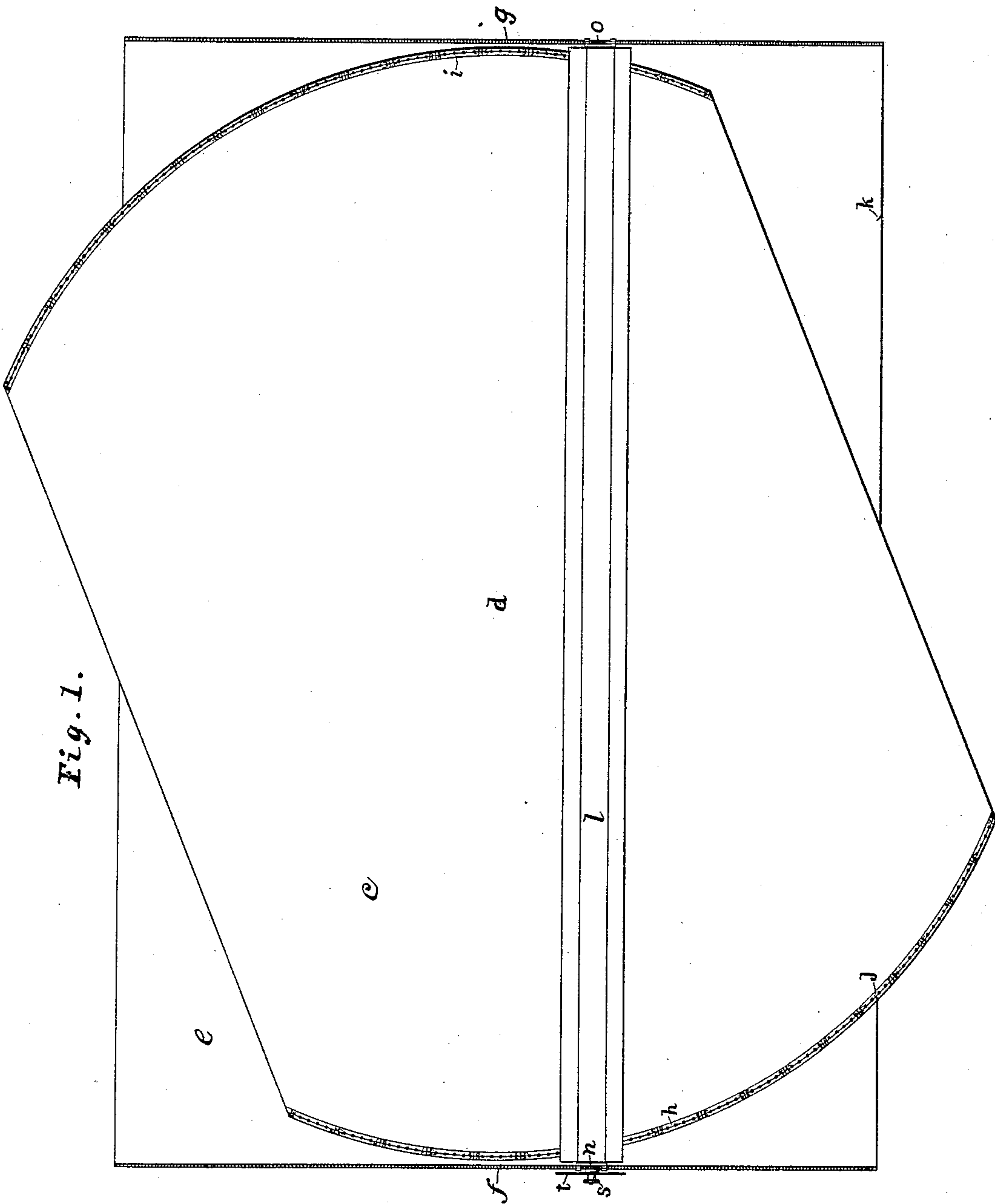


(No Model.)

2 Sheets—Sheet 1.

C. SPERRY.

ROTATABLE DRAWING BOARD AND MECHANICAL RULER.
No. 397,147. Patented Feb. 5, 1889.



WITNESSES:

Allen H. Baxter
Jesse A. Willett

INVENTOR

Charles Sperry

C. SPERRY.

ROTATABLE DRAWING BOARD AND MECHANICAL RULER.

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Fig. 6.

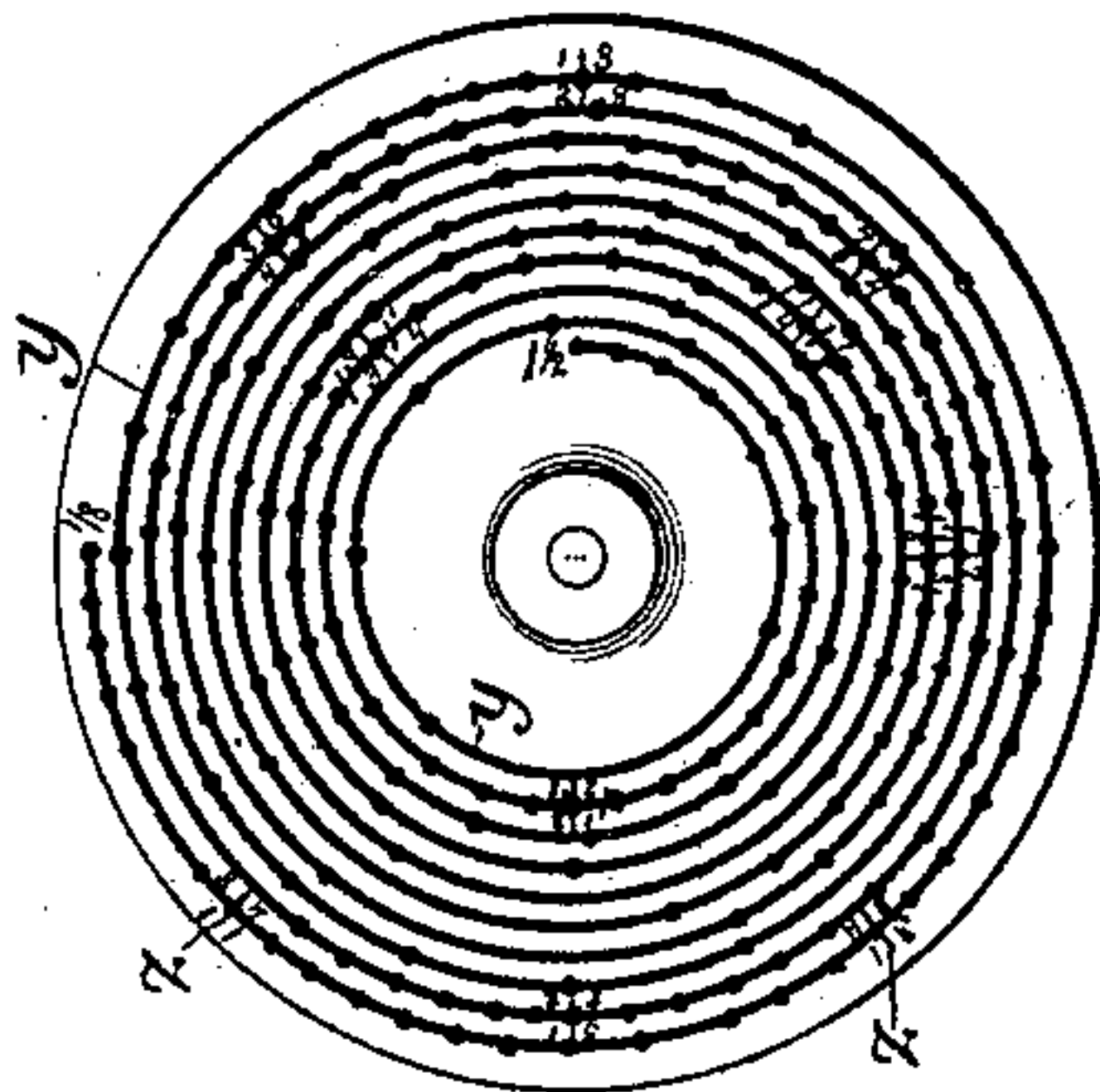


Fig. 7.

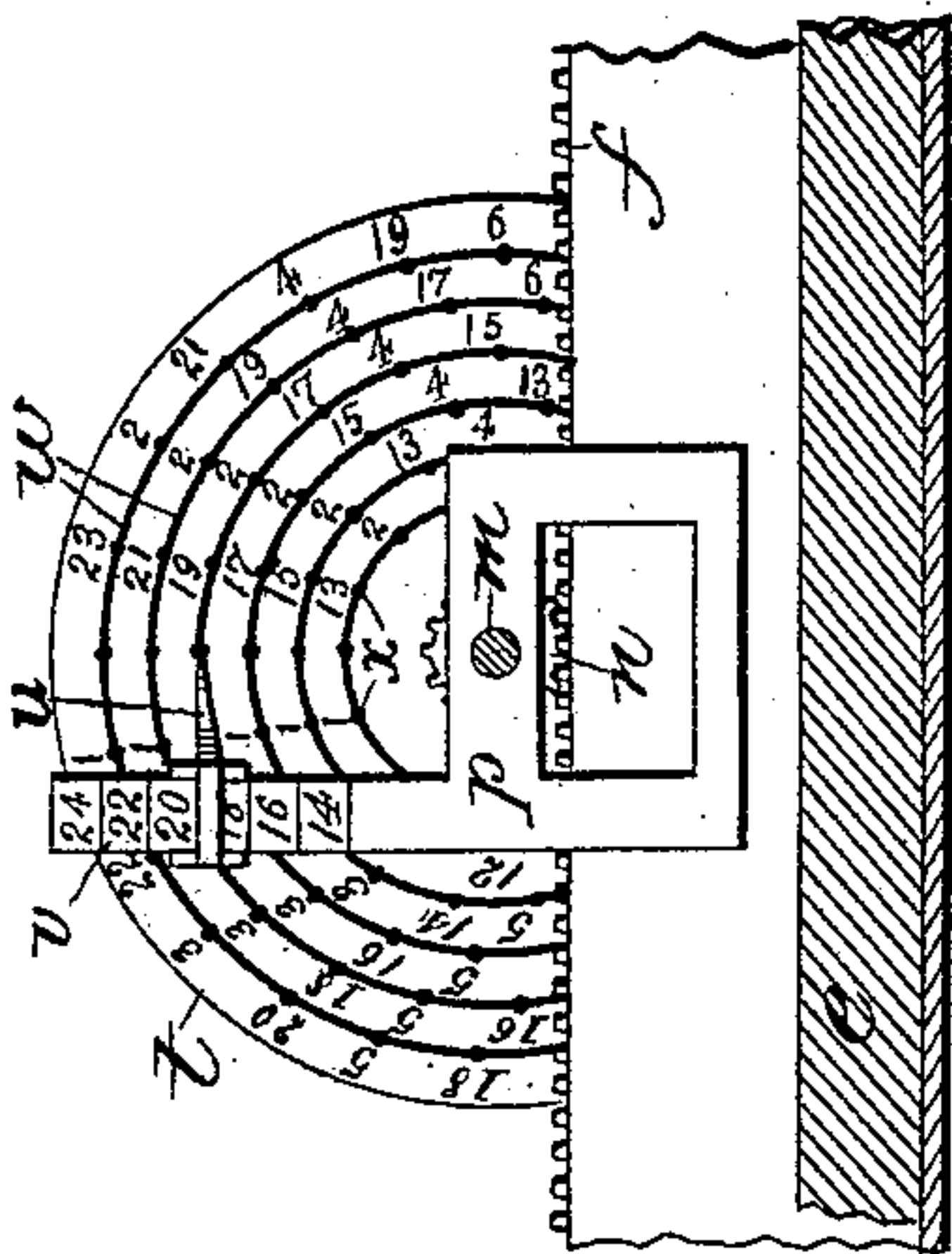
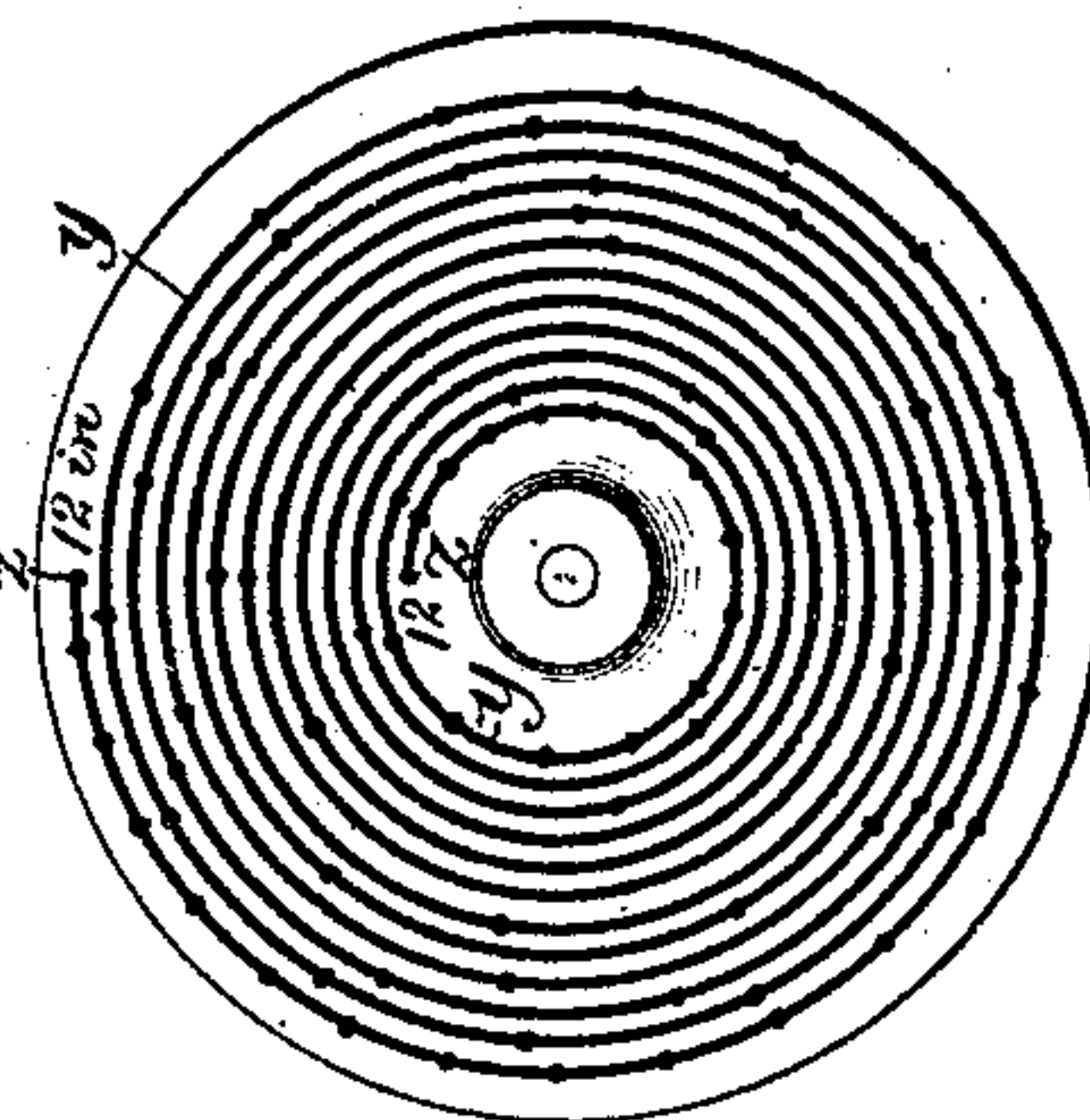


Fig. 4.

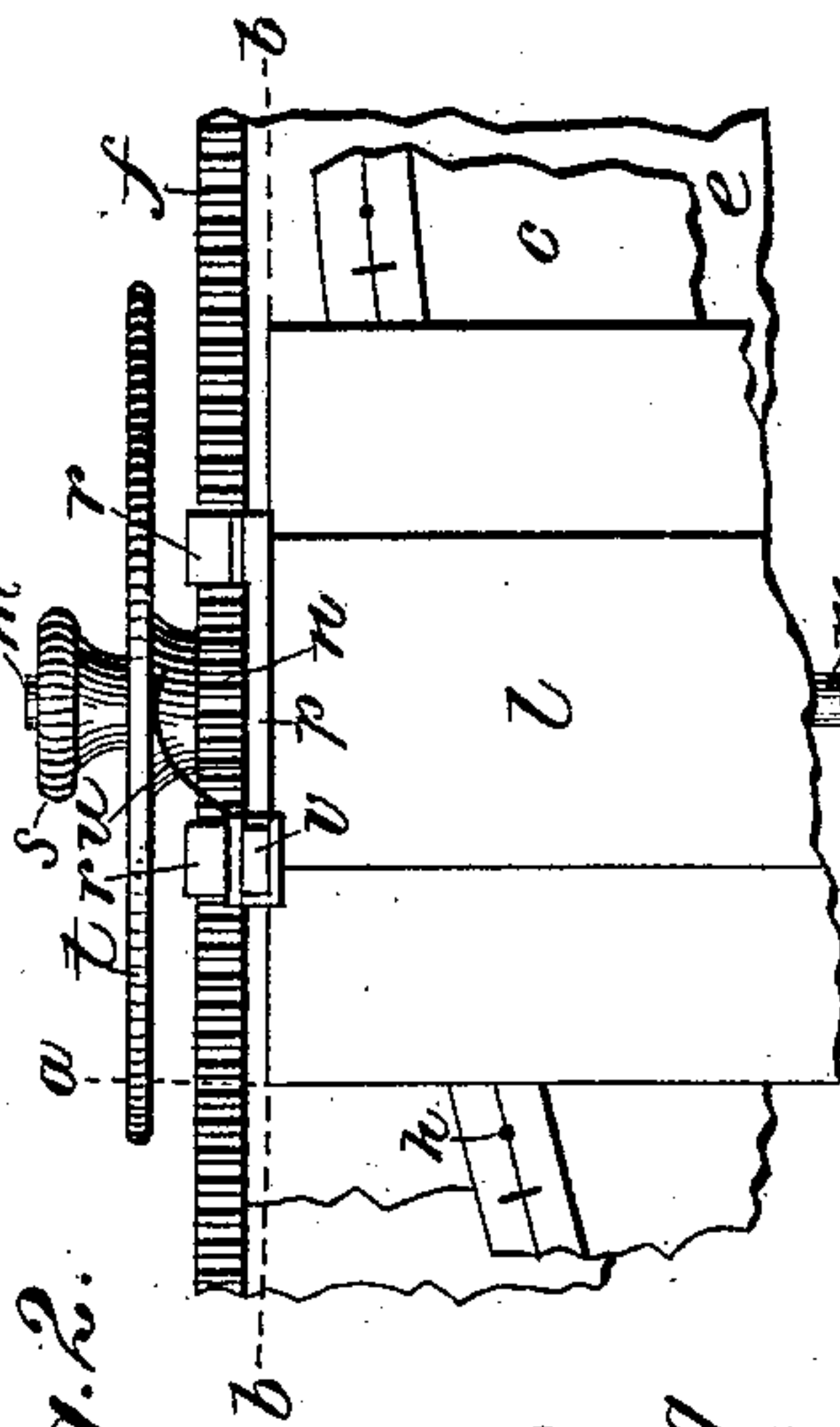


Fig. 2.

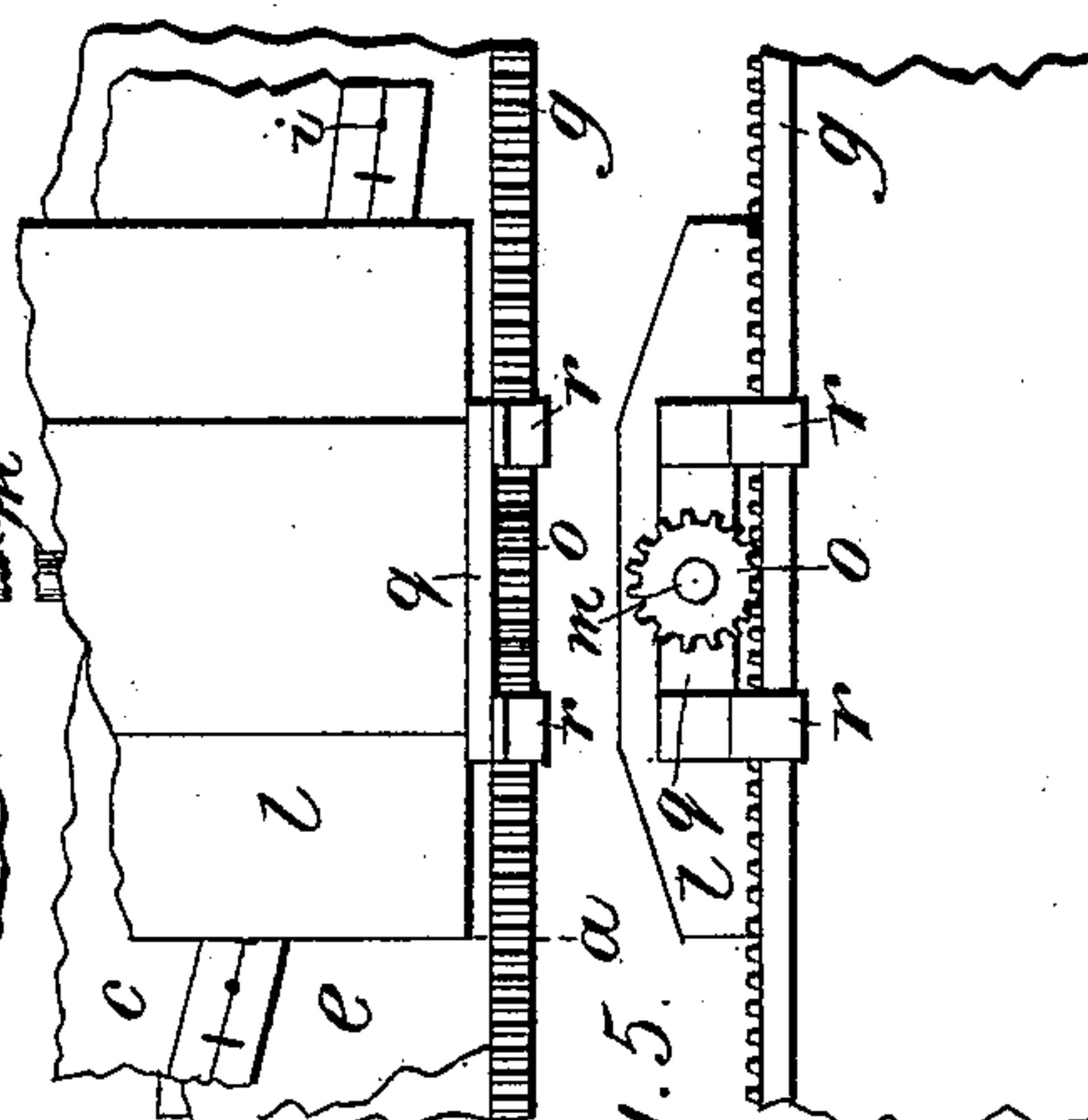


Fig. 5.

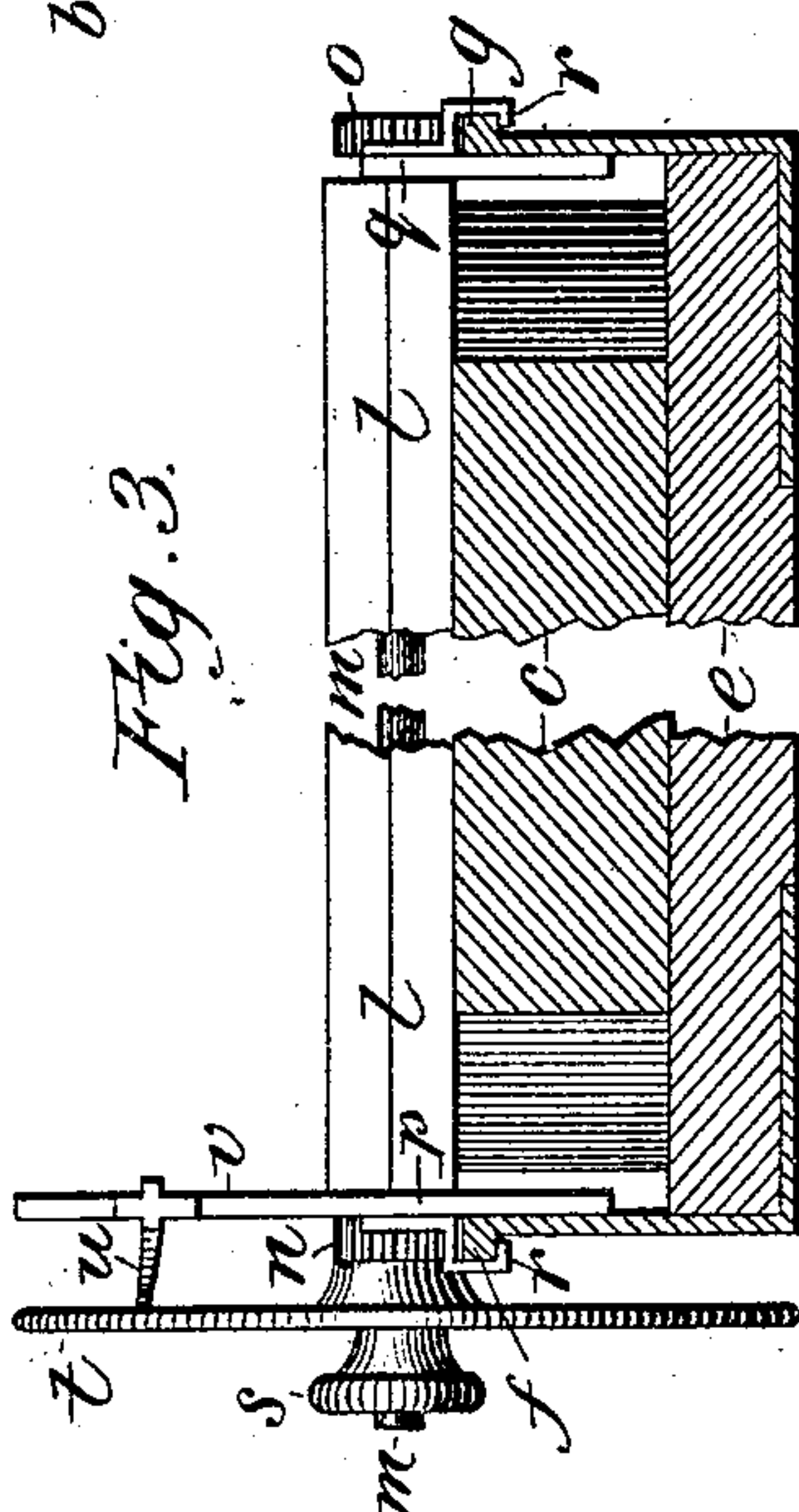


Fig. 3.

Witnesses:
Allen H. Baxter,
Isaac A. Willet

Inventor:
Charles Sperry

UNITED STATES PATENT OFFICE.

CHARLES SPERRY, OF PORT WASHINGTON, NEW YORK.

ROTATABLE DRAWING-BOARD AND MECHANICAL RULER.

SPECIFICATION forming part of Letters Patent No. 397,147, dated February 5, 1889.

Application filed June 22, 1888. Serial No. 277,911. (No model.)

To all whom it may concern:

Be it known that I, CHARLES SPERRY, a citizen of the United States, residing at Port Washington, in the county of Queens and State of New York, have invented a new and useful Rotatable Drawing-Board and Mechanical Ruler, of which the following is a specification.

This invention relates to a drawing-board so constructed as to be conveniently turned and placed at any angle, combined with a ruler moved over the board and kept in a parallel direction by a pinion at each end working on a rack, the pinions being connected by a shaft, on one end of which index-wheels are used to move the ruler, and measure and space the distance between lines.

The objects of my invention are to provide a simple and convenient drawing-board and ruler, with which all measurements and lines at all angles may be made more accurately and expeditiously, with less application of the eyesight, mental effort, and manual labor, for drawing all lines at any angle with the same ruler in one direction, and performing the work with less inconvenience than by using a T-square, protractor, triangles, parallel-ruler, section-liner, shading and measuring scales, &c. I accomplish these objects with a combined drawing-board and ruler constructed substantially as herein specified and illustrated in the accompanying drawings, in which—

Figure 1 is a plan of the instrument with the board turned for drawing lines at an angle of twenty-two and one-half degrees from a horizontal or sixty-seven and one-half degrees from a vertical line. Fig. 2 is a disunited plan of the ruler with shaft, pinions, and index-wheel, and a portion of the board, frame, and racks at each end. Fig. 3 is a disunited sectional elevation of the board, ruler, and shaft with pinions and index-wheel, and the frame with racks, on the line *a a*, Fig. 2. Fig. 4 is a sectional elevation of an index measuring-wheel, a pinion, rack, and hanger on the line *b b*, Fig. 2. Fig. 5 is an end elevation of the ruler, a pinion, and part of a rack. Fig. 6 is a view of an index shading-wheel for representing convex and concave surfaces of several different lengths; and Fig. 7 is a view of another shading-wheel, indexed for shading

a greater length, to represent a convex or concave surface.

Similar letters of reference indicate corresponding parts in the several views.

In the drawings, *c* is the drawing-board, which is pivoted at its center *d* on the under side to a frame, *e*, having racks *f g* across each end. The curved ends of the board *c* are concentric with the center pivot at *d*, and have scales *h i*, graduated in degrees of the circle on which they are placed. These scales are each ninety degrees long and secured ninety degrees apart on the circle. The degrees are indicated on the scales *h i* by two pointers, *j k*, ninety degrees apart, secured to the frame *e*.

The ruler *l* has a longitudinal groove in its lower side, which fits over a shaft, *m*. At each end of the ruler *l* and fastened on the shaft *m* are pinions *n o*, which gear with and run on the racks *f g*. These pinions are of such a size that for each revolution they roll over the racks and move the ruler exactly one inch. The pinions *n o* are kept on and in gear with the racks *f g* by hangers *p q*, which slide on the racks, guided by lugs *r* under the flanges on the racks. On the left-hand end of the shaft *m* is a thumb screw-nut, *s*, for securing changeable index-wheels to the shaft by binding them between the nut and the pinion *n*. An index-wheel, *t*, for measuring, is shown on the shaft, and other wheels for shading are represented in Figs. 6 and 7. An index-pointer, *u*, springs in and out of the index-holes on the wheels when they are turned, thereby retarding and partially holding them at those points. The index-pointer *u* slides on a pointer-guide, *v*, attached to the hanger *p*, so that it may be moved to all the index-circles on the measuring-wheels and run in the spiral grooves on the shading-wheels.

The measuring-wheels have circular grooves *w*, with as many equidistant index-holes *x* as the number of parts that is desired to divide an inch. The side shown of the wheel *t* is indexed to measure and divide inches in two, three, four, five, six, seven, eight, nine, ten, eleven, twelve, fourteen, sixteen, eighteen, twenty, twenty-two, and twenty-four parts. The opposite side of the wheel can be indexed for other fractions, and different wheels with any number of indexes may be used to meas-

ure and move the ruler as finely as is required or possible to draw lines. The indexes are numbered with even numbers, 2, 4, 6, &c., for measuring down, and odd numbers, 1, 3, 5, &c., for measuring up. The number of indexes in each circle is shown on the pointer-guide *v* on a line with the top of the circle.

The shading-wheels have spiral grooves, as *y y*, divided into sections, as *z* to *z*, which are indexed to space lines properly for shading the length required. Fig. 6 is a shading-wheel divided into twelve sections, having indexes for shading convex and concave surfaces one-eighth to one and one-half inch long, and Fig. 7 a wheel with one section indexed for shading convex and concave surfaces twelve inches long. Shading-wheels for the intermediate lengths or longer surfaces are made in the same way. Both sides of the shading-wheels may be grooved spirally through the index-holes, one side being used for representing convex surfaces and the other side by reversing the wheel used for concave surfaces of corresponding lengths; or the same side of the wheel may be used for both convex and concave surfaces by turning the drawing-board one hundred and eighty degrees, or one-half around. Instead of as shown in the drawings, the index-wheels may be made cylindrical, having the indexes and grooves around the circumferential surface and the index-pointer arranged to move longitudinally over this surface.

The instrument is operated and used as follows: The material on which the drawings are to be made is stretched upon and secured to the drawing-board *c*. Horizontal lines are drawn by the ruler *l* when the pointers *j k* are at one end of each scale *h i* on either side of the board, or when the pointers are at each end of either scale. Lines at any angle are drawn with the same ruler in the same direction by turning the board the required number of degrees, (indicated by one of the pointers on one of the scales,) the two scales and pointers measuring all angles and degrees in a circle. Measurements are made with the measuring-wheel, which by turning with the shaft *m* and the pinions *n o* measures with and moves the ruler *l* one inch at each revolution. To draw a line a certain number of inches from another line, the ruler *l* is placed at the line already drawn. Then the measuring-wheel *t* is given the same number of revolutions as the number of inches that the lines are to be apart, when the line may be drawn. If there is a fraction of an inch in the distance required between the lines, the index-pointer *u* is placed at one of the index-circles having a number of indexes, as shown on the pointer-guide *v*, which is a multiple of the number of parts in an inch composing the fraction required, and if the index-pointer is not at the zero-point on the measuring-wheel, where the notation of the index-holes commences, the thumb-nut *s* is loosened and

the wheel turned until the index-pointer enters the hole at the zero-point. Then the thumb-nut is tightened, binding the measuring-wheel against the pinion *n*, which connects it to the shaft *m*. The measuring-wheel is now turned one revolution for every inch and a proportional part of a revolution for the fraction measured by moving the required number of indexes past the index-pointer. Section-lining is performed by moving the ruler *l* with the wheel *t*, using the index-pointer *u* in either circle of indexes, according to the distance apart that the lines are desired to be spaced. Wheels with other numbers of indexes may be used to space lines at other distances apart. The different wheels are taken off and exchanged for others by removing the thumb-nut *s*. Shading is done by moving the ruler with wheels having indexes at varying distances apart in a spiral groove. The ruler *l* is placed at the line on one side of the surface to be shaded, a wheel having an indexed section for the required length is put on the shaft *m*, with the index-pointer *u* in the first index-hole of the section used, and the thumb-nut *s* tightened. The wheel is then turned one index and a line drawn consecutively until the other end of the section and the opposite side of the surface being shaded are reached. The index-pointer *u* follows in the spiral groove *y y* and slides on the pointer-guide *v* when the wheel is turned.

In operating the index-wheels the correct movement of the ruler will generally be effected by feeling and hearing the index-pointer enter the index-holes rather than by observing the number of indexes, thus using other senses to assist the eye-sight and considerably lessening the mental and manual exertion. The work accomplished by the instrument will also be mechanically accurate.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a drawing-board pivoted to a frame, graduated scales concentric with the pivot, and pointers for indicating the degrees of any angle at which the board may be placed, substantially as shown and described.

2. The combination of a drawing-board having racks along its sides, and a ruler having pinions gearing with and rolling on said racks to keep the ruler in a parallel direction when moved over the board, substantially as and for the purposes set forth.

3. The combination of a drawing-board which may be rotated on a frame having a rack at each end alongside of the board and a ruler having pinions working on said racks for drawing lines at all angles and moving the ruler in a parallel direction, substantially as shown and described.

4. The combination of a ruler provided with a pinion at each end, which are connected by

a shaft and gear in a rack at each side of a drawing-board, substantially as shown and described, and for the purposes set forth.

5 5. The combination of a ruler, pinions working on racks at each side of a drawing-board, a shaft, and index-wheels for measuring, shading, section-lining, and moving the ruler as desired, substantially as shown and specified.

10 6. The combination, with a drawing-board provided with racks, of a ruler provided with pinions, shaft, and index-wheels having indexes arranged spirally on the sides, substantially as shown and described, and for the purposes set forth.

15 7. The combination, with a drawing-board provided with racks, of a ruler provided with pinions, shaft, and index-wheels having indexes arranged spirally on the periphery, substantially as described, and for the purposes set forth.

20 8. A drawing-board provided with racks, in combination with a ruler moved and guided by a shaft and pinions working and rolling on

said racks, and index-wheels for operating the ruler, substantially as and for the purposes described. 25

9. A drawing-board provided with graduated scales of degrees, turning on a frame having racks alongside of the board, in combination with a mechanically-moved ruler 30 provided with pinions connected by a shaft and index-wheels, substantially as shown and described, and for the purposes set forth.

10. A rotatable drawing-board, scales, pointers, frame, and racks, in combination 35 with a mechanical ruler, pinions, shaft, and index-wheels, all constructed and arranged for being operated as a T-square, protractor, triangles, parallel-ruler, and section-liner for measuring and drawing all lines at any angle 40 or distance apart, substantially as specified.

CHARLES SPERRY.

Witnesses:

ELBERT STANNARD,
JAMES L. BAXTER.