

(No Model.)

A. BUTLER.
PROTRACTOR.

No. 395,875.

Patented Jan. 8, 1889.

Fig - 1 -

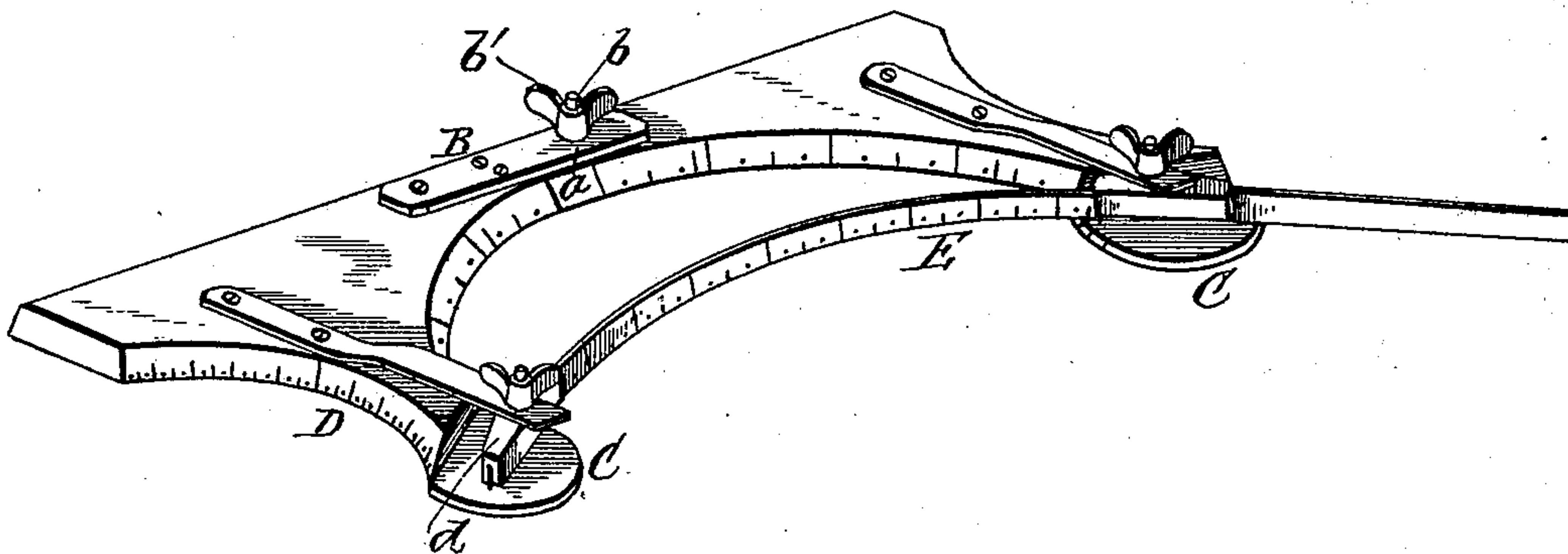


Fig - 2 -

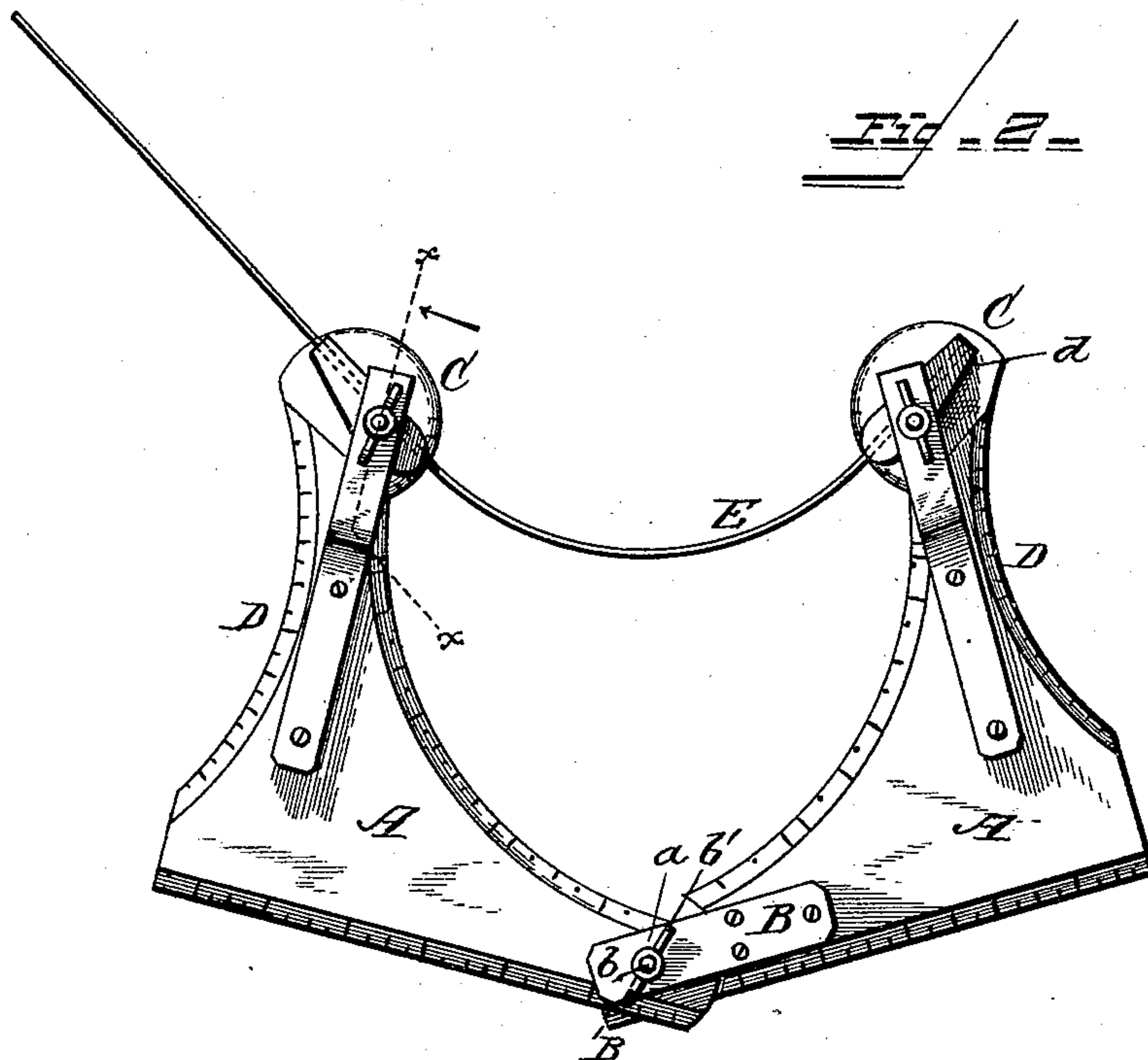
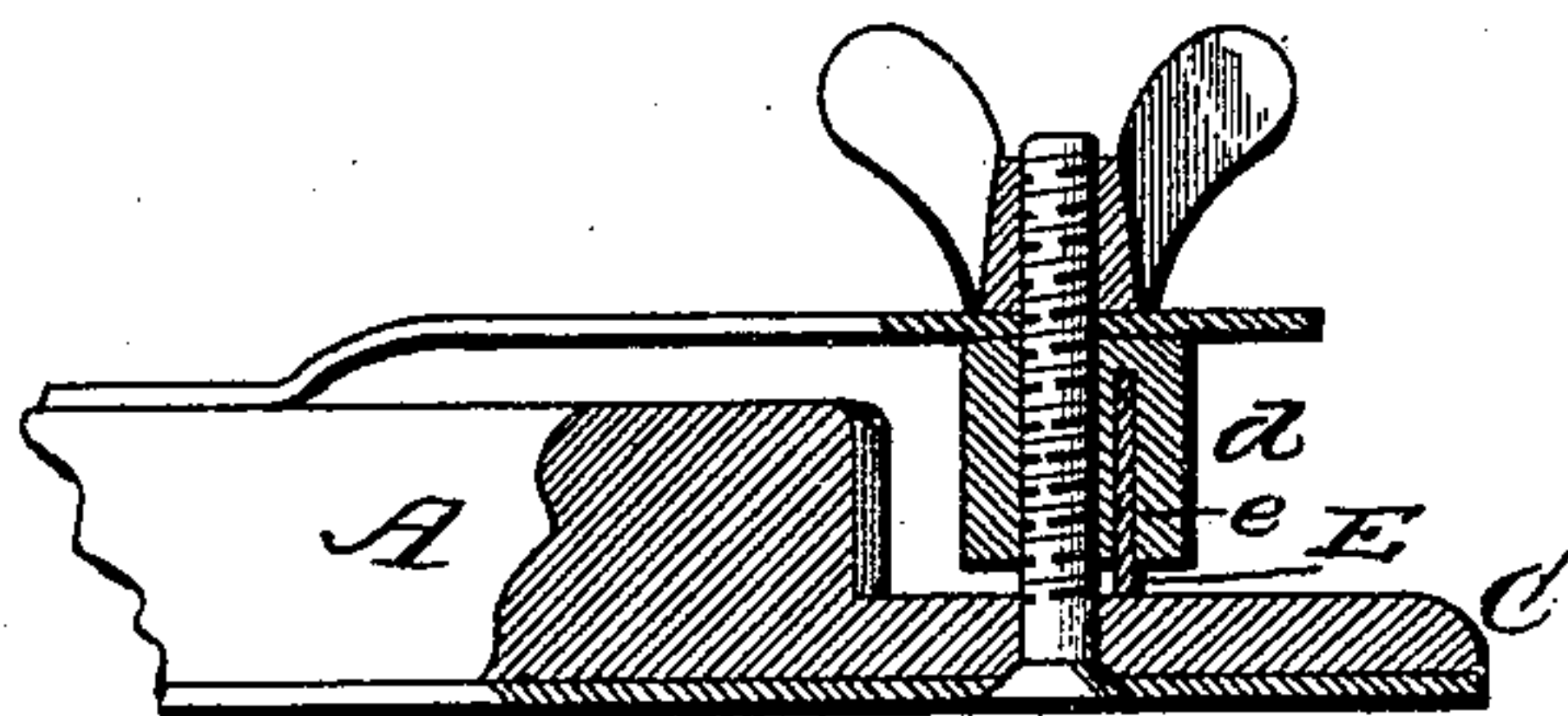


Fig - 3 -



Witnesses

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By *Tris* Attorney

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UNITED STATES PATENT OFFICE.

ABEL BUTLER, OF DALE, INDIANA.

PROTRACTOR.

SPECIFICATION forming part of Letters Patent No. 395,875, dated January 8, 1889.

Application filed August 9, 1888. Serial No. 282,336. (No model.)

To all whom it may concern:

Be it known that I, ABEL BUTLER, a citizen of the United States, residing at Dale, in the county of Spencer and State of Indiana, have
5 invented certain new and useful Improvements in Protractors; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of
10 this specification, and to the letters and figures of reference marked thereon.

This invention relates to certain new and useful improvements in devices for laying off maps and the like; and it has for its ob-
15 jects to improve upon prior devices of this character and to provide a protractor which is adapted for various uses, and which in practice will be found to be very efficient and reliable, and which will lessen to a great ex-
20 tent the labor of drawing maps and the like.

The novelty resides in the peculiar construction of the device and in the combinations, arrangement, and adaptation of parts, all as more fully hereinafter described and
25 claimed.

The invention is clearly illustrated in the accompanying drawings, which, with the letters of reference marked thereon, form a part of this specification, and in which—

30 Figure 1 is a perspective view of my improved protractor. Fig. 2 is a similar view showing the parts in a different position. Fig. 3 is a vertical cross-section through the line *x x* of Fig. 2.

35 The protractor is designed and adapted more particularly for teachers' use in map-drawing, being so arranged that the projections of the hemispheres and the grand divisions can be easily and correctly made ac-
40 cording to any text-book.

The device may be made of any suitable material—wood, iron, or partly wood and part metal—and of any desired size.

Referring to the details of the drawings by
45 letter, A designates a section of the protractor, there being two like sections pivotally secured together, as at *a*, in any suitable manner. In the drawings I have shown on one of the sections a bar, B, or, preferably,
50 two bars—one at the top and the other under-neath the section—and through the bar or

bars is passed the shank of a screw, *b*, which serves as a swivel on which the sections may swing to construct a larger or smaller map. This screw is provided with a thumb-nut, *b'*,
55 which serves to hold the parts in their adjusted positions. This portion composed of the two sections forms a semi-circle, the inner face of which is graduated into factors of three hundred and sixty degrees, while the
60 straight-edge is also graduated, as shown. The semi-circle terminates in circular ears C, partly graduated by factors of three hundred and sixty degrees. On each end of the semi-
65 circle is also formed a graduated arc, D.

E is a spring secured at one end in a suitable holder, *d*, which is swiveled on one of the ears of the semi-circle and designed to be held in its adjusted position by means of a thumb-nut, as shown. On the other ear is a
70 similar holder; but the end of the spring is passed through a slot in this holder, and is adapted to be free to slide therein, but to be securely held in its adjusted position by
75 tightening the thumb-screw. The holder is provided with the slot *e*, above mentioned, and the spring, passing through this slot, is pressed against the ear when the thumb-nut is tightened, thus holding it in place. When
80 the nut is loosened, of course the spring will be free to slide in its holder. This spring should also be graduated to conform to the graduations of the other parts of the device.

The operation is simple and apparent. For instance, to form a hemisphere place the de-
85 vice flat upon a sheet of paper, draw the pencil along the semi-circle, dotting the graduations of the same, the long marks indicating the intersections of the tropics, polar circles, and every twentieth parallel, the shorter
90 marks indicating the tenth parallels, and so on. Next turn the protractor around and draw the other side of the circle in the same manner. Now draw the equator with the
95 back of the protractor or straight-edge and divide it off into five degrees, ten degrees, or twenty degrees, as desired. Then draw and dot the central meridian in the same way; or, if it is not desired to draw or establish the central meridian, simply dot the same. Next
100 draw and dot the polar circles by the use of the small arc at the end of the protractor.

Draw the sixtieth parallel north and south by the arc at the top of the protractor. Draw the other parallels by means of the spring, bending it till it covers the dots at the circumference and central meridians. Then tighten the spring and trace, and then turn the device to the corresponding parallel on the opposite side of the equator and draw it, and so on.

10 The holders or adjusters on the ears of the semi-circle can be turned till the curve becomes full enough near the poles. Then tighten the same and trace the curves.

The parts may be adjusted to draw a smaller or larger map, as desired.

What I claim as new is—

1. A protractor formed of two parts hinged together and forming a semi-circle, and provided with an adjustable spring, substantially as described.

2. A protractor formed of two parts forming a semi-circle graduated as described, and a spring connecting the outer ends of said semi-circle, substantially as and for the purpose specified.

3. A protractor formed with graduated

semi-circle formed of two parts hinged together, graduated arcs, and a graduated straight-edge on the back of the parts forming the semi-circle, substantially as described.

4. A protractor composed of a graduated hinged semi-circle, a graduated straight-edge, and graduated spring, and made adjustable, substantially as described.

5. A protractor formed with a semi-circle graduated as described, graduated arcs, straight-edge and ears, and a spring connecting the ends of the semi-circle and graduated as described.

6. A protractor formed with a graduated semi-circle, a graduated straight-edge, ears, and arcs, a graduated spring connecting the ends of the semi-circle, and swiveled holders for said spring, substantially as described.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

ABEL BUTLER.

Witnesses:

MELISSA J. TURNHAM,
JOHN J. TURNHAM.