(No Model.)

# M. STIXRUD.

## INSTRUMENT FOR PLOTTING CONTOURS OF GROUND.

No. 385,780. Patented July 10, 1888.

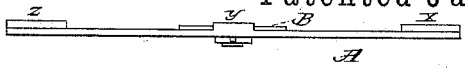


Fig. 2.

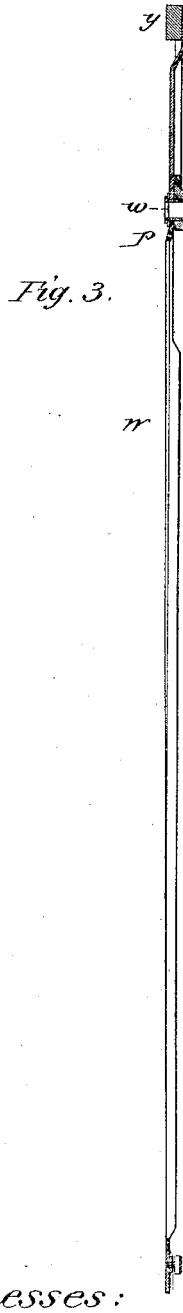


Fig. 3.

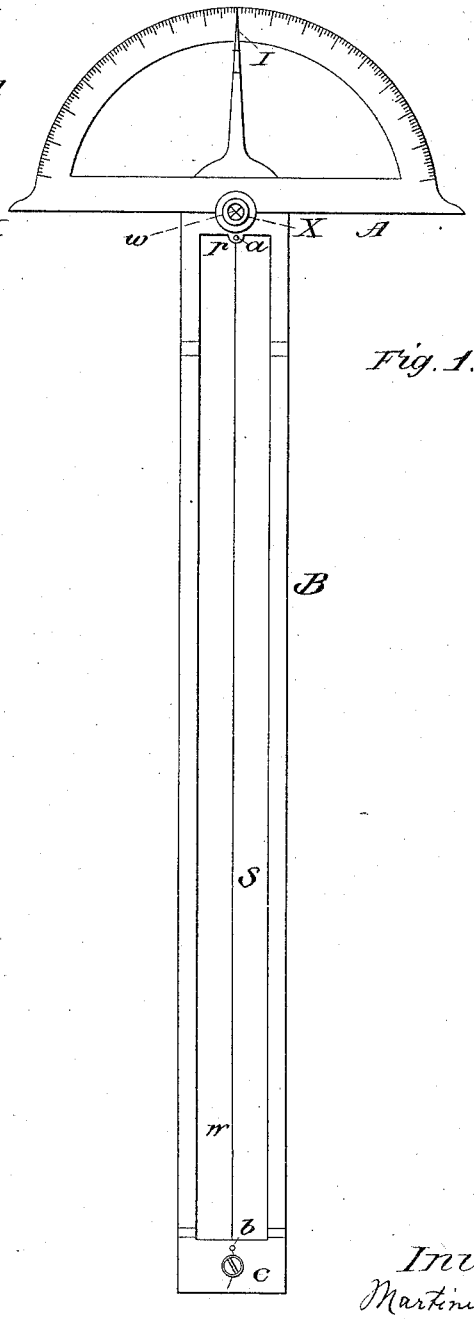


Fig. 1.

Witnesses:
Charles H. Baker
W. J. Jennings.

Inventor:
Martinius Stixrud.
per Charles D. Whittlesey.
his Attorney.

# UNITED STATES PATENT OFFICE.

MARTINIUS STIXRUD, OF SEATTLE, WASHINGTON TERRITORY.

## INSTRUMENT FOR PLOTTING CONTOURS OF GROUND.

SPECIFICATION forming part of Letters Patent No. 385,780, dated July 10, 1888.

Application filed March 20, 1888. Serial No. 267,858. (No model.)

*To all whom it may concern:*

Be it known that I, MARTINIUS STIXRUD, of Seattle, in the county of King and Territory of Washington, have invented certain new and useful Improvements in Instruments for Plotting Contours of Ground, of which the following is a full and correct specification.

My invention is an instrument for plotting contours of ground, to be used in an office. It saves much time in calculating analytically the distances to the contours and goes far toward preventing mistakes from creeping in. It is especially useful in a country where rain is of frequent occurrence and the timber and brush is so dense that plotting the contours directly on maps in the field is impossible.

It was formerly necessary to calculate the distances out to the contours from notes taken in the field, or to plot them on cross-section paper. This was slow and troublesome work and used up a great deal of paper. With my invention such distances can be very quickly, readily, and reliably calculated graphically, and only one sheet of cross-section or profile paper need be used.

My invention consists of a semicircular protractor, A, of German silver, diameter four to six inches, of the ordinary form, but with the zero-point on it where on ordinary protractors the ninety-degree mark is placed, and the scale is graduated each side from the zero-point up to ninety degrees. This protractor A has a frame, B, of German silver, or, better, of steel, attached to it; and these operate together with other mechanism, as illustrated in the drawings herewith, wherein similar letters of reference indicate similar parts.

Figure 1 in the drawings is a plan view of my invention, showing all its parts. Fig. 2 is an end elevation. Fig. 3 is a longitudinal section through the slot S of the frame B, showing the wire W and other parts as marked.

The frame B has in one end a slot, S, about fourteen inches long and five-eighths of an inch wide. A fine steel wire, W, passes longitudinally through the center of the slot. This wire is adjusted so that its prolongation would pass through the intersection of two cross-wirs, *w w*, placed in the center of the hollow pivot X and the pointed end of the frame, which is the indicator I. The tension of the wire W can be adjusted in different ways; but the means shown in the drawings are sufficiently effective and very simple. The wire is passed through the hole *a* and held in place by a knot on the end. Thereafter the wire is passed through the hole *b*. It is then laid under the head of the small screw *c* and drawn over the edge of the frame till the required tension is obtained. The screw being then tightened holds the wire from becoming slack. The projected part (marked *p*) of the frame is bent down so as to make the wire lie touching the paper its full length, as shown in Fig. 3 of the drawings. The frame B is attached to the lower side of the protractor A through the hollow pivot X, around which the frame turns, said pivot being securely fastened to the protractor. The tapered end of the frame or the indicator I, shaped in the manner shown in the longitudinal section of Fig. 3 of the drawings, moves on the upper surface of the protractor and with the frame. The protractor is supported on three rests, *x y z*, which enable the frame to pass under the protractor.

To use this instrument a small board twelve inches by twenty inches is provided with cross-section paper, or preferably with profile-paper. The paper is stretched on the board, and may be varnished, as no lines need be drawn. The spaces on vertical lines give elevations and the spaces on horizontal lines give distances. The intersection of the cross-wires *w w* in the hollow pivot X is placed on the elevation of the center line on the initial point on the left-hand side of the board, the edge of the protractor on the vertical initial line, and the frame moved until the indicator I records the slope-angle. The intersection between the wire W and the horizontal lines will give the distances to the contours. When a break in the slope occurs, the break-point is marked along the wire and the instrument is moved so that the intersection of the cross-wires in the hollow pivot covers the point, the new slope-angle is laid off, and distances are read as before.

Having thus fully described my invention, what I claim as new or novel herein, and desire to secure by Letters Patent from the United States, is as follows:

1. The combination, with a semicircular pro-

tractor, A, provided with rests *x y z*, of a frame, B, having the indicator I and provided with slot S, the wire W, and the hollow pivot X, provided with cross-wires *w w*, substantially as and for the purposes herein described.

2. The combination, with the protractor A, of the slotted frame B, the wire W, and the cross-wired pivot X, substantially as herein shown.

3. In instruments for plotting contours of ground, the frame B, provided with slot S and indicator I, and the wire W, stretched longitudinally through the slot S and held as shown, and the hollow pivot X, provided with cross-wires *w w* and attached to the protractor A, substantially as described.

4. In instruments for plotting contours, the wire W in the slot of a protractor-frame, B, as shown, in combination with the cross-wires *w w* of the hollow pivot X on the protractor A, substantially as set forth.

5. In instruments for plotting contours, the hollow pivot X, attached to the protractor A and provided with cross-wires *w w*, and the slotted frame B and its parts, as shown, turning upon said pivot, substantially as herein described and set forth.

6. The frame B, in instruments for plotting contours, said frame provided with indicator I, and slot S, and projection *p*, and carrying the stretched wire W, and turning upon the protractor A around the pivot X, substantially as herein shown.

In testimony that I claim the foregoing I have hereunto set my hand, this 9th day of March, 1888, at Seattle, King county, Washington Territory, in the presence of two witnesses.

MARTINIUS STIXRUD.

Witnesses:
N. B. COLT,
E. D. MCCLINTIC.