

(No Model.)

F. W. CORNELIUS.

INSTRUMENT FOR DIVIDING ANGLES INTO EQUAL PARTS.

No. 538,239.

Patented Apr. 30, 1895.

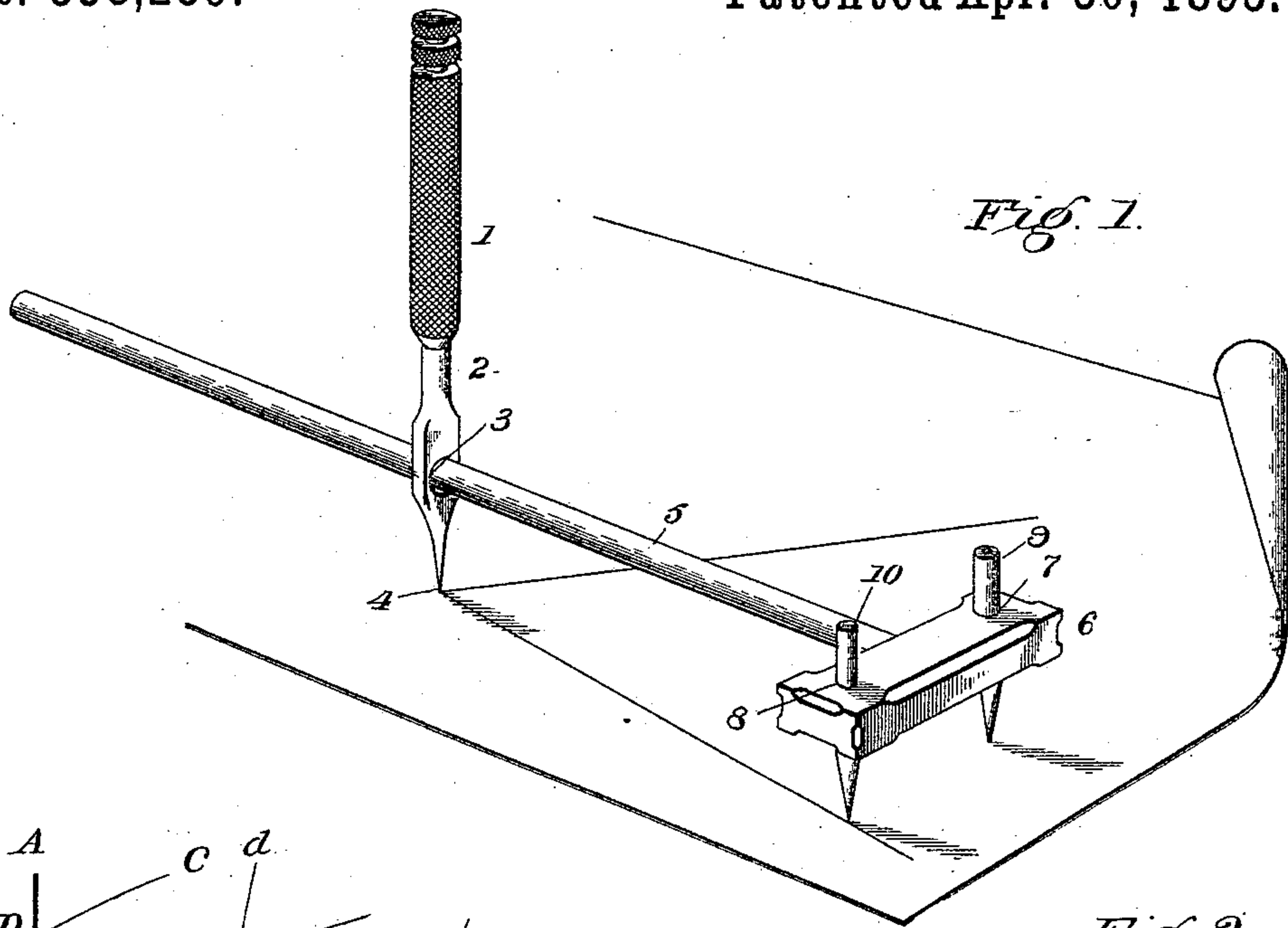


Fig. 1.

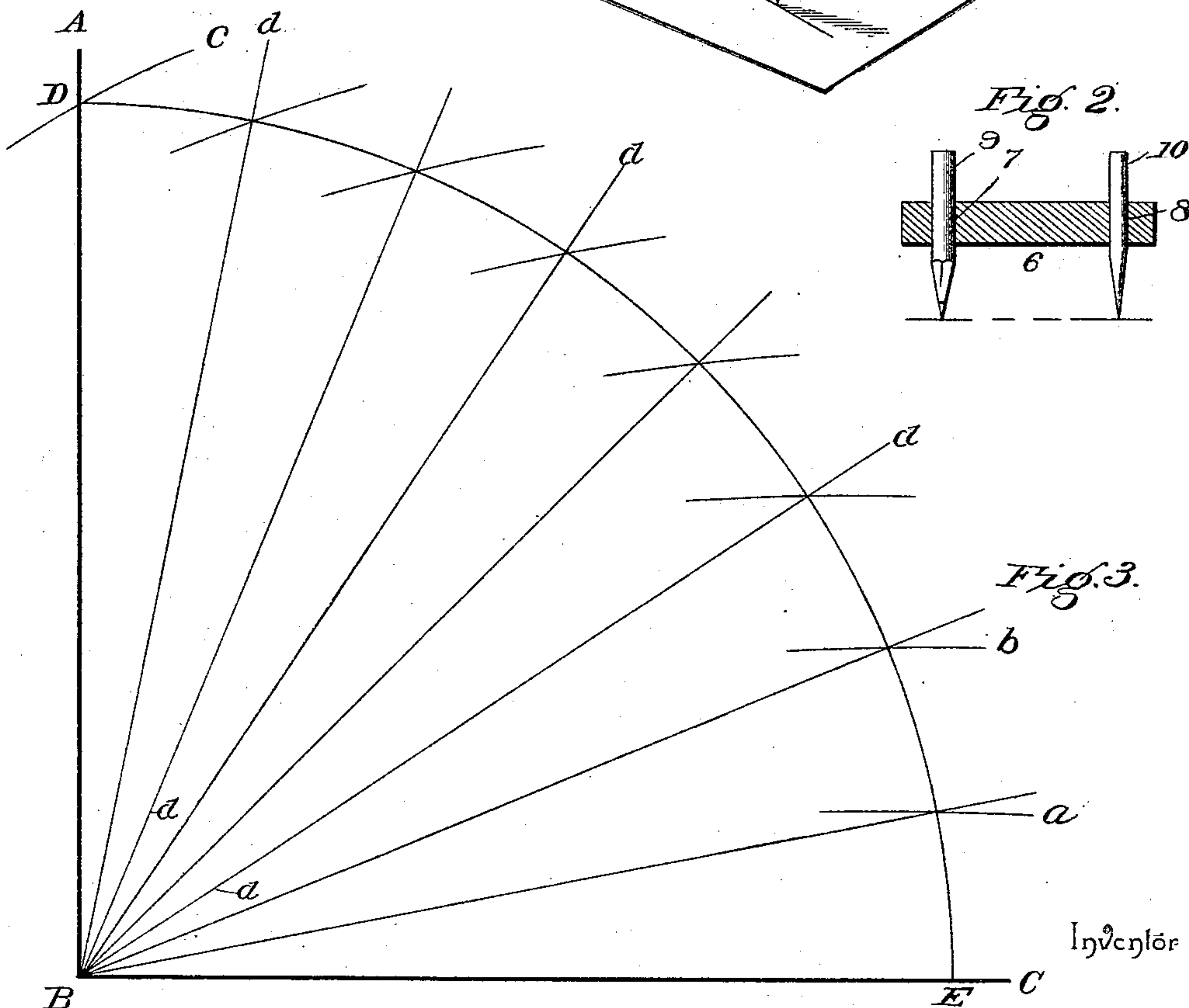


Fig. 2.

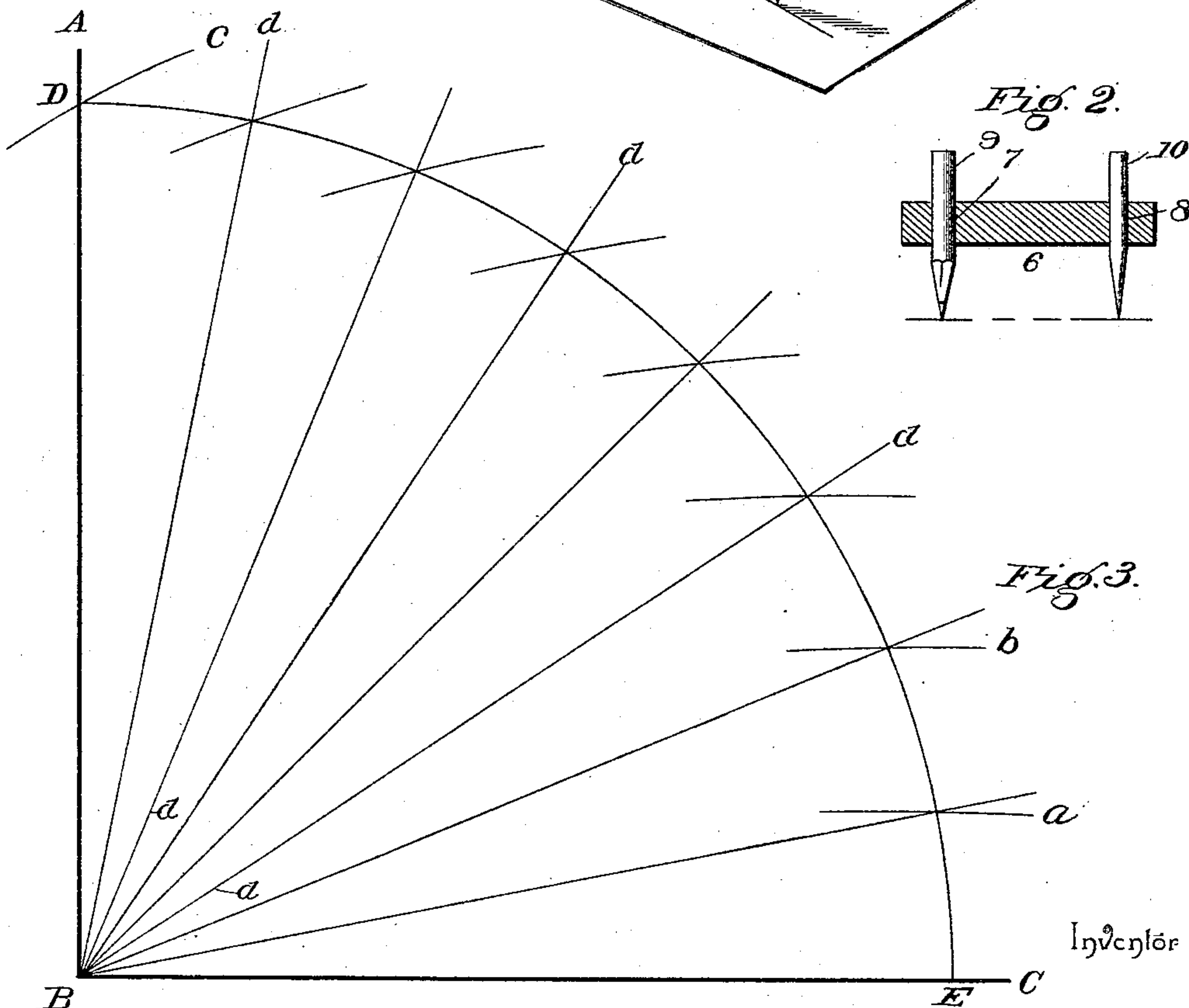


Fig. 3.

Witnesses

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UNITED STATES PATENT OFFICE.

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INSTRUMENT FOR DIVIDING ANGLES INTO EQUAL PARTS.

SPECIFICATION forming part of Letters Patent No. 538,239, dated April 30, 1895.

Application filed December 18, 1894. Serial No. 532,208. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS W. CORNELIUS, a citizen of the United States, residing at Purley, in the county of Franklin and State of Texas, have invented new and useful Dividers, of which the following is a specification.

This invention relates to an improvement in that class of dividers wherein the instruments are mechanically related to the beam compass, having in common with said compass a member for retaining the center, and having adjustable on said center an outrunning beam carrying the pencil or dividing point. Now, while my invention is mechanically related to the beam compass, it is radically different therefrom in function, the purpose of my device being to provide means for dividing any given angle into equal parts, the number of which may be any that the manipulator may desire.

To this end my invention consists in a member having a point adapted to be placed at the point of the angle to be divided, and having movable thereon a beam extending horizontally and having at one end a transverse head projecting from each side of the beam and carrying at one end an indicating point and at the other end a marking pencil. With such an instrument I am enabled to divide any angle into any number of equal parts; and this operation, which is the use or purpose for which my invention is designed, will be fully explained hereinafter.

In the drawings: Figure 1 represents a perspective view of my improved dividers, showing them in operative adjustment; Fig. 2, a cross-section, taken through the head of the horizontal beam; Fig. 3, a diagrammatic view in illustration of the operation for the performance of which my invention is designed.

The reference numeral 1 indicates a bar of steel or other metal, having a rounded upper portion, and a lower portion 2 reduced in thickness and formed with an opening 3, below which the point 4 is arranged. This bar is the member referred to hereinbefore which is adapted to have a stationary relation to the point of the angle, and which will hereinafter be termed the center point or member.

5 indicates the horizontal beam referred to

before, and this is also formed of any suitable metal and round in cross-section, it being of such a size that it will be capable of free movement longitudinally and axially in the opening 3 of the center member 1. Rigidly secured to, or formed integral with, one end of the beam 5 is the head 6, which is formed rectangular in cross-section, though this is not essential, and which is flattened or spread horizontally.

Formed in the ends of the head 6 are the vertically-disposed openings 7 and 8, the opening 7 being at one end and the opening 8 at the remaining end. In the opening 7 the pencil 9 is arranged, and this pencil may be secured in place by any suitable means, such as by forming it with a slight taper and forcing it to bind against the sides of the opening, as shown in the drawings, or by the use of set-screws or any other well-known means. The lower end of the pencil is sharpened so as to be capable of marking, as the operation of the device may require.

The opening 8 is provided with an indicating point 10, which is secured therein by the same means used in connection with the pencil 9, and which has its lower end pointed and projected to a plane equal to that in which the lower end of the pencil 9 is located.

The center member or point 1 may be milled at its upper portion, so as to provide a roughened surface to facilitate the manipulation of the instrument; and all of the elements of my invention may be given such form and shape as is preferred, provided their essential attributes remain unchanged.

In the employment of my instrument, supposing that it is desired to divide the right angle A B C into eight equal parts, the center member 1 should be placed with its point 4 at the point B, or the point of the angle, and the indicator 10 should be placed with its point upon the line C, the beam 5 and head 6 having been first moved into a position which will permit this arrangement or location of the parts.

The next operation is the moving of the head 6, and consequently the beam 5, in a line parallel with the line C, so that the point or indicator 10 will travel on said line, and so that the pencil 9 will describe a line running

nearly parallel therewith and adjacent to the inner side of the line C. This latter line is designated by the letter *a*. The head 6 is now moved inwardly until the point 10 is in position to trace the line *a*, whereupon the operation is repeated, which will result in the formation of the line *b*. So the device is operated until one of the lines described by the pencil 9 intersects with the line A B, and until a sufficient number of lines, such as *a* and *b*, have been drawn to leave eight divisions of a supposed arc representing the circumference of which the lines A B and B C may be the radius. When the eight divisions of this arc have been attained, the arc should be described so as to fix its relation to the other lines. This arc should have the point B for its center and should start from that point on the line A B with which the eighth line of the pencil 9 intersects. In other words, the radius of the arc should be that portion of the line A B which lies between the point B and the eighth line of the pencil 9, this latter line being designated by letter *c*.

D E indicates the arc; and the divisions of the angle are fixed and made certain by drawing the lines *d*, which will be, in the particular case supposed, seven in number, and which will have a common center at the point B, and which will radiate therefrom and intersect with the respective lines of the pencil 9 at the points on said lines where they intersect with the arc D E.

The essentialities of the foregoing operation are that the lines of the pencil 9 should be formed in the manner described until a number has been produced which will be equal to the number of spaces or divisions into which the angle is to be divided; and the last line, the line *c* of Fig. 3, should be continued until it intersects with the line A B. This will get the divisions of the triangle, and the outer boundaries of said divisions, or rather their circumferential locations, are to be determined by the description of the arc D E. It will be obvious that this operation can be continued indefinitely, so as to accord with the number of divisions which it is desired to make in the angle; and that the operation under these variances will be carried out after the manner described in connection with the problem of Fig. 3.

If so desired, the pencil 9 and indicator 10 could be made adjustable on the head 6, so that they could be moved toward and from each other and the distance between them regulated, to the end that the convenience in the use of the instrument might be increased. Indeed, in practice this will be necessary, since it will be found desirous to make divisions of all sizes. In this event they could be arranged in transverse slots and held at the proper adjustment by clamping screws operating in them and binding against the head.

It is also possible to mount the center member or point 1 upon a suitable carriage or table, and arrange it so that the point may be

made to rest upon the center point of the angle, the purpose of the carriage or table being to facilitate the steadiness of the center member. In event of such an arrangement it will be necessary to revolvably mount the member 1, as will be understood.

An essentiality in the construction and adjustment of the parts of my invention is that the pencil 9 and point 10 be equidistant from every point on the beam 5, and unless this adjustment is present the successful operation of the invention will be defeated.

It will be observed that the lines described by the pencil 9 will each curve, and that each will extend diagonally, or out of parallel, with the line B C. It will also be seen that each line curves in a different arc and that each extends diagonally from the line B C to a different degree. This curved and diagonal disposition of the several lines is due to the swinging of the head 6, under the influence of the member 1, which holds the beam 5 in the same radial relation to the several parts of the angle. Thus, it will be seen that the line *a* curves to a very slight degree, and that it is also extended diagonally in relation to the line B C, its inner end being nearer to the said line than its outer end. Now, as the performance of the operation is continued, the curves and slant of the several lines described by the pencil 9 will be correspondingly increased. Thus, the line *b* will have a curve equal to twice that of the line *a*, one degree being due to the curve in the line *a* and being transmitted to the line *b*, owing to the fact that the pointer 10 must follow on the line *a*; and the other degree being due to the swing in the head 6, which gives the line *a* its primary curve. The line *b* will also have a slant in relation to the line B C equal to twice the slant of the line *a*, and this owing to the facts which were stated regarding the curve in the line *b*, namely, one-half of the slant in line *b* will be due to the primary slant in line *a*, and the remaining half to the swing of the head 6. So the operation is continued, and upon the description of each of the several lines formed by the pencil 9, each line will have a curve and slant equal to the curve and slant of the one immediately preceding it and the curve and slant of the line *a*, or the line first formed by the pencil 9. All of this seemingly delicate adjustment need not be entered into upon the use of my invention, for, while it will be present in every operation of the instrument, it will, obviously, be not necessary for the operator to pay any attention to it, since the accuracy which my instrument has will insure the correct description of every line. In other words, it is merely an incident to the operation of my invention, and an explanation of it will add to and exemplify an understanding of the complete invention.

Changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or

sacrificing any of the advantages of this invention.

Having described the invention, I claim—

5 1. The combination of a center member provided with a point and with a transverse opening, a beam movable in said transverse opening, a transverse head secured to one end of the beam and extending on each side thereof, a pencil at one end of the head, and an indicating point at the remaining end of the head, 10 the pencil and indicating point being equidistant from every point on the transverse beam, substantially as described.

15 2. The combination of a member capable of being held at the point of an angle, a trans-

verse beam slidably mounted on said member, a pencil mounted on the transverse beam and extended beyond one side thereof, and an indicating point mounted on the transverse beam and extended beyond the opposite side, 20 the pencil and indicating point being equidistant from every point on the transverse beam, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in 25 the presence of two witnesses.

FRANCIS W. CORNELIUS.

Witnesses:

T. E. CORNELIUS,

J. A. CORNELIUS.