

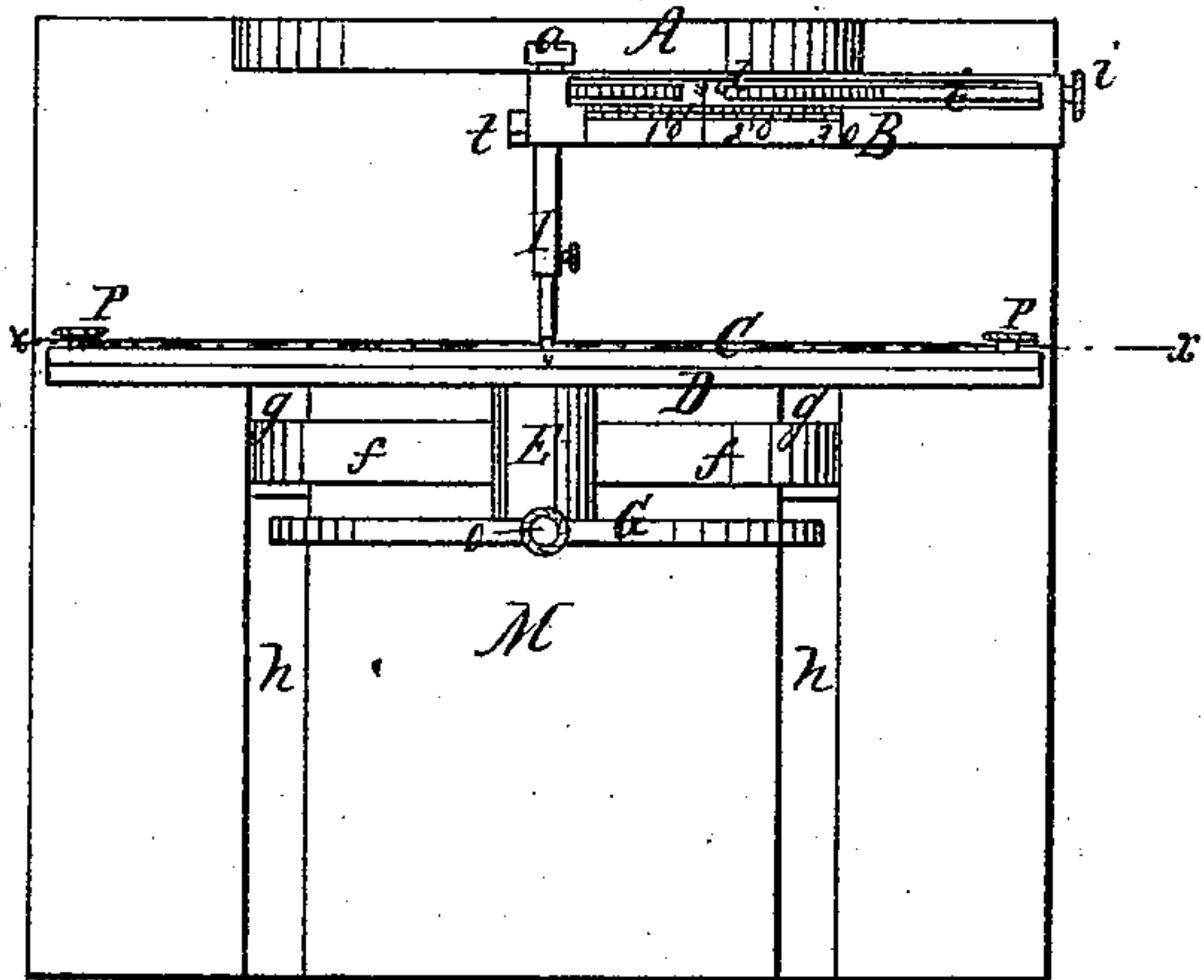
*C. R. Liff.*

*Drafting Protectors.*

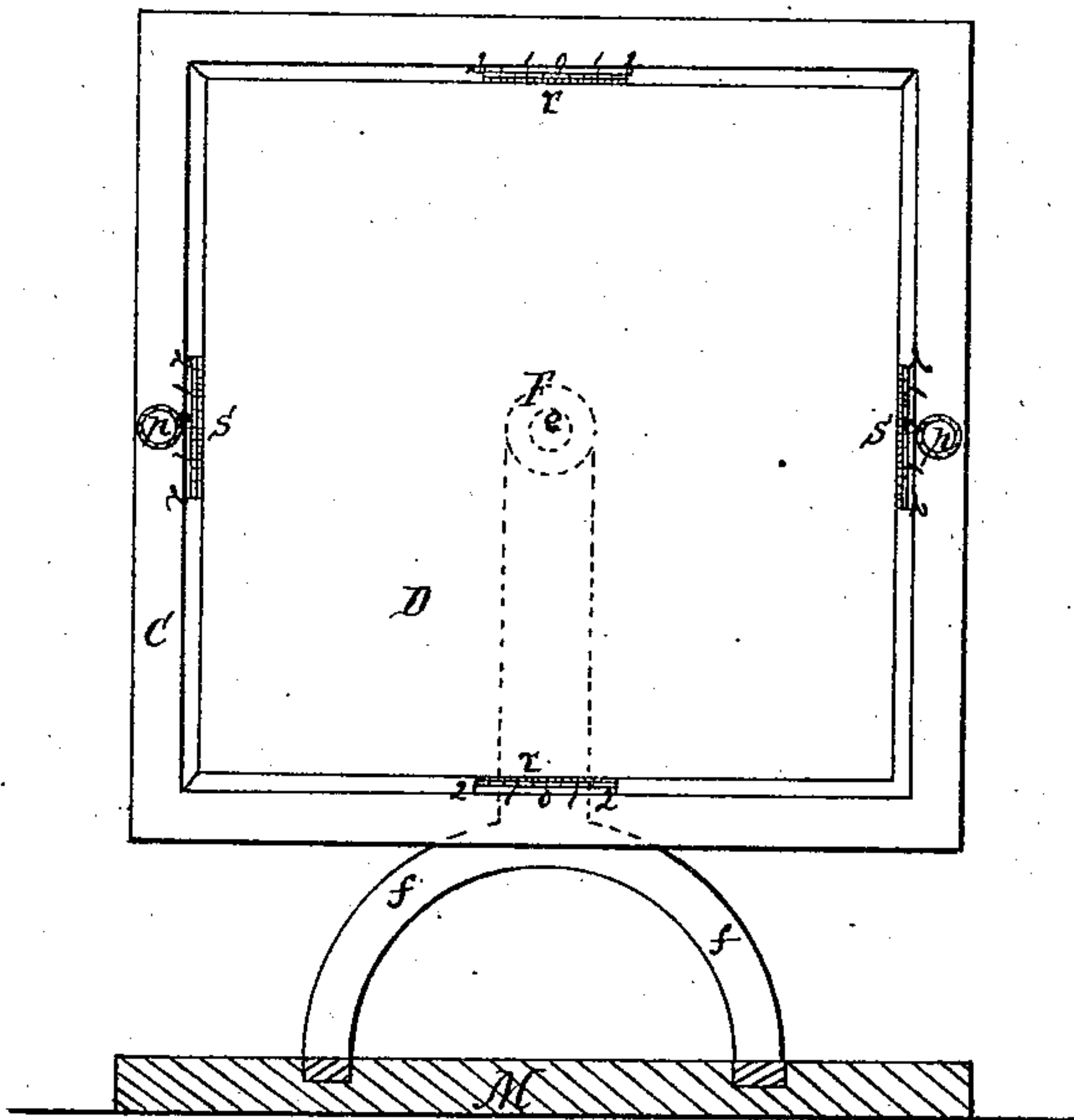
*Nº 15,183.*

*Patented Jun. 24, 1856.*

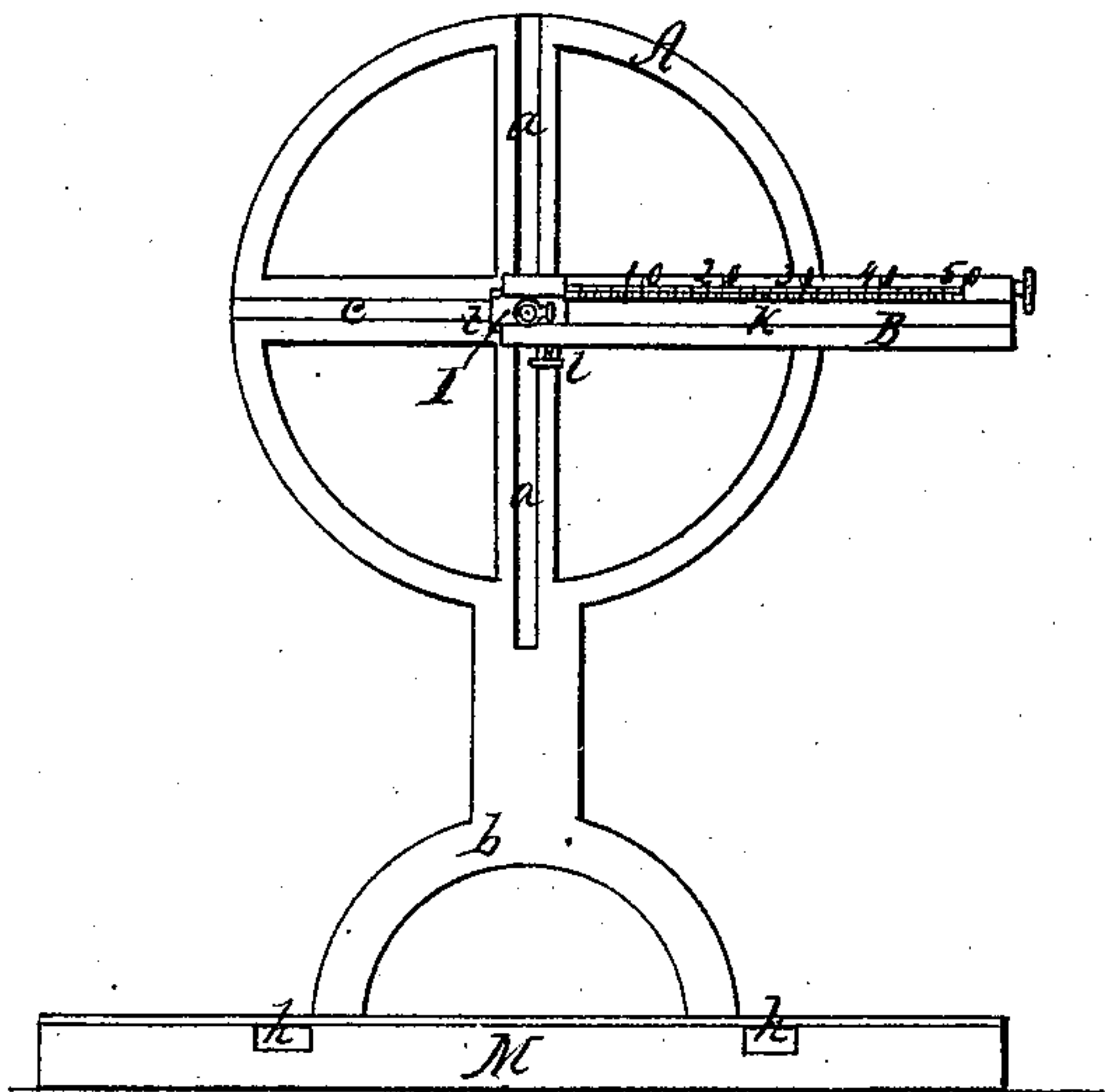
*Fig: 1*



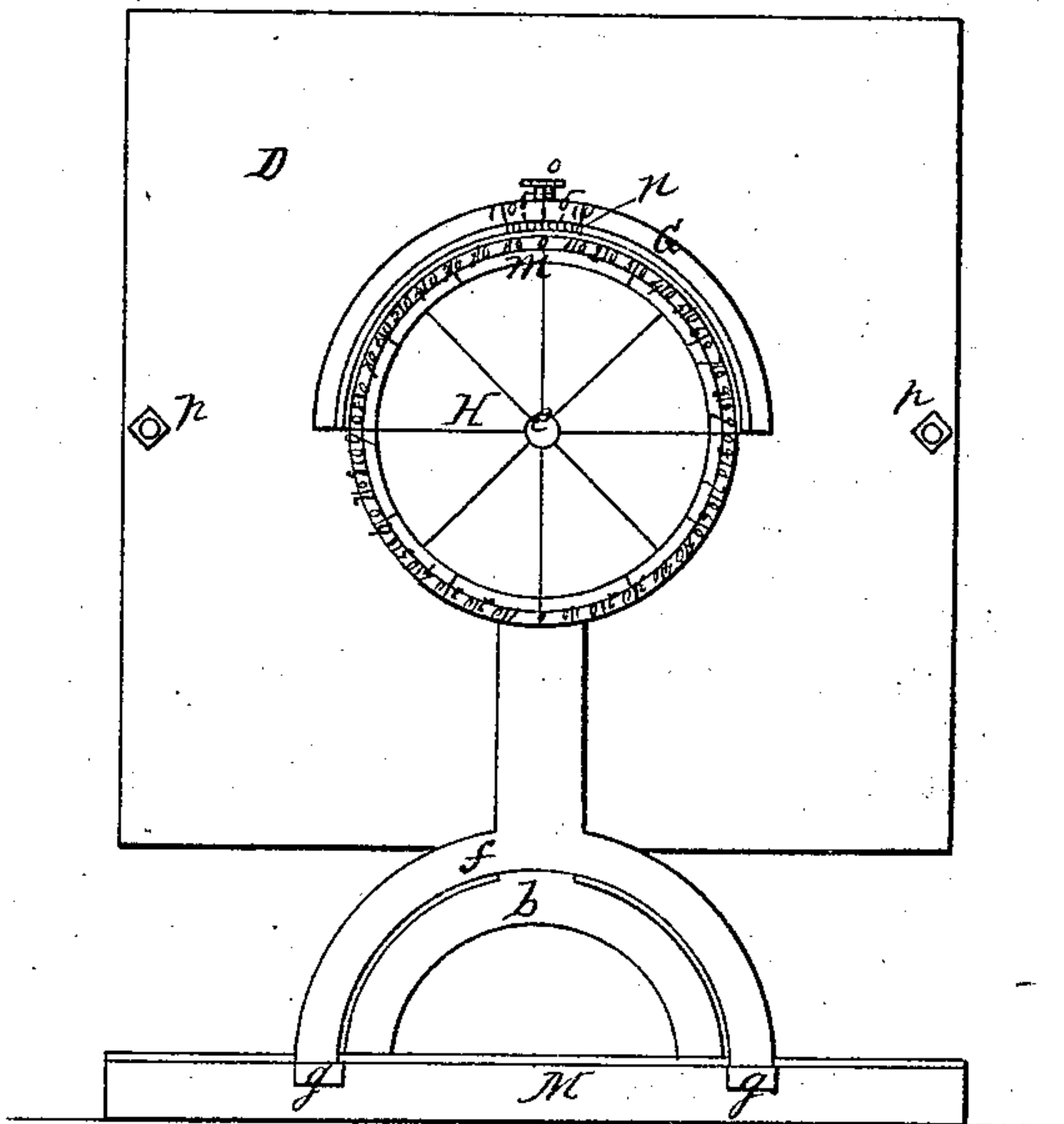
*Fig: 3*



*Fig: 2*



*Fig: 4*





# UNITED STATES PATENT OFFICE.

CHARLES R. ILIFF, OF FALMOUTH, KENTUCKY.

## PLOTTING INSTRUMENT.

Specification of Letters Patent No. 15,183, dated June 24, 1856.

*To all whom it may concern:*

Be it known that I, C. R. ILIFF, of Falmouth, in the county of Pendleton and State of Kentucky, have invented a new and Improved Instrument for Drawing Geometrical Lines, which I denominate a "Geometrical Constructor"; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification, Figure 1, being a plan of the machine; Fig. 2, a front elevation of the trammel-stand, the drawing-stand being removed; Fig. 3, a vertical section of the instrument, on the line  $x x$ . Fig. 1, looking toward the face of the drawing stand; Fig. 4, a front elevation of the whole instrument.

Like letters designate corresponding parts in all the figures.

The nature of any invention consists in the combination of a trammel provided with adjustments for forming ellipses, right lines and circles, with a stand or board, provided with angle, and off-set adjustments, whereby I am enabled to readily form all the regular lines required in drawing, projecting, and plotting.

I employ a cross, ring or disk, A, provided with right-angled grooves  $a, a$ , and beam B, similar to those composing the ordinary trammel. The cross, or ring is mounted on a suitable stand M, the supporting standard  $b$ , being as narrow as practicable in order to allow the beam to be readily moved around. The end block of the beam which slides in the vertical groove  $a$ , may be immovably secured to said beam; but the block  $d$ , which slides in the horizontal groove  $c$ , is made adjustable in the beam from the vertical end block, to the farthest distance it can assume therefrom, and be retained in its groove. I adjust its position by the screw  $i$ , or its equivalent, by simply turning which, its position is shifted. A scale of equal parts is added to the beam, as shown in Fig. 1, by which one axis of any ellipse can at once be established. The pen carrier I is secured to a sliding block  $t$ , which is also made adjustable the whole length of the beam, and secured in any position desired, by a fastening screw  $l$ . Or an adjusting screw similar to the screw  $i$  may be employed. A scale  $h$  of equal parts (Fig. 2) is also provided for this slide. Thus the pen cannot only be adjusted to any position outside of both guide blocks, but

to any position between them, and also directly over them. This mode of adjustment adds exceedingly to the capability of the instrument. Thus when the pen is directly over the vertical guide block, as seen in the drawings, a straight perpendicular line will be formed by turning the beam. If the pen is placed directly over the other guide block  $d$ , it will describe a straight horizontal line. If placed just half way between the centers of the two blocks, it will form a perfect circle. If it is moved to any point between the guide blocks and said middle point, it will describe ellipses, whose transverse diameters are respectively vertical or horizontal according to its position, when placed nearest the vertical or the horizontal slide block.

The drawing stand is mounted on two feet  $g, g$ , which slide into grooves  $h, h$ , in the bottom M of the trammel stand, at right angles to the face of the cross A. On the top of its standard  $f$ , is a bearing E, whose central line coincides with the axis of said cross. A pivot  $e$  passes through this bearing, to the inner end of which is secured the drawing plate, or board D, in a plane parallel with the trammel cross. A clamping frame C, is attached to the face of said plate, and provided with clamping screws  $p, p$ , by which the drawing paper is secured in place. On the inner edges of said clamping frames are marked the scales  $s s$  and  $r, r$ , (Fig. 3,) corresponding to any convenient unit of measure, and numbered from the central horizontal and vertical lines in either direction, as represented. To the other end of the pivot  $e$ , is secured a disk H, the edge of which is divided into single degrees of the circle, or if that is not convenient, into divisions of say ten degrees, and numbered both from the top and bottom toward the right and left, as shown in Fig. 4. Immediately around the upper half of this disk, is situated an arc G, which is immovably attached to the bearing E. From the highest point of this arc, is marked both ways, a number of degrees  $n$ , of the circle, say about ten degrees in either direction, and numbered accordingly. A milled screw  $o$  is also provided for confining the other disk H in any position. The use of this scale of degrees is to measure the single degrees, when the scale  $m$  or the disk H is not divided into single degrees, but only into sections of ten, or other number of degrees. If divided into



a scale of single degrees, the scale  $n$ , may be divided so as to constitute a vernier. All the scales on the instrument should be divided to the same unit.

5 When the instrument is used, this drawing stand, which is removable at pleasure, from the trammel stand, is pushed in its grooves  $h, h$ , until the pencil, or pen,  $I$ , touches the paper on the drawing plate  $D$ . Any figure  
0 which the trammel is capable of forming by adjusting the guide and pen blocks, can then be drawn upon the paper secured to the face of the drawing plate. Then by the angular adjustment  $H, G$ , the directions of those fig-  
5 ures or lines can be varied at pleasure; while by the offset adjustment, with the scales  $r, r$ , and  $s, s$ , the position on the paper can be selected and changed as desired. Or, by  
10 holding the trammel beam in any fixed position, and turning the drawing plate, accurate circles are readily formed. And not only can entire circles be described, but arcs of any number of degrees, may be formed by simply noting the distance moved on the  
15 scale  $m$ . Similar portions of ellipses are just as easily described and measured. This feature of the angular adjustment, together with the offset adjustment enables arches

of any form to be quickly and accurately described. Thus with this combination of 30 the trammel and adjustable drawing stand, arranged as herein described, an instrument capable of forming almost every line required in practice, is produced. The map projector, for instance, can describe the 35 meridians and parallels of latitude, the surveyor construct his plots, and the engineer describe his curves and angles, with the greatest facility.

Having thus described my improved in- 40 strument for constructing geometrical lines, I wish it to be understood that I do not claim the trammel nor any of the separate adjustments described, in themselves separately; but what I claim as my invention 45 and desire to secure by Letters Patent is—

The combination of the trammel, constructed substantially as specified, with the drawing stand, which is provided with the angular and offset adjustments, as described, 50 whereby an instrument of greatly increased capability is produced.

CHARLES R. ILIFF.

Witnesses:

J. S. BROWN,

CLEMT. S. STULE.