(No Model.)

M. COUGHLIN.

BEVEL PROTRACTOR.

No. 375,049. Patented Dec. 20, 1887.

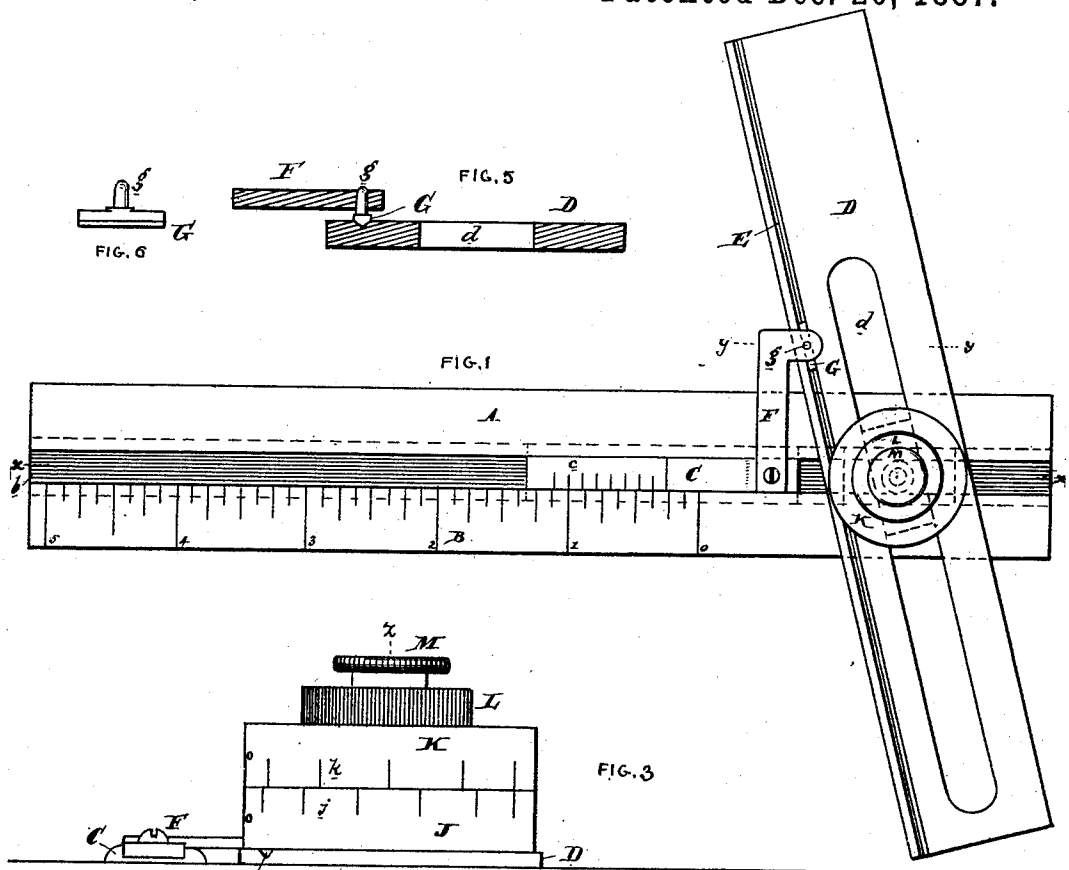


FIG. 1

FIG. 6

FIG. 5

FIG. 3

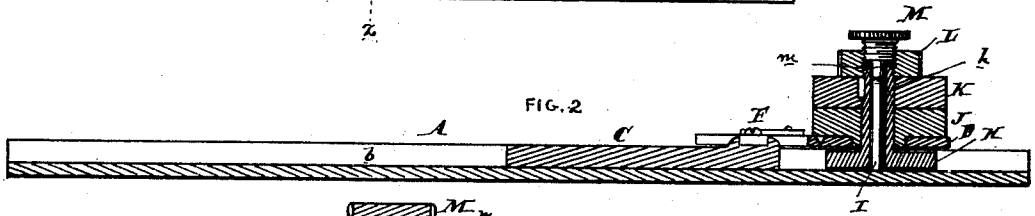


FIG. 2

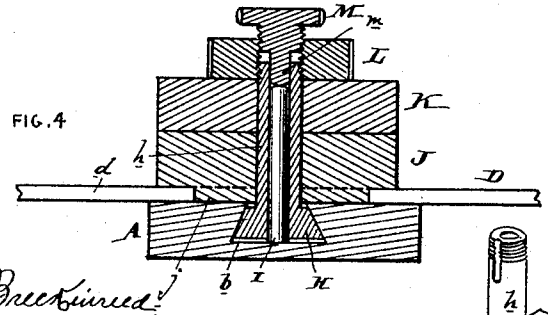


FIG. 4

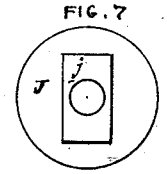


FIG. 7

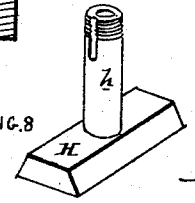


FIG. 8

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BEVEL-PROTRACTOR.

SPECIFICATION forming part of Letters Patent No. 375,049, dated December 20, 1887.

Application filed June 23, 1887. Serial No. 242,207. (No model.)

To all whom it may concern:

Be it known that I, MICHAEL COUGHLIN, of the city and county of Philadelphia, and State of Pennsylvania, have invented an Improvement in Bevel-Protractors, of which the following is a specification.

My invention has reference to bevel-protractors; and it consists in certain improvements, all of which are fully set forth in the following specification, and shown in the accompanying drawings, which form part thereof.

The object of my invention is to provide an instrument which may be used as a rule, a T-square, and universal bevel with the protractor attachment, the whole being combined in a compact form and capable of easy adjustment. The instrument is so constructed that it is capable of measuring angles both in degrees or circular measure and in inches or linear measure, and vernier attachments are provided for accurate measurement.

In the drawings, Figure 1 is a plan view of my improved measuring-instrument. Fig. 2 is a longitudinal sectional elevation of same on line *x x* of Fig. 1. Fig. 3 is an enlarged side elevation of one end of the instrument. Fig. 4 is a cross-section of same on line *z z*. Fig. 5 is a cross section on line *y y*. Fig. 6 is an elevation of the sliding block for connecting the two parts shown in Fig. 5. Fig. 7 is an inverted plan view of one of the degree-rings, and Fig. 8 is a perspective view of the adjustable axis for the degree-rings.

A is the main rule, which is provided with the dovetailed groove *b*, running longitudinally through it, and has upon its face the linear scale B.

C is a sliding vernier-block having the vernier-scale *c*, and is adapted to slide in the groove *b* of the rule A.

H is a sliding block, also adapted to slide in the groove *b*, and is provided with the upright tubular bearing *h*. Upon this bearing the movable vernier-ring J is placed, and between this vernier-ring and the rule A is placed the adjustable blade D, which is provided with a longitudinal slot, *d*, into which extends the projection *j* on the bottom of the vernier-ring J. By this means any movement of the blade D about *h* as an axis causes the ring J to move with it, and at the same time the blade D may be longitudinally adjusted upon the ring J.

K is the degree-ring, which is arranged above the ring J, and is held rigidly to the bearing *h* against circular movement by a key or other suitable means. The upper end of the bearing is threaded and receives a clamping-nut, L, which, when screwed down tight, clamps the several parts firmly upon the rule A and fixes the blade D at whatever angle may be desired. If it is desired to move the blade D about *h* as an axis without shifting the block H in its bearing, the nut L is loosened slightly, so as to reduce the pressure between the rings J and K, and then the thumb-nut M is screwed down tightly, causing its extension *m* to press upon a pin, I, loosely supported within the bearing *h* and its block H, and this forces said pin down tightly upon the floor of the groove *b*. This same tendency causes the block H to jam in the upper walls of the groove, and the pivot-point is held rigid, while the blade D is free to be moved around to make any angle desired with the rule A, and the angle so made will be indicated by the scales *k* and *j* upon the rings J and K. One-half of the circumference of the ring K is shown as divided into six divisions, whereas a part of the ring J corresponding to five of such divisions is also divided into six divisions to form a vernier. The six divisions of the ring K would correspond to one hundred and eighty degrees.

In place of making only six divisions, any other number of divisions may be used, so far as this invention is concerned—that is, there may be a division to a degree or any number of degrees. By moving the plate D the ring J is moved around with it, and the divisions on the two rings are thereby relatively changed, indicating the angle through which the blade has been moved.

The upper surface of the blade D near the edge is provided with a V-shaped groove, E, into which the V-shaped block G presses. This block is provided with a stud, *g*, which fits through a hole in the end of an arm, F, connecting with the slide C. From this it is seen that any change of angle of the blade D will shift the slide C, causing it to indicate in linear measure substantially the angle moved through for small variations of the angles

from a perpendicular to the rule A. In practice the distance from *g* to the center line through the pivot I and groove *b* is equal to one inch. By making the block G V-shaped there is little or no lost movement from wear, and the arm F may have sufficient spring in it to keep the block snugly in the groove E of the blade D. The groove E being the full length of the blade, there will be no opposition to its longitudinal adjustment due to its connection with the arm F.

It is evident that the details of construction might be considerably modified by one skilled in the art of making mathematical instruments, and therefore I wish it to be understood that while the construction here shown is that most preferable, the details may be modified in various ways without departing from the spirit of the invention.

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

1. The combination of a rule with a pivotal bearing adjustable longitudinally upon said rule, a longitudinally-adjustable blade pivoted on said bearing, a circular or degree scale movable with said blade to indicate the adjustment of said blade, a clamping device to rigidly clamp the blade to the rule, and a clamp to secure the pivotal bearing in any desired position upon the rule.

2. The combination of a rule with a pivotal bearing and scale, a longitudinally-adjustable blade pivoted on said bearing, a circular or degree scale movable with said blade to indicate the adjustment of said blade, a sliding indicator moving before the scale of the rule, and a connection between the slide and blade, whereby the slide moves approximately proportional to the change in the angle of the blade when the angle is nearly a right angle.

3. The combination of a rule with a pivotal bearing and scale, a longitudinally-adjustable blade pivoted on said bearing, a circular or degree scale movable with said blade to indicate the adjustment of said blade, a sliding vernier-scale moving before the scale of the rule, and a connection between the slide and blade, whereby the slide moves approximately proportional to the change in the angle of the blade when the angle is nearly a right angle.

4. The combination of the rule having a pivotal bearing and a scale marked upon it, a sliding scale-block movable on the rule before its scale, a pivoted blade upon said pivotal bearing, and a connection between the slide and blade, whereby the angular movement of the blade is approximately indicated by the movable slide when the angle is nearly a right angle.

5. The combination of the rule having a pivotal bearing and a scale marked upon it, a sliding scale-block movable on the rule before its scale, a pivoted longitudinally-adjustable blade upon said pivotal bearing, a clamp to hold said blade in any position of longitudinal adjustment, and a connection between the slide and blade, whereby the angular movement of the blade is approximately indicated by the movable slide when the angle is nearly a right angle.

6. The combination of the rule having a pivotal bearing adjustable longitudinally upon the rule and a scale marked upon it, a sliding scale-block movable on the rule before its scale, a pivoted blade upon said pivotal bearing, a connection between the slide and blade, whereby the angular movement of the blade is approximately indicated by the movable slide when the angle is nearly a right angle, and a clamp to secure the pivotal bearing in any position upon said rule.

7. The combination of the rule having a pivotal bearing adjustable longitudinally upon the rule and a scale marked upon it, a sliding scale-block movable on the rule before its scale, a pivoted longitudinally-adjustable blade upon said pivotal bearing, a clamp to hold said blade in any position of longitudinal adjustment, and a connection between the slide and blade, whereby the angular movement of the blade is approximately indicated by the movable slide when the angle is nearly a right angle, and a clamp to secure the pivotal bearing in any position upon said rule.

8. The combination of rule A, having a longitudinal groove, *b*, sliding block H, having hollow bearing *h*, blade D, rings J K, having scales marked thereon, one of which is connected to the bearing and the other to the blade, nut L, to clamp the blade rigidly, pin I, extending through the bearing to the floor of groove *b*, and clamping-nut M, to press upon pin I to clamp the bearing rigidly upon the rule.

9. The combination of rule A, having scale B and longitudinal groove *b*, sliding block H, having hollow bearing *h*, blade D, having groove E, rings J K, having scales marked thereon, one of which is connected to the bearing and the other to the blade, nut L, to clamp the blade rigidly, pin I, extending through the bearing to the floor of groove *b*, clamping-nut M, to press upon pin I to clamp the bearing rigidly upon the rule, the sliding scale C in the groove *b*, and the connecting-block G, connecting the slide with the blade D.

In testimony of which invention I hereunto set my hand.

MICHAEL COUGHLIN.

Witnesses:
R. M. HUNTER,
ANDREW ZANE, Jr.