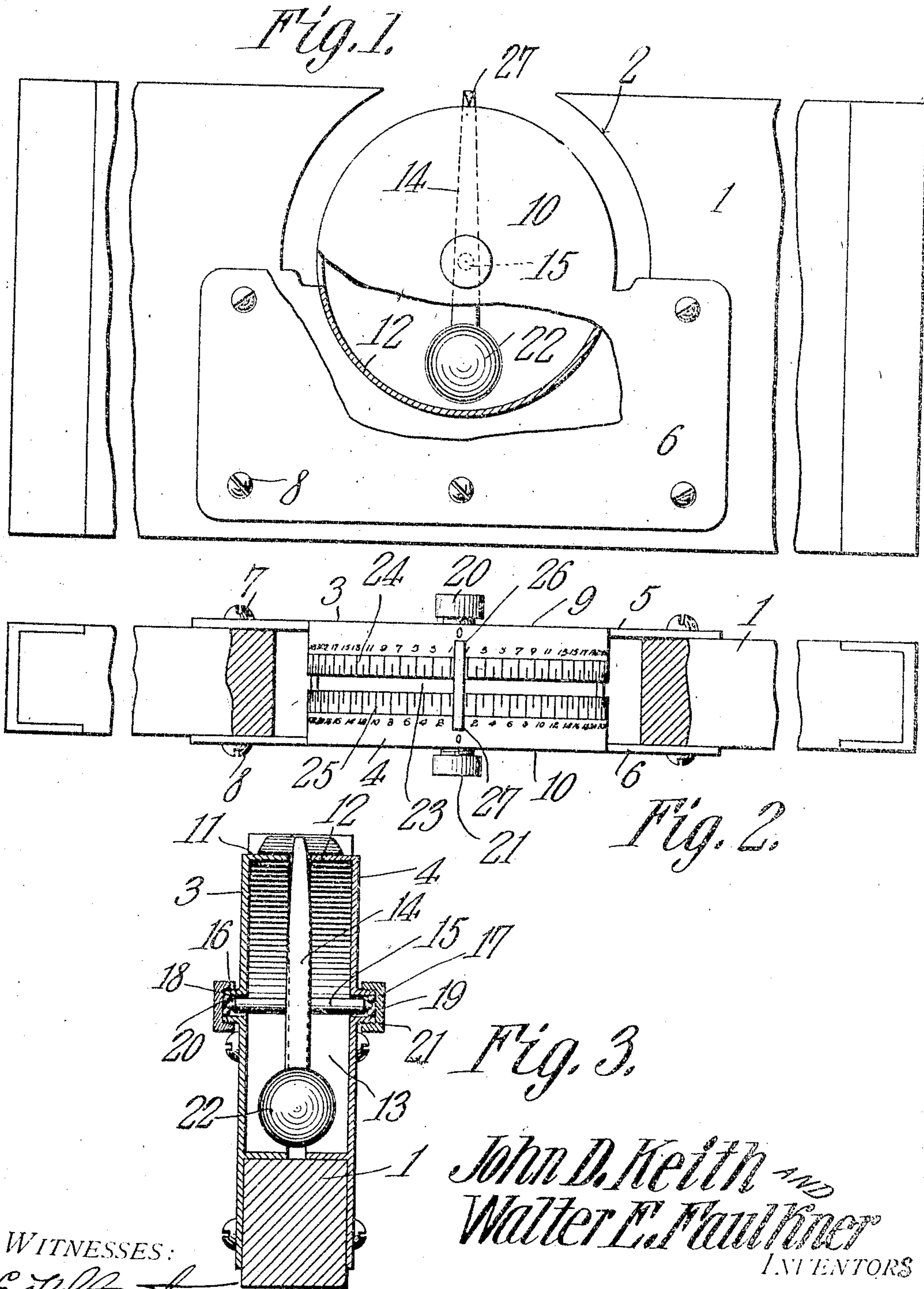
No. 888,238.

PATENTED MAY 19, 1908.

J. D. KEITH & W. E. FAULKNER.

CLINOMETER.

APPLICATION FILED AUG. 14, 1907.



WITNESSES:

*E. J. Stewart*

*C. A. Bortman*

*John D. Keith and  
Walter E. Faulkner*  
INVENTORS

By *CA Snow & Co.*  
ATTORNEYS



# UNITED STATES PATENT OFFICE.

JOHN DAVID KEITH AND WALTER EDGAR FAULKNER, OF SANTA ANNA, TEXAS.

## CLINOMETER.

No. 888,238.

Specification of Letters Patent.

Patented May 19, 1908.

Application filed August 14, 1907. Serial No. 328,518.

*To all whom it may concern:*

Be it known that we, JOHN DAVID KEITH and WALTER EDGAR FAULKNER, citizens of the United States, residing at Santa Anna, in the county of Coleman and State of Texas, have invented a new and useful Clinometer, of which the following is a specification.

My present invention relates to improvements in instruments for determining grades or angles of inclination of structures and objects of various descriptions, and it has for its object to provide an improved device of this character that is so simple in construction that it may be manufactured cheaply and is not liable to get out of order easily, and which, in practice, is capable of indicating immediately the angle or grade, the instrument being provided with a scale so graduated that the instrument will give a direct reading of the angle or grade, so that computations are unnecessary.

To these and other ends, the invention comprises the various novel features of construction and combination and arrangement of parts, which will be hereinafter more fully described, and pointed out particularly in the appended claims.

In the accompanying drawing:—Figure 1 is a side elevation, partly in section, of a clinometer or level constructed in accordance with the present invention. Fig. 2 is a top plan view of the instrument shown in Fig. 1, portions of the stock being broken away to show the scales. Fig. 3 represents a transverse section of the instrument.

Corresponding parts in the several figures are indicated throughout by similar characters of reference.

The clinometer shown in the present embodiment of the invention is capable of being applied to stocks of various forms, it being usually employed on an ordinary straight edge or leveling board of a length that will permit it to be easily handled, an ordinary straight edge 1 being shown in the present instance which is provided at a point intermediate its ends with a segmental recess 2 which extends downwardly from the upper edge thereof. The instrument, in the present instance, is carried by and is substantially inclosed within a casing, the latter, in the present instance, being composed of a pair of cooperating sections 3 and 4, the sections having substantially rectangular attaching plates 5 and 6 which are secured upon the opposite sides of the stock by means

of screws or other fastening devices 7 and 8, semi-circular bearing plates 9 and 10 being extended upwardly from the upper edges of the attaching plates of the respective sections. The sections of the casing are spaced apart in substantially parallel relation and are each provided with a substantially circular flange, the flanges 11 and 12 of the members being formed concentrically and extending inwardly toward one another forming a circular chamber 13 within which the operating elements of the instrument are inclosed.

The movable element of the instrument, in the present instance, is composed of a pendulum 14 which is mounted on a transverse pivot 15, the opposite ends of the latter being mounted in a suitable manner within the casing. In order to reduce the friction to such a point that the pendulum will swing very delicately, it is preferable to provide anti-friction bearings for it, the opposite ends of the pivot, in the present instance, being provided with cone surfaces 16 and 17 with which the sets of balls 18 and 19 cooperate, the caps 20, 21, which in the present instance are adjustable, providing ball races or cups.

The pendulum is constantly maintained in vertical position by means of a counter weight 22, the upper end of the pendulum extending through the slot 23 which is formed between the circular flanges of the casing sections, and that portion of the pendulum which projects to the exterior of the casing is provided with a finger or indicator by means of which a reading may be had of the angle or grade of the structure or object under test. In the present instance, a pair of cooperating scales 24 and 25 are marked off on the circular flanges 11 and 12 of the casing sections, the scales being so graduated or calibrated that each graduation on the scale corresponds to the rise or fall of a given amount at a predetermined distance, measured from the axis of the pendulum. The scale shown in the present case has graduations corresponding to a rise or fall of one inch at a distance of five feet from the axis of the pendulum, but it will be understood, of course, that the instruments may be supplied with scales which designate different gradients, or, in those cases where it is desirable to determine angles of inclination, the scale will be calibrated in degrees. The indicator on the upper end of the pendulum is provided with a pair of pointers 26 and 27 which cooperate,



respectively, with the scales 24 and 25, the reading edges of the pointers being arranged very closely to the peripheral surfaces of the circular flanges carrying the scales and moving concentrically therewith, so that errors in reading due to parallax and other causes cannot arise. In using the double scale, the main graduating marks of one scale are opposite to the minor graduations of the opposite scale, so that not only can a reading be had from either side of the instrument but the readings will be more accurate.

By forming the casing of two sections which are secured on the opposite sides of the straight edge or board upon which the instrument is to be used, the casing is capable of accommodating itself to boards of different thicknesses.

An instrument of the character described constructed in accordance with the present invention is composed of but few parts which are so simple in construction that they may be manufactured cheaply and thus enable the instrument to be sold at a reasonable price, and they are not liable to get out of order, and, in practice, the instrument is capable of giving a direct reading of the angle or grade to be determined.

What is claimed is:—

1. An instrument of the character described embodying a stock, a casing secured to the stock and provided with inwardly extending concentric flanges having their adjacent longitudinal edges spaced apart and their exposed surfaces provided with graduations constituting scales, and a pendulum pivoted to swing within the casing and having one end thereof extended between said flanges and provided with oppositely disposed pointers movable over and co-acting with the adjacent scales.

2. An instrument of the character described embodying a stock, a casing secured to the stock and provided with spaced inwardly extending flanges, graduated scales on the flanges, said scales being provided with numerals progressing alternately from one scale to the other, and a pointer pivoted to swing within the casing and having one end thereof extending between the flanges

and provided with oppositely disposed transverse pointers movable over and co-acting with the adjacent scales.

3. In an instrument of the character described, the combination with a stock, of a casing including cooperating sections arranged at the opposite sides of the stock and provided with spaced inwardly extending flanges graduated to form a scale, and an indicator pivoted between said sections and having one end thereof weighted and its opposite end extended between the flanges and provided with a transverse pointer movable over the surface of the scale.

4. In an instrument of the character described, the combination with a stock, of a casing composed of a pair of cooperating sections each embodying an attaching plate secured to the side of the stock and a segmental portion having an inturned circular flange, the flanges of the sections cooperating to form a chamber, a pendulum pivoted within the said chamber and having an indicator projecting to the peripheries of the said flanges and provided with a pair of pointers, and scales arranged on the said flanges and cooperating with the said pointers.

5. In an instrument of the character described, the combination with a stock, of a casing composed of a pair of cooperating sections each embodying an attaching plate, secured to the side of the stock and a segmental portion having an inturned circular flange, the flanges of the sections cooperating to form a chamber, a pendulum pivoted within the said chamber and having an indicator projecting to the peripheries of the said flanges, axially adjustable bearings on the casing sections cooperating with the pendulum pivot, and a scale on the casing cooperating with the indicator.

In testimony that we claim the foregoing as our own, we have hereto affixed our signatures in the presence of two witnesses.

JOHN DAVID KEITH.

WALTER EDGAR FAULKNER.

Witnesses:

J. C. WALLACE,

AMOS TAYLOR.