H. POSNER.

INTERSECTOGRAPH.

APPLICATION FILED MAY 28, 1917.

1,290,343.

Patented Jan. 7, 1919.

2 SHEETS—SHEET 1.

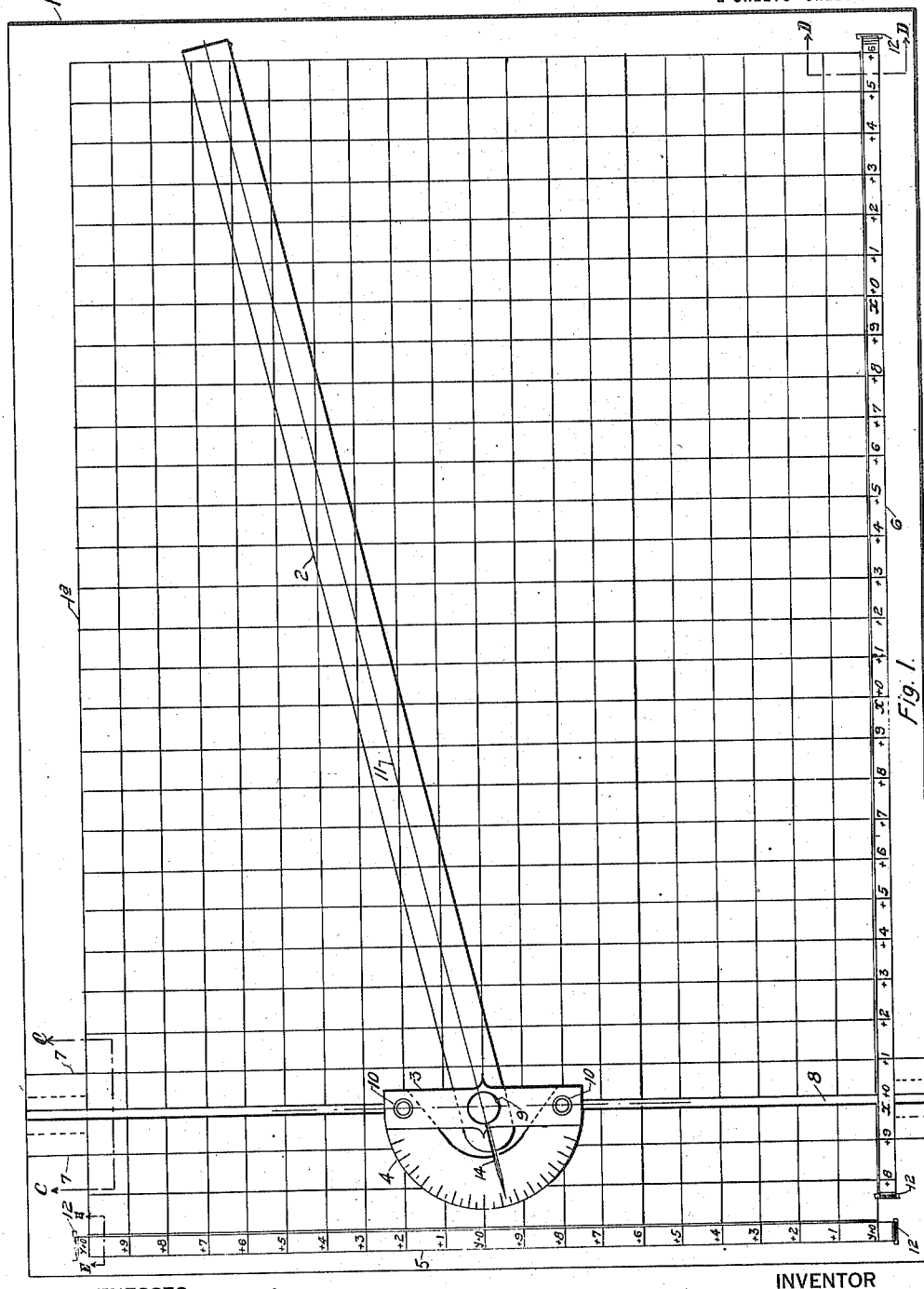


Fig. 1.

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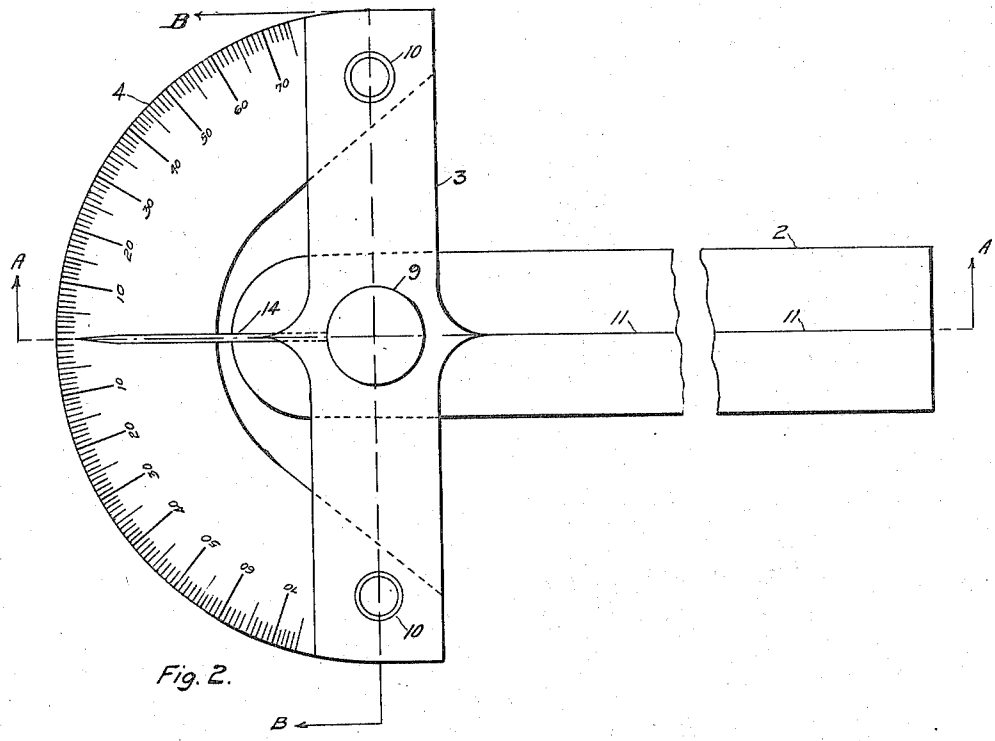


Fig. 2.

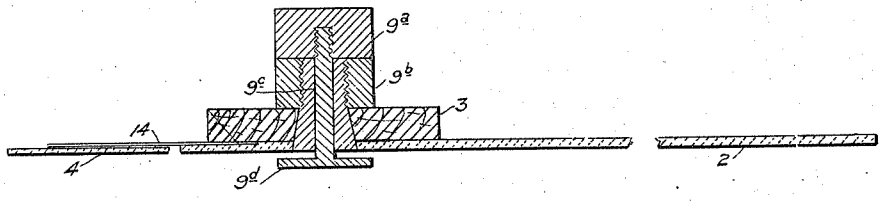


Fig. 3.

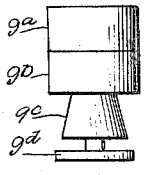


Fig. 5.

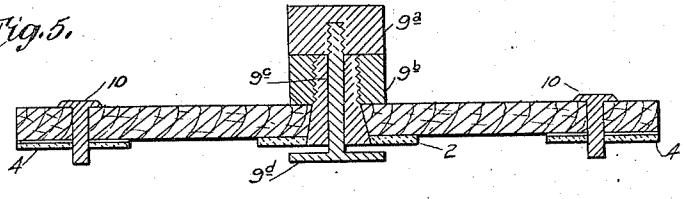


Fig. 4.

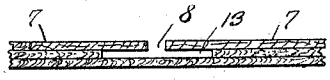
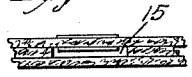


Fig. 6.

Fig. 7.



Fig. 8.



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UNITED STATES PATENT OFFICE.

HARRY POSNER, OF BROOKLYN, NEW YORK.

INTERSECTOGRAPH.

1,290,343. Specification of Letters Patent. Patented Jan. 7, 1919.

Application filed May 28, 1917. Serial No. 171,497.

To all whom it may concern:

Be it known that I, HARRY POSNER, a citizen of the United States, residing at the borough of Brooklyn, in the county of Kings and the State of New York, have invented a new and useful Intersectograph, of which the following is a specification.

My invention has for its object the construction of a device which would make it possible to effect a rapid graphical solution for finding the point of intersection between two intersecting lines, the conditions being that the origin and slope of one of the lines and the coördinates of any two points on the other line must be given or obtained before the solution can be effected. In the problems which arise in engineering these conditions are nearly always given. This especially holds true in earthwork, such as excavation and embankment, in which the "neat line" is the line on which the origin and the slope are known, while the "ground line" represents the line on which the coordinates of two points, usually the ends, are known. The invention is especially useful in this class of work, but it is not restricted to it. Should a case arise in which the two intersecting lines are both determined either by the coördinates of two points on them, or by their respective origins and slopes, then, in the first case, knowing the coördinates of two points of a line, its slope can be readily obtained and one of the points used as an origin; while in the second case, knowing the origin and slope of a line, the coördinates of any two points on it can easily be obtained and thus in either case, the problem will revert to the general form as outlined above.

The above named object is attained by means of a mechanism illustrated in the accompanying drawings in which,

Figure 1 is a plan view of the entire mechanism; Fig. 2 is a plan view of the slider; Fig. 3 is a vertical section on the line A A. Fig. 4 is a vertical section on the line B B. Fig. 5 is a perspective view of the nut which controls the movement of the slider. Fig. 6 is a full sized plan view of the board, slot, and sliding bands; Fig. 7 is a vertical section on the lines C C and Fig. 8 is a vertical section on the lines D D and E E. Similar numerals refer to similar parts throughout the drawing.

The face 1^a of the board 1 is ruled into squares one inch on a side and these are, in their turn, subdivided into squares one tenth of an inch on a side. This ruling can be varied to suit the work in hand, and the size of the squares made larger or smaller depending on the degree of precision required by the problem. The straight edge 2 is made of transparent material, such as celluloid, and has a fine black line cut longitudinally in the center of its under face. The straight edge is fastened to part 9^c which revolves about part 9^d as an axis. The part 9^b, when tightened, holds the straight edge 2 fast at any desired inclination, but does not prevent the slider, as a whole, from moving in the slot 8 formed in the board. The part 9^a, when tightened, holds the whole slider fast in any position in the slot 8, and prevents the straight edge 2 from rotating about part 9^d and the head 3 from moving in the slot 8. The part 9^d serves as an axis for part 9^c, also its circular disk-shaped head fits into groove 13 and prevents the head 3 of the slider from being pulled out of slot 8; also, when part 9^a is tightened, its head bears against the strips 7, made of wood, metal or other hard material, and holds the slider fast in any desired position. The protractor 4 and pointer 14 make it possible to set the straight edge at any desired slope. This can also be accomplished and somewhat more accurately, by laying off the natural functions of the given angle on the ruled face of the board and then making the line 11 pass through the points thus laid off. The head 3 slides in slot 8 and is guided in the slot by the rivets 10. The sliding bands 5 and 6 are endless and pass through slots 12 and grooves 15 in the board 1. The markings on the bands are as follows: on band 6; X+0 to +9, successively, on band 5: Y+0 to +9 successively, as shown on face 1^a (see Fig. 1). The pivotal mounting of the straight edge makes it possible to set it at any desired inclination and thus makes the intersectograph adaptable to solving problems in which the given lines may have any slope whatsoever, while the motion of the slider in the slot makes it possible to place the origin at any desired point in the slot and thus enables us to utilize the entire width of the board in solving problems. Again, the sliding bands, besides serving as indexes on which the coördinates of the points, plotted or sought, are read,

also enable us to shift the origin along the sloping line as will be evident to those skilled in the art.

Briefly the operation of the intersectograph in solving problems is as follows: Line 11 takes the part of the given sloping line, the center of the part 9^a serving as the origin, while the slope is obtained by setting the straight edge properly. The coördinates of the two given points are plotted on the face 1^a and a straight edge passed through them, where the straight edge cuts line 11 is the desired point of intersection, the coordinates of which are read on the bands 5 and 6.

It is evident that in solving problems certain values must be assigned to the X's and Y's on the bands. This is done by assigning a value to the X and Y near the pivot, or origin, the remaining X's and Y's differing by ten from the next preceding or next succeeding X or Y.

Having thus fully described the construction and operation of my invention, I claim:

1. In an intersectograph, the combination of a board having a slot extending across the face thereof, a head having a protractor-scale slidable along said slot, a blade pivotally connected to said head, and scale-members movably mounted on said board and parallel to adjacent edges thereof.

2. In an intersectograph, the combination of a board, a head having a protractor-scale movable transversely of the board, a blade pivotally connected to said head, and slidable endless flexible bands carried by said board located parallel to adjacent edges of the board, said bands being provided with scale indications.

3. In an intersectograph, a board having one of its faces ruled into squares of predetermined dimensions, sliding bands carried by the board located in parallelism with adjacent edges thereof, said endless flexible bands being provided with index markings to serve as coördinates of points sought, and a straight-edge pivotally connected to said board and movable transversely thereof.

4. In an intersectograph, a board having one of its faces ruled into squares of predetermined dimensions, sliding bands carried by the board located in parallelism with adjacent edges thereof, one of said endless flexible bands being provided with index markings ranging from Y+0 to +9 successively, the other of said bands being provided with index markings ranging from X+0 to +9 successively, and a straight edge carried by said board and movable transversely thereof.

5. In an intersectograph, a board having one of its faces ruled into squares of predetermined dimensions, a movable endless flexible member located adjacent one of the longitudinal edges of the board provided with coördinate indications, a second movable endless flexible member located adjacent one of the transverse edges of said board also provided with coördinate indications, and a straight edge movably secured to the ruled face of the board.

6. In an intersectograph, a board having one of its faces ruled into squares of predetermined dimensions, a movable endless flexible member located adjacent one of the longitudinal edges of the board provided with coördinate indications, a second movable endless flexible member located adjacent one of the transverse edges of said board also provided with coördinate indications. a head movable transversely of the board, a protractor carried by said head, a straight edge pivotally secured at one end thereof to said head, and a pointer carried by the straight edge to a line with the markings on said protractor.

Signed at the city of New York, in the county of New York and State of New York this 5th day of May, 1917.

HARRY POSNER.