

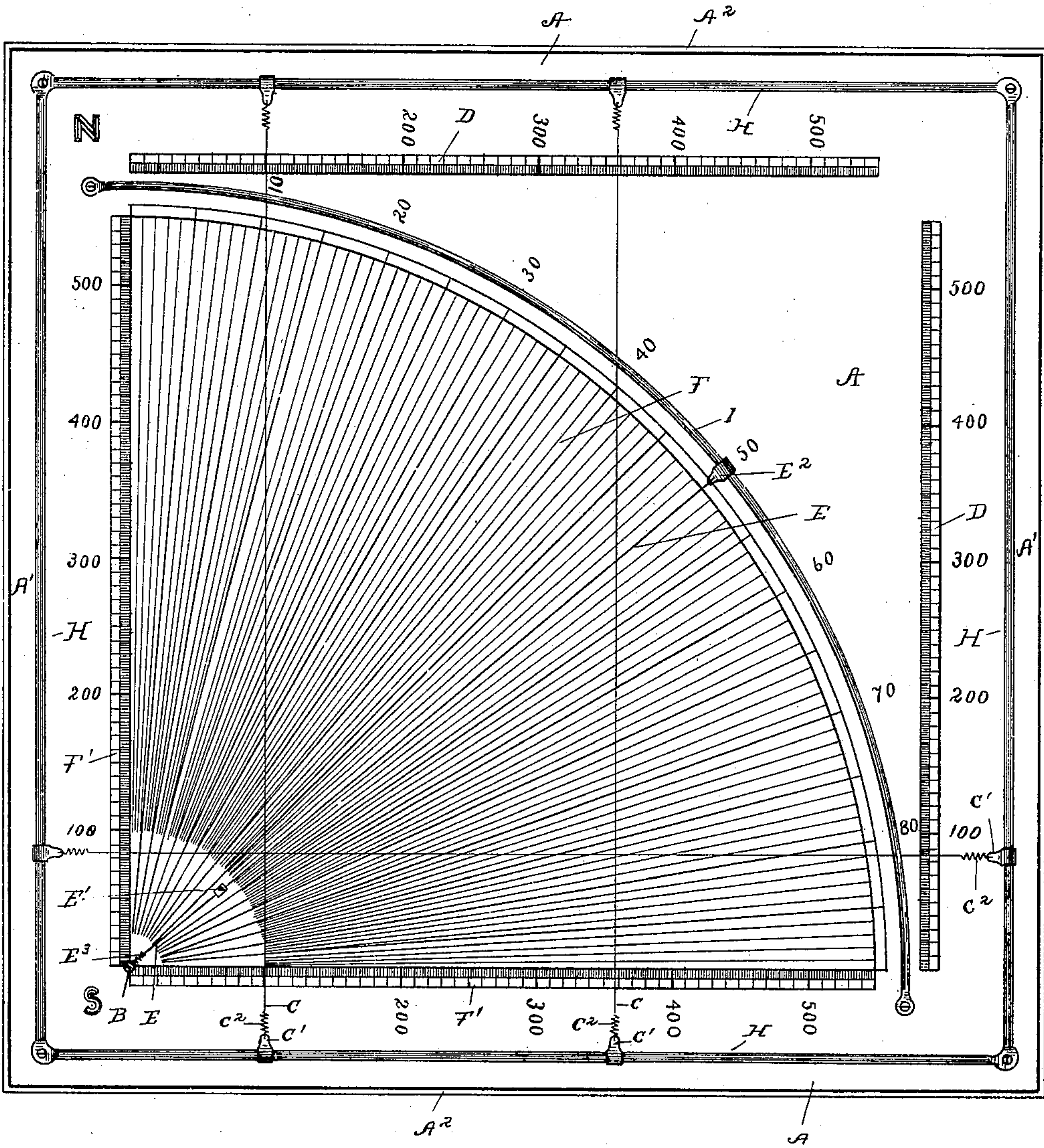
No. 633,263.

Patented Sept. 19, 1899.

D. GRANT.

(Application filed Feb. 11, 1898.)

(No Model.)



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UNITED STATES PATENT OFFICE.

DANIEL GRANT, OF PETALUMA, CALIFORNIA.

SURVEYOR'S INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 633,263, dated September 19, 1899.

Application filed February 11, 1898. Serial No. 669,989. (No model.)

To all whom it may concern:

Be it known that I, DANIEL GRANT, a citizen of the United States, residing at Petaluma, in the county of Sonoma and State of California, have invented certain new and useful Improvements in Surveyors' Instruments; and I do hereby declare the following to be a full, clear, and exact description of said invention, such as will enable others skilled in the art to which it most nearly appertains to make, use, and practice the same.

This invention relates to improvements in surveyors' instruments; and it consists in the novel construction and arrangement of the parts whereby the measurements of distances by triangulation are readily and mechanically obtained.

The drawing is a plan view of the invention.

Heretofore, particularly in mining, it has been necessary to employ surveyors to instruct the miner as to the distance which he could operate on certain lines before running beyond the limits of his claim. This data has been arrived at by the surveyor through a system of calculation with which the miner is not familiar and by means of instruments requiring skilled handling and which are in the first instance too costly for the possession of the ordinary miner. The present instrument is designed to practically effect all of the purposes for which a surveyor has heretofore been employed and to produce an instrument for such purpose at a cost that will permit its being sold at a very moderate price within the reach of all classes of miners.

As a rule mining claims are confined within certain limits, which, if projected, give a surface-space rectangular and oblong in shape. These lines are projected vertically downward into the earth. The miner may start a shaft at any point; but in all positions it is necessary for him to know when he is approaching its imaginary wall or limit-line which has been projected vertically from the surface. The most practical manner for him to obtain this information is to know the distance from any given point that he may drift before reaching the limit-lines of his claims. The instrument illustrated in the drawing will permit him, though ignorant of all of the mathematics of engineering, to ascertain that information. The linear dis-

tances vary as the line of his operation is either inclined downward or upward or from side to side. All that it is necessary for him to know in starting is the direction of any one line marking the limits of his claim. Having ascertained this line by compass or otherwise, he applies the instrument shown in the drawing thereto. If the question be how far he can follow a straight line inclined horizontally from a line of his claim, the board A is placed in a horizontal position, with the one or the other of the adjoining sides A' A' parallel with the ascertained lines of the claim. If he is to follow a line to the left of the claim-line, he uses the side A' on the right of the center of the quadrant, which is marked B. Having placed the board as described, he moves the wires C C to give him the original plotting or mapping of the claim—that is, the wire C on the one diameter of the board may be moved over the scales D D at either side of the board to a mark corresponding to the number of feet his claim extends in that direction. The wire which is extended across the other dimension of the board is moved to the lines over the scales D D on the other sides of the board to a point indicating the distance of the other or lateral dimension of the claim. Having done this, he has now two lines extending across the board, the one being the limit-line on the one side from the point where he is starting and the other being the limit-line of the other dimension of his claim removed from the point where he is starting. In other words, he has mapped out the oblong rectangular shape of his claim. The point B, which is the center of the quadrant, is a pivot, being set up from the surface of the board A to receive pivotally the end of the direction-wire E, whereby the latter can only move in the arc of a circle. Knowing the direction in which he desires to operate he adjusts the wire until he has brought it to that line. The direction-wire E will in this position intersect the one or the other of the wires C and will show at what point he would pass out of the limits of his claim and against which wall he would come. By measuring with a scale of the same dimensions as those indicated in the drawing the distance from the center of the pivot B to the point where the direction-wire

E intersects the limit-wire C he will find the linear limit of his operations along that line. By using a tape-line, with which all miners are familiar, he can from day to day ascertain accurately his operations toward the limit of his claim in that direction. The direction-line thus noted is maintained until he desires to change the direction of his operation. The direction-wire is provided with a small sliding mark E', which he moves to indicate his position at any time. The method of using the instrument would then be to deduct from both limit-lines the number of feet which his position at the time of changing would indicate that he had traveled parallel with each of the wires C. The remainder after this reduction would give him the limits of his claim from the new position. He would then shift the wires C to the marks upon the scales D which would indicate the dimensions of the remainder of the portion of the claim that he was now entering. When the wires C C are set in position on the reduced dimensions, the direction-wire E would be changed to the new direction in which he desired to operate after having first so set the instrument that the direction-wire was accurately in line with the line of former operations. The direction-wire E would now intersect one of the side wires C, and the measurement from the point or pivot B to the point of intersection with the limit-wire would inform him of the limit of his operation in that direction from the point of the ending of the former line of operation. At all points in "running" the shaft, as it is termed, when it is desired to change the instrument it has to be set first with reference to the direction-wire E to ascertain the former direction before changing. It will be seen from this that the side lines of the instrument are not changed with relation to the limit-lines of the claim, or, in other words, the side lines of the instrument are always maintained in the same direction.

What has been described has reference to the lateral or sidewise drifting or driving of a shaft. To all intents and purposes the same procedure is followed when the distances are desired for perpendicular inclination of the shaft. In using the instrument for perpendicular measurements it is desired that a plumb-bob or spirit-level should be used in conjunction with the instrument to the more accurately maintain the sides A' A' in their original positions.

In construction the instrument consists of a base A, having a quadrant F indicated thereon. This may be carved upon a metal plate or printed upon cardboard attached to said base, or it may be printed directly upon the latter. The sides of said quadrant are provided with equal scales F' F', that start from the pivotal point above referred to, as B. Parallel with the scales forming the straight sides of the quadrant and on the opposite sides of the base A are provided the scales D D.

These are divided in exact similarity to the scales F' F'. About the arc of the quadrant are division-points numbered, preferably, from "0" to "90," and these divisions are in some instances subdivided to divide the arc into the units of the "90°."

To the surface of the base A, near the edges thereof, are attached the side bars H H, parallel to the scales F' F' and D D and removed slightly to the outside of the said scales. In constructing these side bars I prefer to form them in a solid or frame-like construction, as shown in the drawing. The side bars are constructed by me preferably from steel spring-rods, which are raised slightly from the surface of the chart except at the limit of the sides. While I prefer to so construct the side bars, yet it is obvious that this construction may be varied without departing from the spirit of my invention. A similarly-constructed rod I is curved to extend about the outer edge of the quadrant F and slightly removed from it. These rods are provided to receive the small hooks or thimbles C' C' and E², with which the wires C C and E are provided. The wires are attached to the hooks at their ends and are provided with a spiral formation to produce springs C² E³, the object of which is to maintain the wires in position when set and to tighten them when in position.

If desirable, the base A may be provided with a raised edge A² for the purpose of receiving a cover (not shown) to protect the instrument.

The instruments are in some instances provided with compass directions printed upon them, as shown in the drawing. The letter "N" and letter "S" may be used only, and they may be printed upon or carved upon the surface of the base A or caused to adhere to the same by any suitable means. While these letters are not necessary, it is often an advantage to a miner to be able to thus locate at all times the compass direction of one of the limit-lines of his claim.

Having thus described this invention, what is claimed is—

1. The herein-described surveyor's instrument, comprising a base-board having a quadrant indicated thereon, said quadrant having scales formed along its straight edges, and scales located on opposite sides of said base-board and in juxtaposition with said former scales, movable wires extending across said scales and at right angles to each other, an angularly-adjustable marking-wire pivotally secured at one end at the corner of said quadrant, and an indicator adjustably secured upon said marking-wire; substantially as set forth.

2. The herein-described surveyor's instrument, comprising a base-board having a quadrant indicated thereon, said quadrant having scales formed along its straight edges, and scales located on opposite sides of said base-board and in juxtaposition with said former scales, raised bars extending around the edges

of said base-board, movable clips working on
said bars, wires having spring connection with
said clips and extending across the face of
said chart, a curved bar adjacent the curved
5 edge of said quadrant, a movable clip work-
ing thereon, a marking-wire pivotally secured
at one end to the corner of said quadrant and
having its other end united to said latter

clip, and an indicator working on said mark-
ing-wire; substantially as set forth.

In testimony whereof I have hereunto set
my hand this 20th day of January, 1898.

DANIEL GRANT.

Witnesses:

E. F. MURDOCK,

F. M. EACHUS.