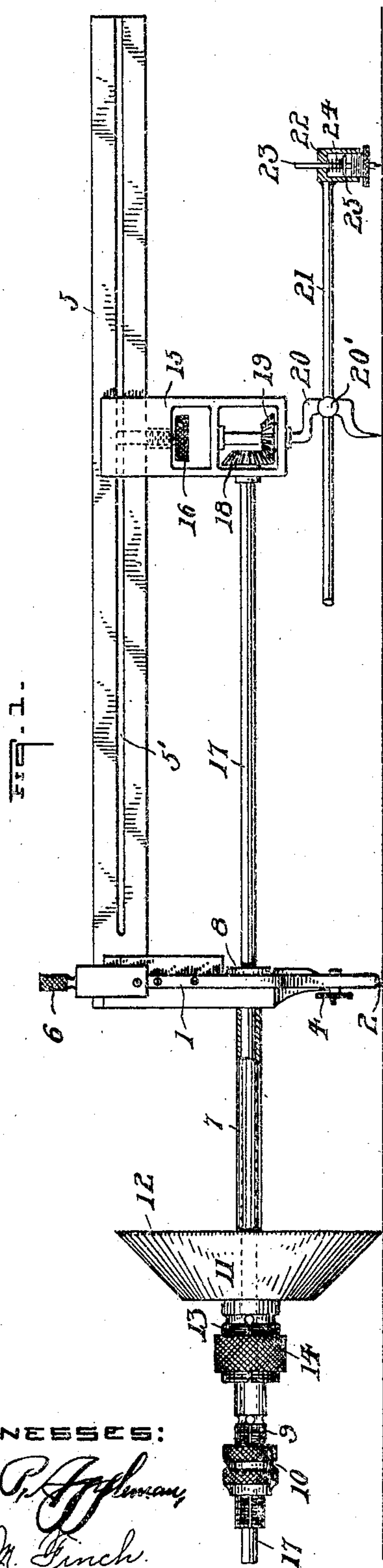


V. M. SPUNAR.
 MATHEMATICAL DRAWING INSTRUMENT.
 APPLICATION FILED JAN. 21, 1908.

954,476.

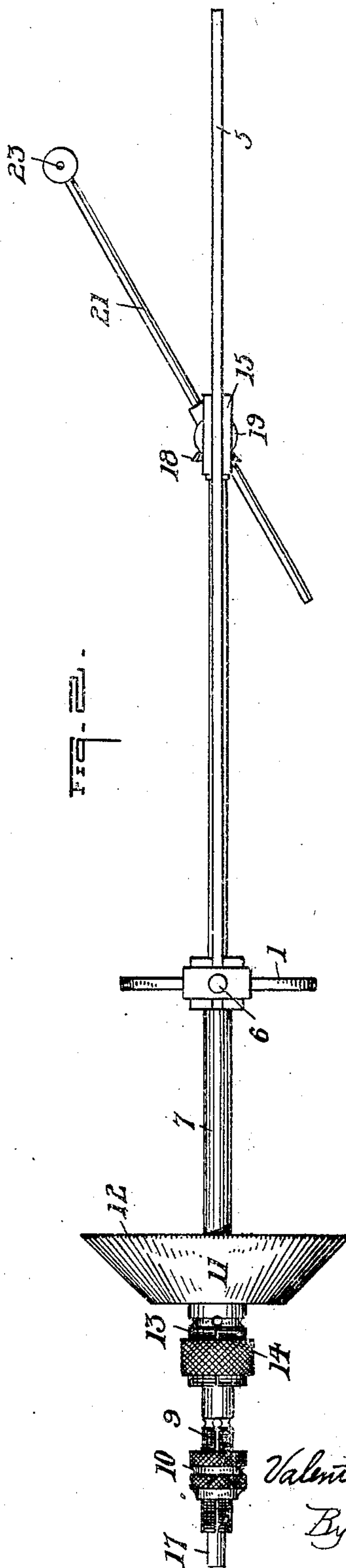
Patented Apr. 12, 1910.

2 SHEETS—SHEET 1.



WITNESSES:

J. P. Hoffman
V. L. Finch



INVENTOR

Valentine M. Spunar
By H. W. Stearns

ATTORNEY

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2 SHEETS—SHEET 2.

FIG. 4.

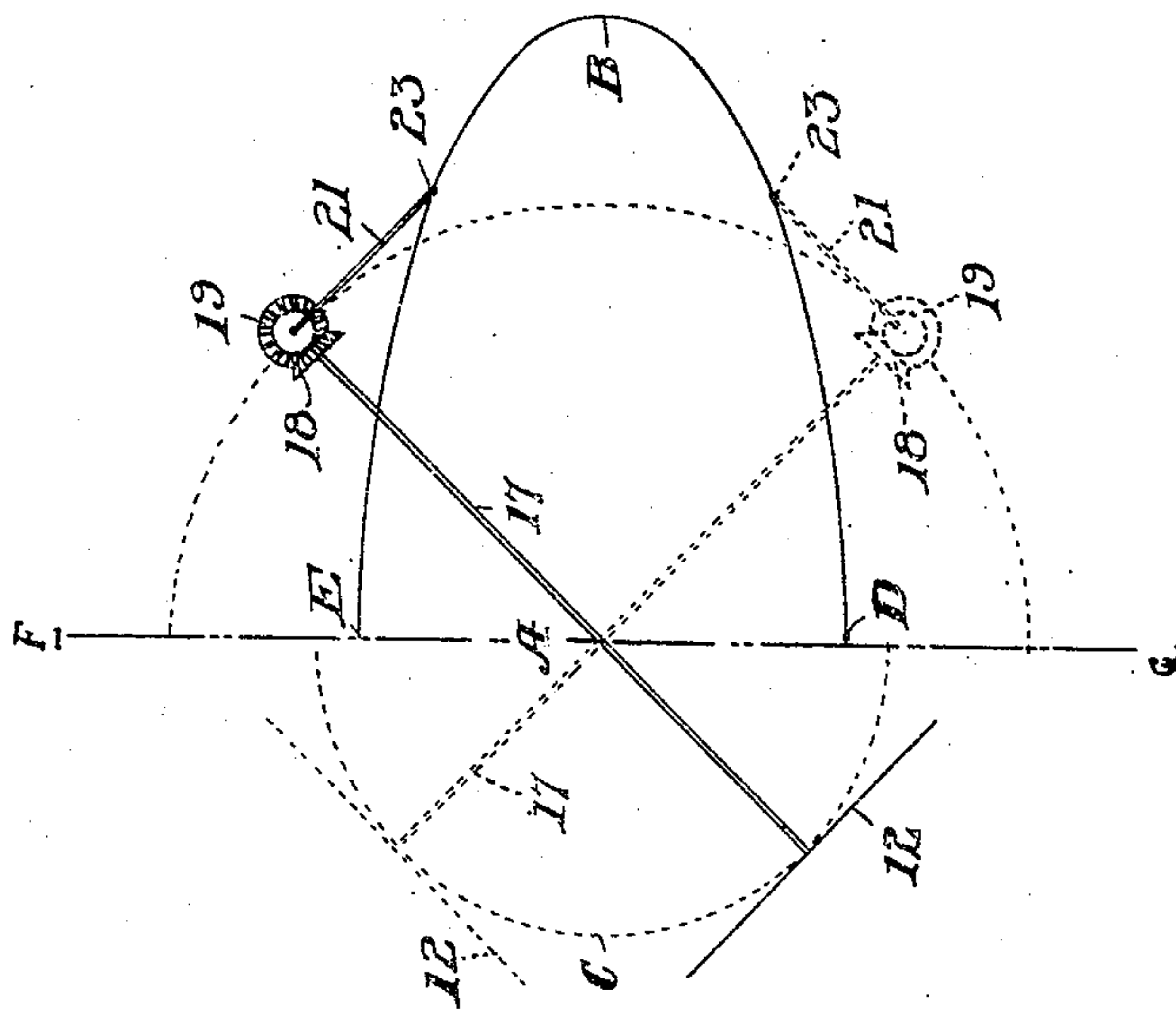
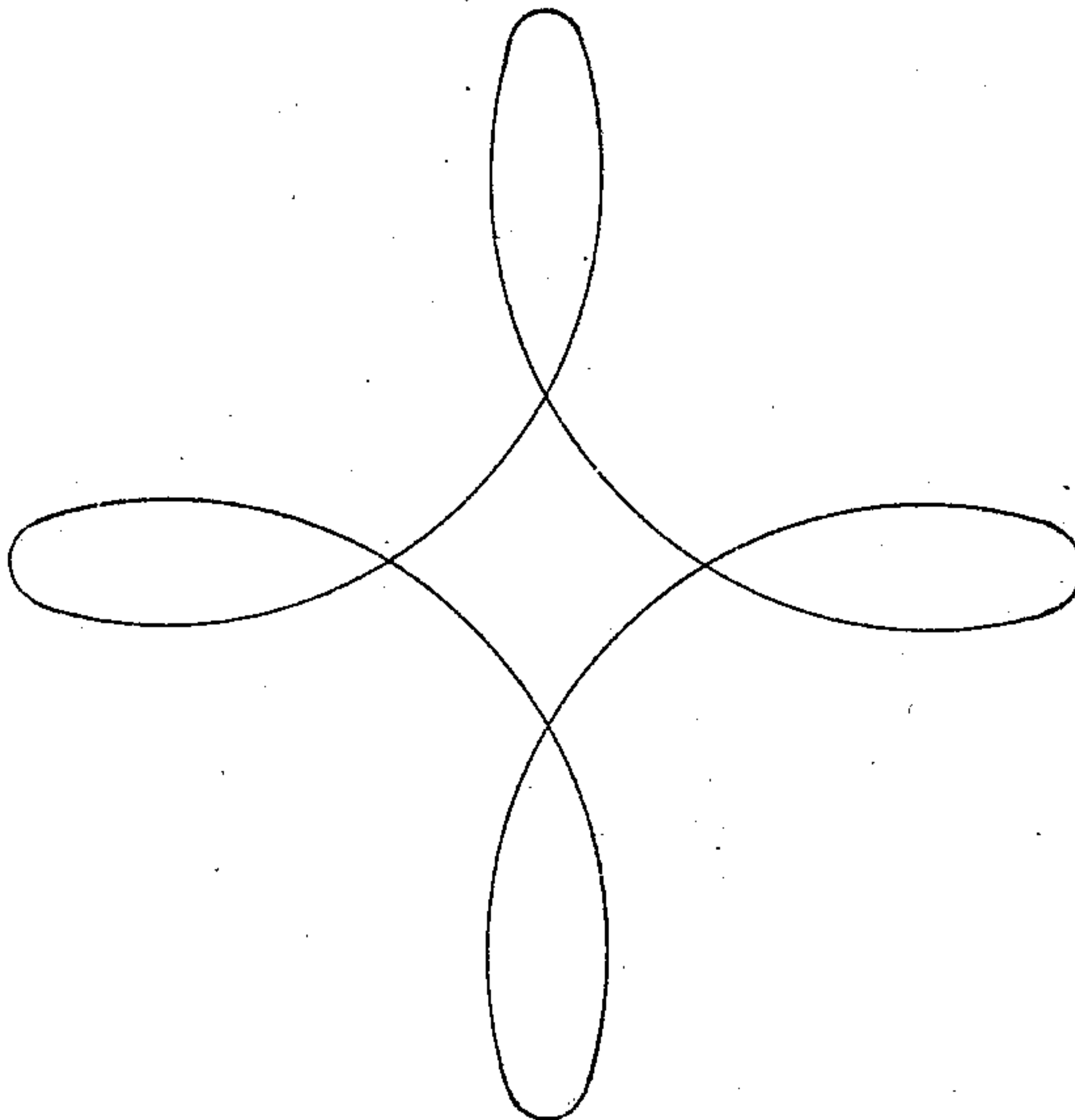


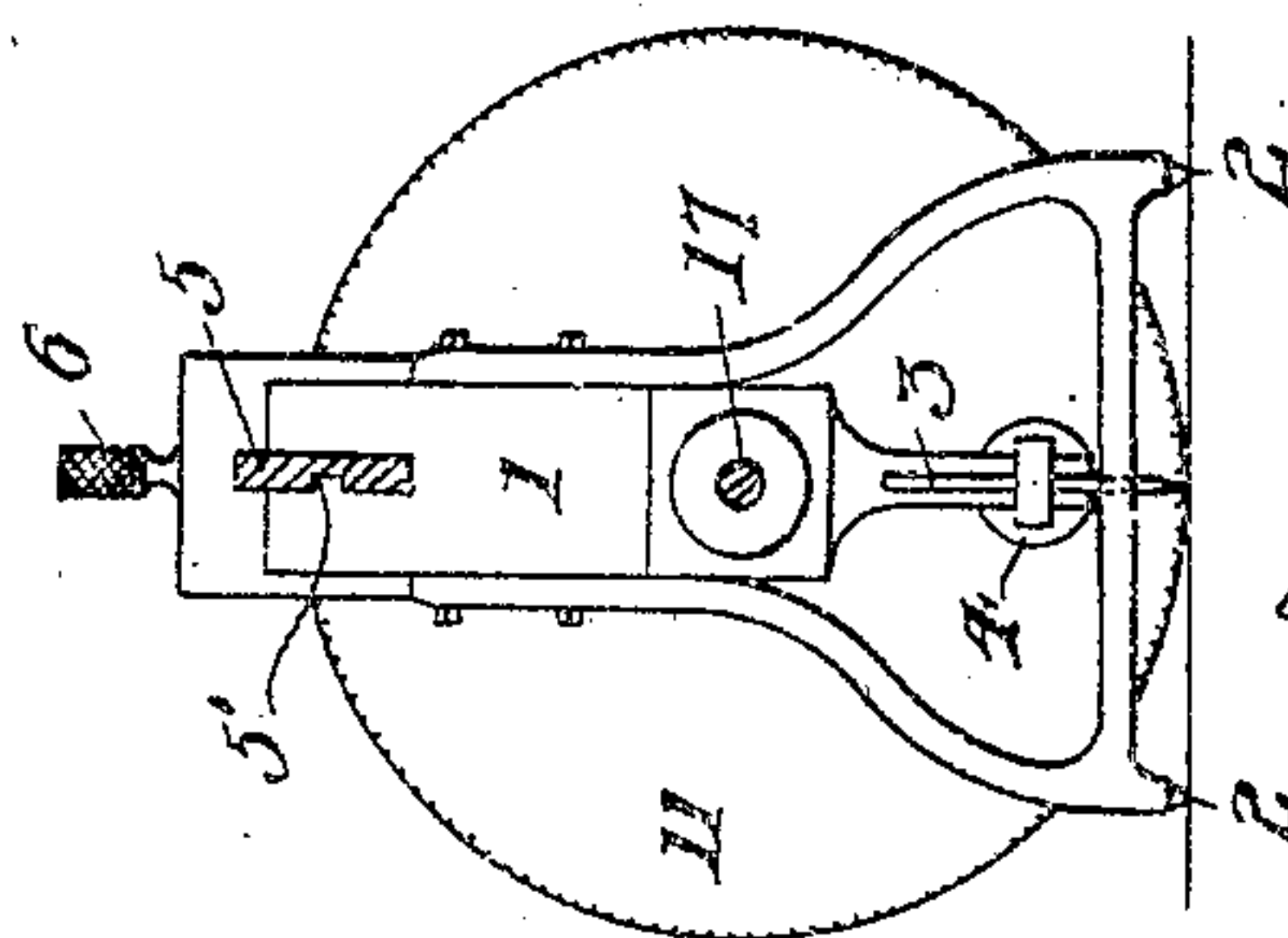
FIG. 5.



WITNESSES:

J. P. Spelman,
V. M. Finch.

FIG. 6.



INVENTOR

Valentine M. Spunar

By H. O. Heywood

ATTORNEY

UNITED STATES PATENT OFFICE.

VALENTINE MAR. SPUNAR, OF EAST PITTSBURG, PENNSYLVANIA.

MATHEMATICAL DRAWING INSTRUMENT.

954,476.

Specification of Letters Patent.

Patented Apr. 12, 1910.

Application filed January 21, 1903. Serial No. 412,010.

To all whom it may concern:

Be it known that I, VALENTINE MAR. SPUNAR, a subject of Austria-Hungary, residing at East Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Mathematical Drawing Instruments; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

My invention relates to certain new and useful improvements in drawing instruments designed principally for use in forming mathematically correct design work, such as ellipses, fluted configurations etc.

The primary object of my invention is to provide an instrument of the character described that will be of great service in drafting rooms and also for designing purposes, in fact it will be of a general utility for all classes of drawing.

In the accompanying drawings, in two sheets, Figure 1 is a side view in elevation of the instrument in assembled form. Fig. 2 is a top plan view of the same. Fig. 3, Sheet 2, is a cross sectional view showing detail construction of the supporting column which constitutes the pivotal point of the instrument. Fig. 4 is a diagrammatical view of the arc of travel taken by the different parts in the formation of an ellipse. Fig. 5 shows another design that can be made with my device.

Throughout the different views shown in the drawings the numeral 1 designates the frame work constituting the supporting column and pivotal point of my device. As will be seen by reference to Fig. 3, this column 1 has a comparatively broad base in order to afford a steadying means while the device is being operated, at each side of which are provided non-friction bearings 2—2. In the center of this column is arranged an adjustable pin 3, which serves as a pivotal point when the instrument is in service. This pin is held securely in position by means of a set screw 4. To the upper portion of this column 1 is secured a supporting bar 5, which extends outward at right angles to said column and may be of any desired length and provided on its face with

a scale, not shown. On the top of said column is provided a knob or contact piece 6 which serves as a turning means for operating the device. Operatively extending through the supporting column 1, at a predetermined point, but preferably at about midway of its height is a sleeve 7, the inner end being provided with a limiting collar 8. The opposite end of this sleeve is provided with a split tapered and threaded portion 9 upon which end is mounted a screw collar 10. Mounted over this sleeve and adjustable thereon is a wheel 11 having a sharp milled contacting edge 12 designed to travel on the drawing board. This wheel is formed with a tapering portion having sufficient material therein to cause said wheel to keep a close contact with the drawing board during the operation of the device. This wheel is also provided with a split tapered and threaded portion 13, upon which is mounted a screw collar 14.

Suspended from, and operatively attached to, the supporting bar 5, by means of a slotted guide portion 5', or any other suitable manner, is a housing member 15 which is secured in position, when properly adjusted, by means of a set screw 16.

Extending through the sleeve 7 is a shaft 17, the inner end being operatively connected with the housing 15 and having mounted thereon a beveled gear 18. The gear meshes in a similar gear 19, their relation, with reference to teeth, being preferably one to one. This latter mentioned gear is mounted on a radial supporting member 20 which may be constructed in the form shown or it may be made in any other desired shape. Through this said member 20 passes an adjustable radial bar member 21, held in position by a set screw 20', on one end thereof being provided a holder 22 for receiving a marking pen or pencil 23. This marking member is kept in close engagement with the drawing board by means of a small tension spring 24 which bears against a collar 25 provided on the said marker. This latter feature is not necessarily material to the proper working of my device as any other suitable means for keeping the marker in contact with the paper, may be substituted.

In order to form an ellipse with my drawing instrument illustrated by the diagrammatical view Fig. 4 the wheel 11 is first positioned and securely held by means

of the screw collar 14 on the sleeve 7 at a point where the milled traveling edge 12 will be exactly two inches from the fixed or pivotal point 3. When the instrument is 5 turned or operated by means of the knob 6, the wheel 11 will describe a perfect circle around the fixed pivot A and when the wheel 11 is made to travel from the point C to the point D the shaft 17 will be caused 10 to turn, owing to it being held to the sleeve 7 by means of the screw collar 10, thus revolving the gear 18 meshing with the gear 19, thereby turning the member 20 and carrying the radial bar 21, supporting the 15 marking member 23, so that said marker will travel in a path B to E; which will complete one quarter of the ellipse.

The radius of the wheel 11 to the distance between the plane of its edge 12 and the 20 pivotal point 3, determines the number of revolutions made by the meshing gears 18 and 19, and consequently the movement of the radial member 20. When the traveling edge 12 of said wheel 11 is positioned at two 25 inches from the pivot 3 the ratio will be as one to two, one revolution of said wheel causing the gears to rotate twice, thereby drawing the marking member in its arc of travel, which, when completed, forms a per- 30 fect ellipse of pre-determined length and width. The nearer said traveling edge 12 is brought to the pivotal point 3 the less the ratio, and the farther away the greater the ratio.

35 The length of the bar 21, or in other words the radius of the marking point 23 away from the pivotal point 20, determines the arc of travel of said marker. The nearer said marker is placed to the pivotal point 40 20 the shorter the radius and the closer it will describe a circle, and the farther away it is placed the longer the radius and the more pronounced will become the ellipse. The path of the pivotal point 20, while mak- 45 ing the segmental ellipse shown, is marked by dotted lines from F to G. The distance of the traveling edge 12, of the wheel 11, away from the pivotal point 3 determines the character of the design and the distance 50 of the marking point 23 away from the pivotal point 20, and likewise the distance the housing member 15 is placed away from the said point 3, determines the curvature of the design.

55 The normal relation of the distance between the pivotal point 3 and the traveling edge 12, to the longest radius of the wheel 11, being as one to two for forming an ellipse, when this relation is changed, by in- 60 creasing or diminishing the distance of the said traveling edge away from said pivotal

point 3 thereby causing said wheel to describe a wider or smaller circle, the consequent result is, that the revolution of said meshing gear will be relatively increased or 65 reduced according to the distance traveled by said wheel 11, which will cause the member 20 to turn in unison, thereby drawing the marking point 23 in a path, other than an ellipse; the design shown in Fig. 5 being an 70 example.

In order to adjust the housing member 15, on the supporting bar 5, the set screw 16 is first turned away from contact with said supporting bar and the screw collar 10 75 turned off the taper screw 9, which will then permit of the shaft 17 being moved through the sleeve 7.

Having described and shown my invention what I claim and desire to secure by 80 Letters Patent is:

1. In a drawing instrument, a suitable supporting frame work provided with a pivotal point; a bar member extending outward at right angles with the said supporting 85 frame; a housing operatively mounted on said bar; a sleeve operatively seated through the supporting frame work; a wheel mounted on said sleeve; a shaft extending through said sleeve, one end engaging in the hous- 90 ing; a radial member operatively seated in, and carried by, said housing; meshing gears mounted on the radial member and shaft; and an adjustable rod carried by the radial member, on one end being mounted a suit- 95 able holder for a marker.

2. In a drawing instrument, a suitable supporting frame work provided with a pivotal point; a bar member extending out- 100 ward at right angles with the said supporting frame; a housing operatively mounted on said bar; a sleeve operatively seated through the supporting frame work, hav- ing a limiting means at one end thereof; a wheel mounted on said sleeve, said wheel 105 being provided with a sharp traveling edge, also a securing means; a shaft extending through said sleeve, one end engaging in the housing; means for clamping or holding the sleeve to the shaft; a radial member oper- 110 atively seated in, and carried by, said housing; meshing gears mounted on the radial member and shaft; and an adjustable rod carried by the radial member, on one end being mounted a suitable holder for a marker. 115

In testimony whereof, I affix my signature, in presence of two witnesses.

VALENTINE MAR. SPUNAR.

Witnesses:

BEATRICE FITZGERALD,
H. W. STEVENSON.