

No. 670,677.

Patented Mar. 26, 1901.

D. J. KELSEY.
DRAFTSMAN'S PROTRACTOR.
(Application filed July 31, 1900.)

(No Model.)

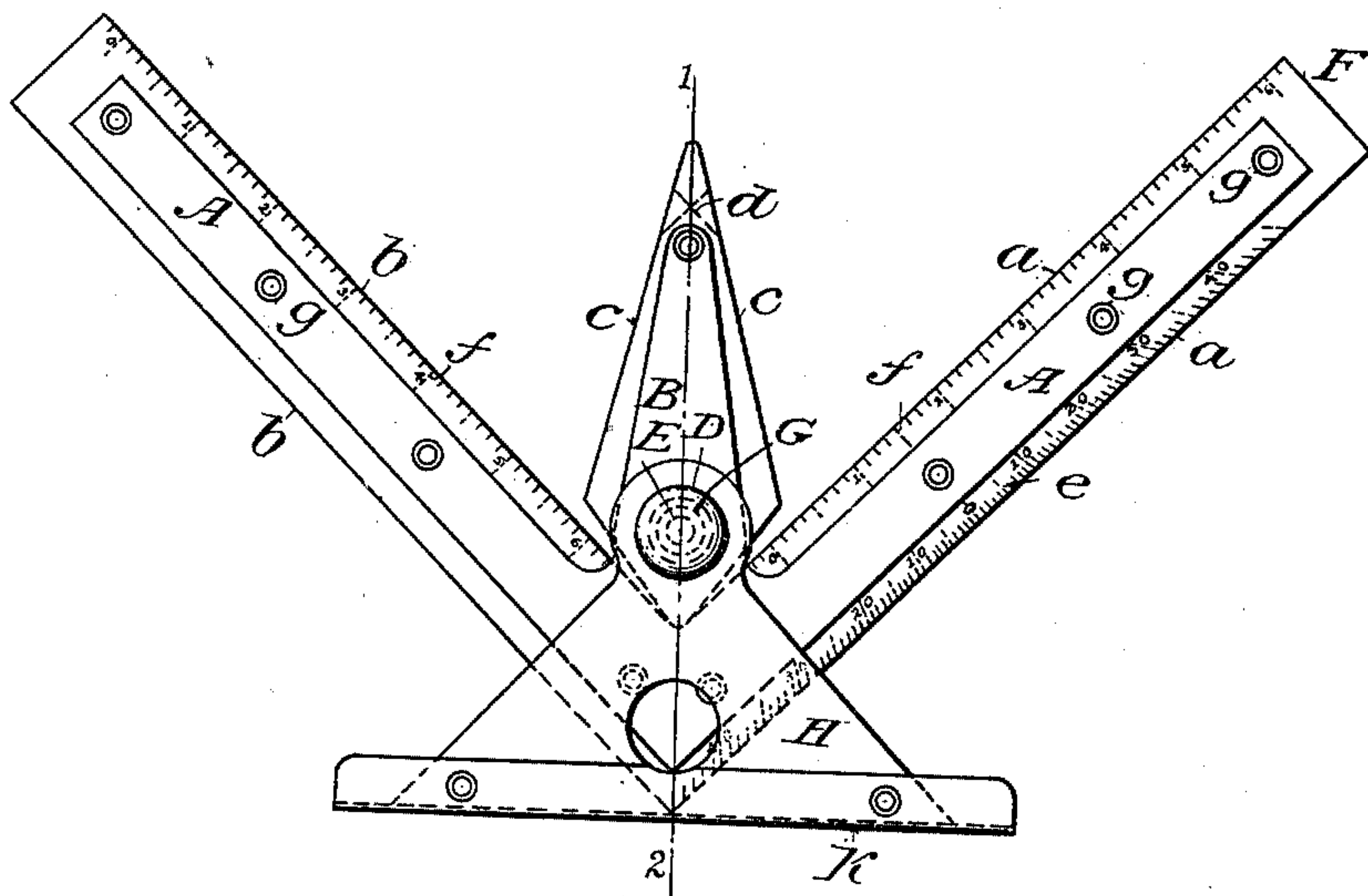


Fig. 1.

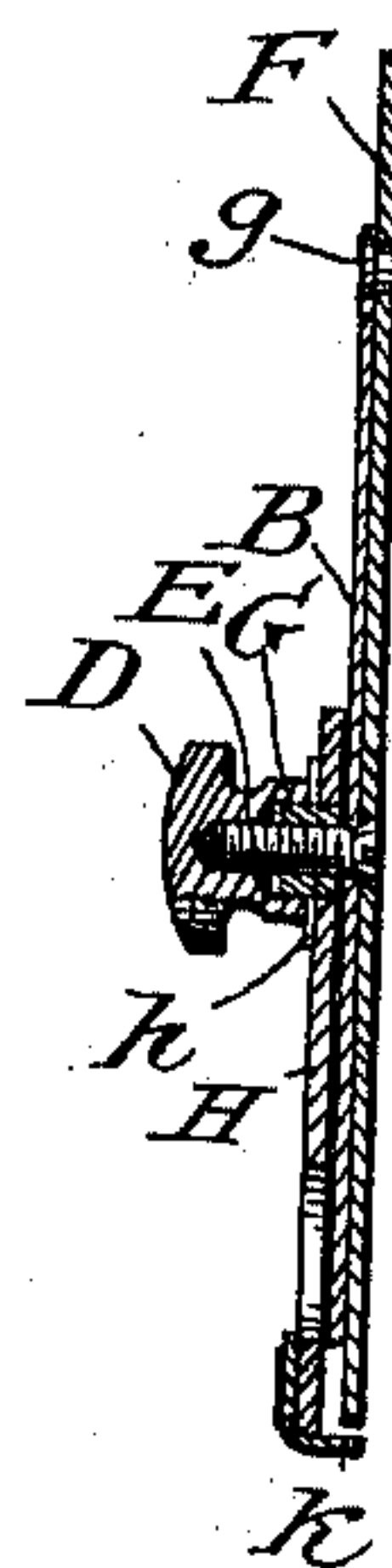


Fig. 2.

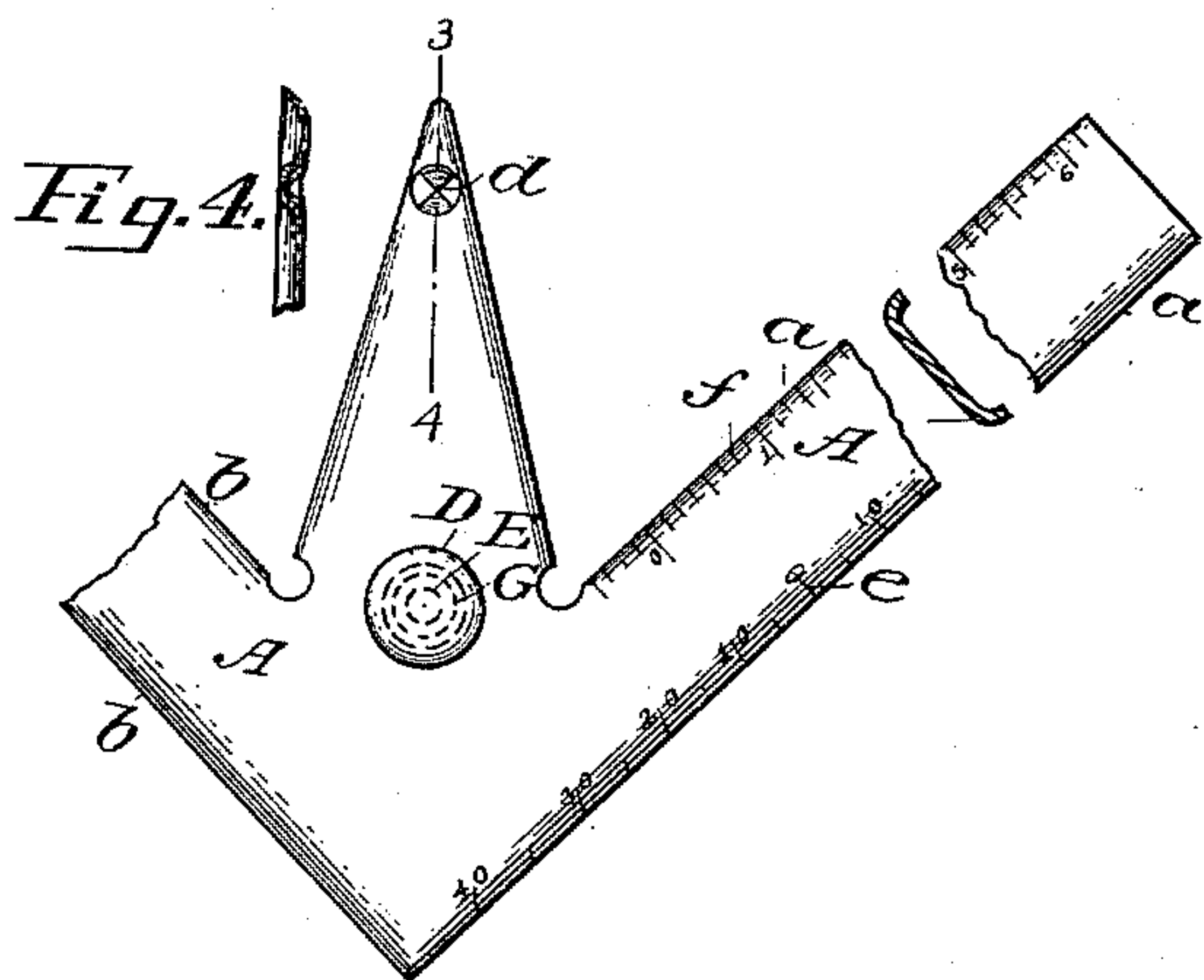


Fig. 3.

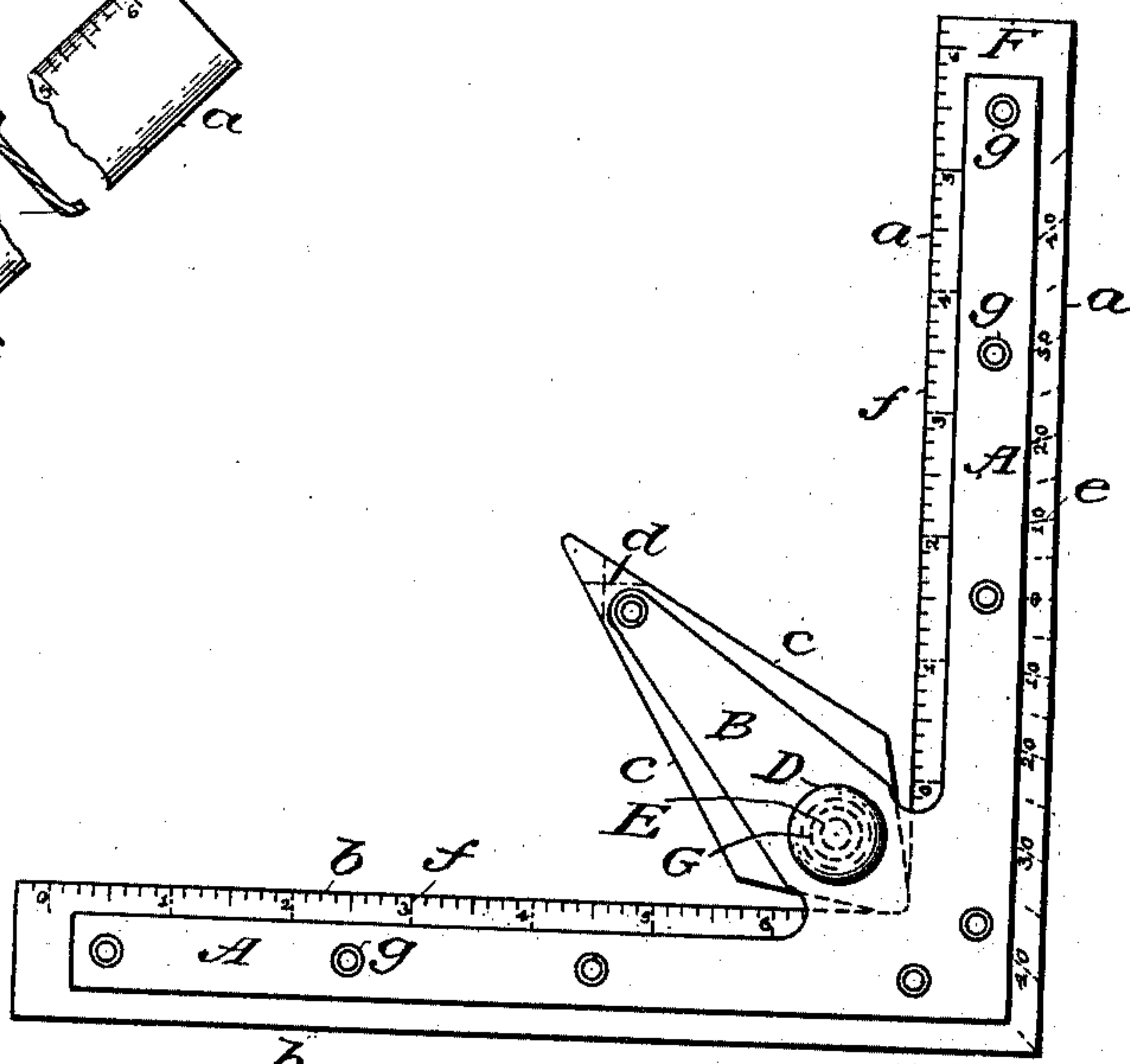


Fig. 5.

WITNESSES:

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DRAFTSMAN'S PROTRACTOR.

SPECIFICATION forming part of Letters Patent No. 670,677, dated March 26, 1901.

Application filed July 31, 1900. Serial No. 25,476. (No model.)

To all whom it may concern:

Be it known that I, DUANE J. KELSEY, a citizen of the United States, residing at New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Draftsmen's Protractors, of which the following is a specification.

My invention relates to improvements in draftsmen's protractors in which perpendicular systems of ruling edges in combination with a graduated surface and center are arranged for drawing lines or measuring angles, in direct relation to given lines on a drawing, or, in conjunction with a base attachment, (to be used against a straight-edge,) for ruling lines and their perpendiculars at fixed angles with the latter over a considerable range of surface. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a top view of the instrument, and Fig. 2 is a vertical section on the line 1 2 of Fig. 1. Fig. 3 shows another method of arranging a center-mark and graduation; Fig. 4, a section on line 3 4 of Fig. 3, and Fig. 5 a top view of the protractor without the base attachment.

A plate A A in the form of an open square with a central extension B carries two systems of parallel-ruling edges *a a* and *b b*, mutually perpendicular. The central extension B also carries short ruling edges *c c* at angles of sixty degrees with the former and in addition a center-mark *d* of a protractor-graduation *e*, that is made at one or more of the ruling edges of the square. This graduation is so located that its zero-mark is on a line radiating from the center-mark of the protractor and normal to the ruling edges of that arm of the square upon which it occurs. Lineal scales *f f* may also be graduated along any of the ruling edges for convenience in dimensioning lines.

I prefer to make the ruling edges of transparent material F, secured to a strengthening-plate A by large hollow rivets *g g*, cement, or other common means. This permits the center-mark of the protractor and the graduations above mentioned to be made on the under side of the instrument, and thus in

close contact with the drawing, while visible from above through the transparent material. Another method of arranging the center-mark and graduation as adapted to opaque material is shown in Figs. 3 and 4.

For convenient manipulation of the instrument a knob D is secured by a screw E, passed through from the under side, with countersunk head and small check-nut G on top, beyond which its thread receives a suitably-shaped knob-nut D. As thus far described the instrument is used for measuring angles between lines on drawings by placing it so that the center-mark of the protractor shall be upon the intersection of the given lines and their opening covered by the protractor-graduations, as with any ordinary protractor. It is also used for drawing lines at given angles with others by so placing it that its center-mark and proper protractor-graduation shall be upon the chosen line and in such a region along the line that its ruling edges thus correctly fixed in direction shall pass through any given point on the line.

For continuous working in connection with a T-square or other parallel-ruling device and at any particular angle with the latter a simple base attachment H is provided, having a straight or guiding edge *k* to bear against the T-square and a hole *h*, by which it is slipped over the nut G on the screw E, that holds the knob D, the latter being first removed and afterward replaced and screwed down to clamp the base in any desired relative position with the square. With this arrangement the instrument is set to a required angle by bringing the base to bear against the T-square and swinging the protractor-square previous to clamping into position, so that the center-mark and proper degree-graduation shall be upon some horizontal or vertical line on the drawing. After clamping the instrument as a whole may be slid along the T-square carrying the ruling edges for lines and their perpendiculars on any part of the drawing at the required angle.

I am aware that prior to my invention protractors have been made with a piece bearing ruling edges and a graduated arc or index arranged to turn within or upon a frame or base, also graduated, with an index or scale of

angles to be used in conjunction with the T-square. I do not therefore claim such a combination broadly; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. A protractor, in the form of an open square having two systems of parallel ruling edges, mutually perpendicular, along the arms of the square and, extending into the opening between them, from their region of juncture, a portion bearing two other shorter ruling edges, at fixed angles with those mentioned, and in addition, a center-mark for a scale of angles arranged about it at one of the aforesaid parallel-ruling edges, substantially as set forth.

2. In a protractor, in the form of an open square, having two systems of parallel-ruling edges, mutually perpendicular, along the arms of the square and, extending into the opening between them, from their region of juncture, a portion bearing two other shorter ruling edges, at fixed angles with those mentioned, also a center-mark, for a scale of angles arranged about it, at one of the aforesaid parallel-ruling edges, the combination with a detachable base H, having a straight or guiding edge *k*, and hole *h*, to pass over nut *g*, substantially as shown.

3. In a protractor, in the form of an open square, having two systems of parallel-ruling edges, mutually perpendicular, along the arms of the square and extending into the opening between them, from their region of juncture, a portion bearing two other shorter ruling edges, at fixed angles with those men-

tioned and a center-mark for a scale of angles arranged about it at one of the aforesaid parallel-ruling edges, the combination of a transparent material, forming the ruling edges and surfaces of graduation, with a strengthening-plate, secured upon its upper side and of similar contour with the outline of the instrument, substantially as described.

4. A protractor, in the form of an open square, having two systems of parallel-ruling edges, mutually perpendicular, along the arms of the square and, extending into the opening between them, from their region of juncture, a portion bearing two other shorter ruling edges, at fixed angles with those mentioned, and a center-mark for a scale of angles arranged about it, at one of the aforesaid parallel-ruling edges, the arms of the square being provided with linear scales, along their inner ruling edges, substantially as set forth.

5. A protractor, in the form of an open square, having two systems of parallel-ruling edges, mutually perpendicular, along the arms of the square and, extending into the opening between them, from their region of juncture, a portion bearing two other shorter ruling edges, at fixed angles with those mentioned, and a center-mark for a scale of angles arranged about it, at one of the aforesaid parallel-ruling edges, the whole being provided with a knob D, screw E and check-nut G, substantially as shown.

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Witnesses:

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HOSMER KELSEY.