July 22, 1941. W. W. CROSS 2,249,728

INCLINOGRAPH

Filed Oct. 6, 1939 2 Sheets-Sheet 1

Fig. 1.

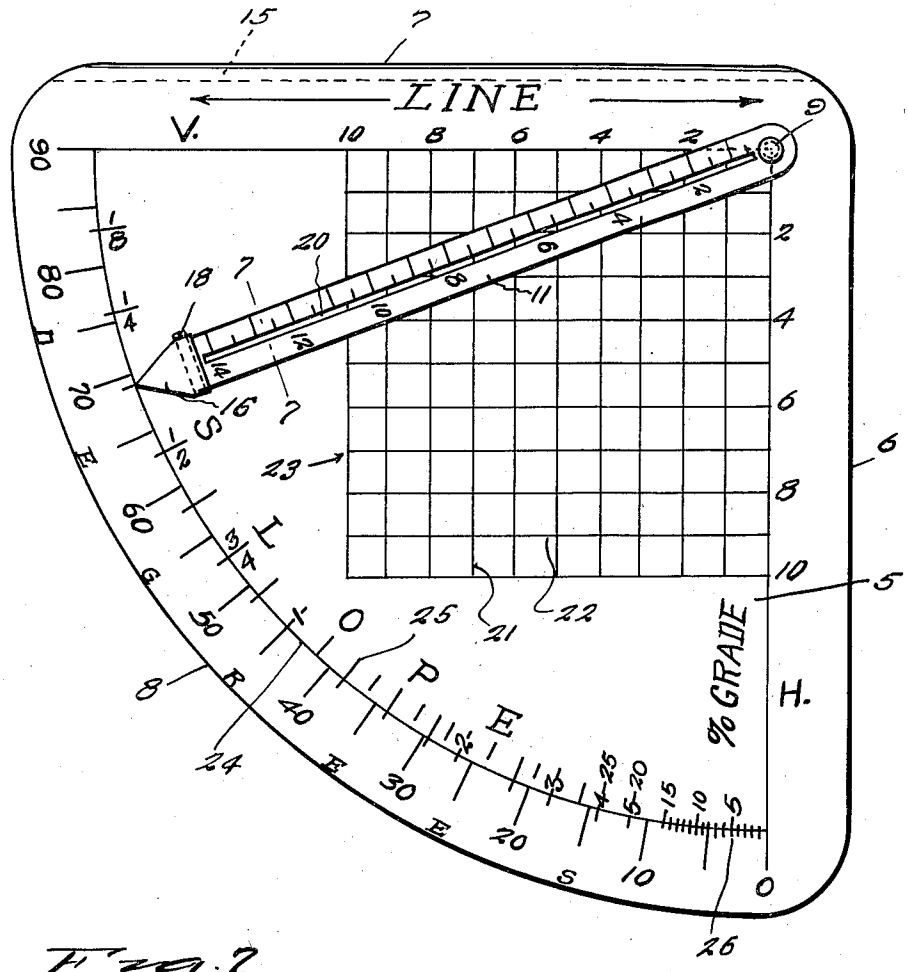
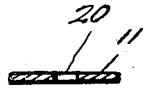


Fig. 2.



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INCLINOGRAPH

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Fig. 2.

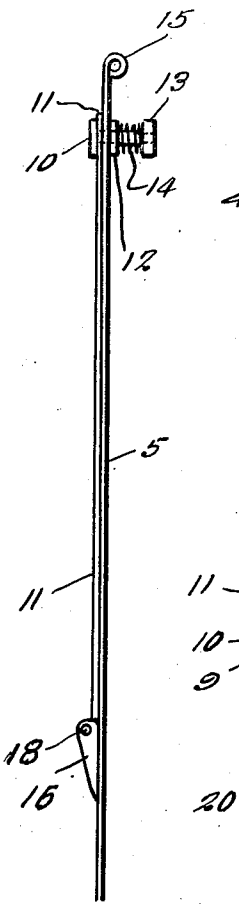


Fig. 3.

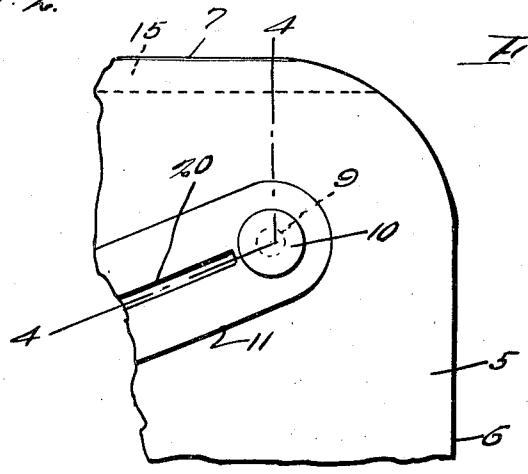


Fig. 4.

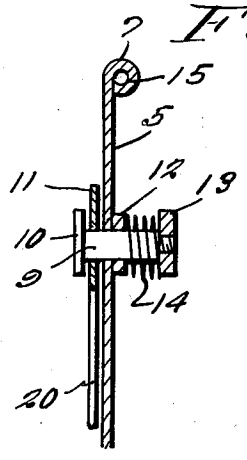


Fig. 5.

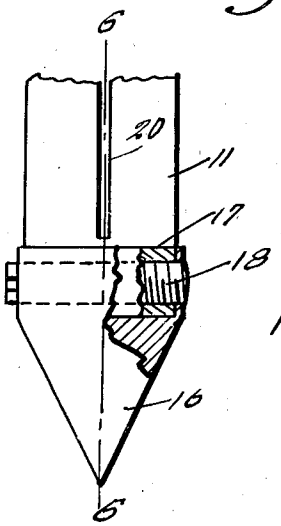
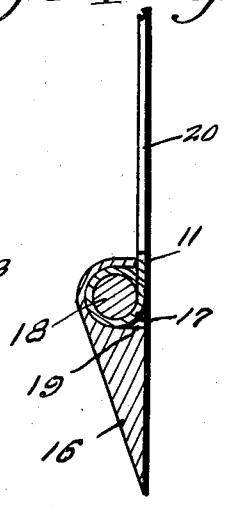


Fig. 6.



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Patented July 22, 1941 2,249,728

UNITED STATES PATENT OFFICE

2,249,728

INCLINOGRAPH

Winfield W. Cross, Tucson, Ariz.

Application October 6, 1939, Serial No. 298,319

1 Claim. (Cl. 33—70)

This invention appertains to new and useful improvements in registers or meters for determining inclinations and various angles, the principal object of the present invention being to perform this work easily and accurately with a minimum amount of apparatus.

Another important object of the invention is to provide a device which will be positive acting in operation and not susceptible to the ready development of defects.

These and various other important objects and advantages of the invention will become apparent to the reader of the following specification.

In the drawings:

Figure 1 represents a side elevational view of the device.

Figure 2 is an end elevational view.

Figure 3 is a fragmentary side elevational view.

Figure 4 is a fragmentary detailed sectional view on the line 4—4 of Figure 3.

Figure 5 is a fragmentary elevational view of the pointer with a portion broken away.

Figure 6 is a sectional view on the line 6—6 of Figure 5.

Figure 7 is a cross sectional view on the line 7—7 of Figure 1.

Referring to the drawings wherein like numerals designate like parts, it can be seen that numeral 5 represents a plate of suitable material having the three edges 6, 7 and 8, the edges 6 and 7 being at right angles to each other while the connecting edge 8 represents the arc of a circle having its center at the pivot pin 9. This pivot pin as shown in Figure 4 has the head 10 which forms a clamp for the pointer arm 11. The pin 9 extends through the plate 5 and has a washer 12 thereon and also the nut 13 with a coiled compressible spring 14 interposed between the washer 12 and nut 13. Obviously the tension of the spring 14 is to be such that when the head 10 is held against the arm 11, the arm will be prevented from swinging to a gravitated position.

The upper edge 7 of the plate 5 is preferably rolled to provide a sight tube 15. The arm 11 and pointed head 16 define a pendulum. As shown in Figures 5 and 6, the arm 11 has its free end portion rolled as at 17 to form a cylinder through which the screw 18 is disposable. The head 16 has the pocket 19 extending inwardly from the back threof and this pocket is formed with end walls having openings therein through which the screw 18 is driven as shown in Figure 5. Thus the head 16 is carried by the arm 11.

The arm 11 is formed with a longitudinally extending slot 20 through which the vertical and horizontal lines 21 and 22 of the plat generally referred to by numeral 23 are visible. The arm 11 adjacent the slot 20 is graduated to represent the slope distance or hypotenuse of any desired right triangle.

Adjacent the curved edge 8 is the arc 24. When the instrument is used to measure vertical angles, the point of the pendulum follows the inscribed arc 24 which is graduated in degrees from horizontal. The inside of the arc is graduated as at 25 to represent the co-tangent of the corresponding angle or the X to I slope ratio. The small angle end of this scale denoted by numeral 26 is replaced by graduations to represent the percent of grade.

The upper edge of the instrument being of tubular shape can be placed against or parallel to the line to be measured and may be as before stated tubular to form a small sight tube.

Aside from the pointing of drill holes and the computing of their required depths, this instrument will help the driller in solving other problems of which the following is an example: Suppose that a road is being built along a steep hillside and the driller notes that the center line stake is marked "Cut 20 feet." In case the road is to be made twenty feet wide, he may locate a point on the hillside, directly above the lower edge of the road in the following manner: By securing a measuring tape's end to the stake and stretching the tape down the hillside he will be able to determine the slope distance between his eye and the stake from a trial distance. He may then sight through the tube 15 of this instrument, allowing the pendulum to come to rest and to become secured by the spring release, on the vertical angle of that line between his eye and the stake. At this pendulum setting, the slope distance on the pendulum scale should coincide with 10 ft. on the horizontal scale when the proper point has been located. The vertical scale, at this same intersection point, will denote the difference in elevation between the eye and the stake. If this slope distance happened to be 11 ft., the vertical scale would show that his eye was 4½ ft. lower than the stake. A driller, knowing that his eyes were 5½ ft. above the ground, would then know that he was standing 4½ plus 5½ or 10 feet lower than the stake. This 10 feet difference when subtracted from the cut of 20 feet which was marked on the stake leaves a cut of 10 feet which represents the necessary depth to be drilled at that point in order to reach grade.

While the foregoing specification sets forth the

invention in specific terms, it is to be understood that numerous changes in the shape, size and materials may be resorted to without departing from the spirit and scope of the invention as claimed hereinafter.

Having described the invention, what is claimed as new is:

A gauge of the character described comprising a chart carrier, a pendulum arm having one end pivotally connected to the carrier and being adapted to swing across said carrier, said pendulum arm being provided with a weighted head pivotally mounted on its opposite end and adapted to swing toward the said carrier.

WINFIELD W. CROSS.