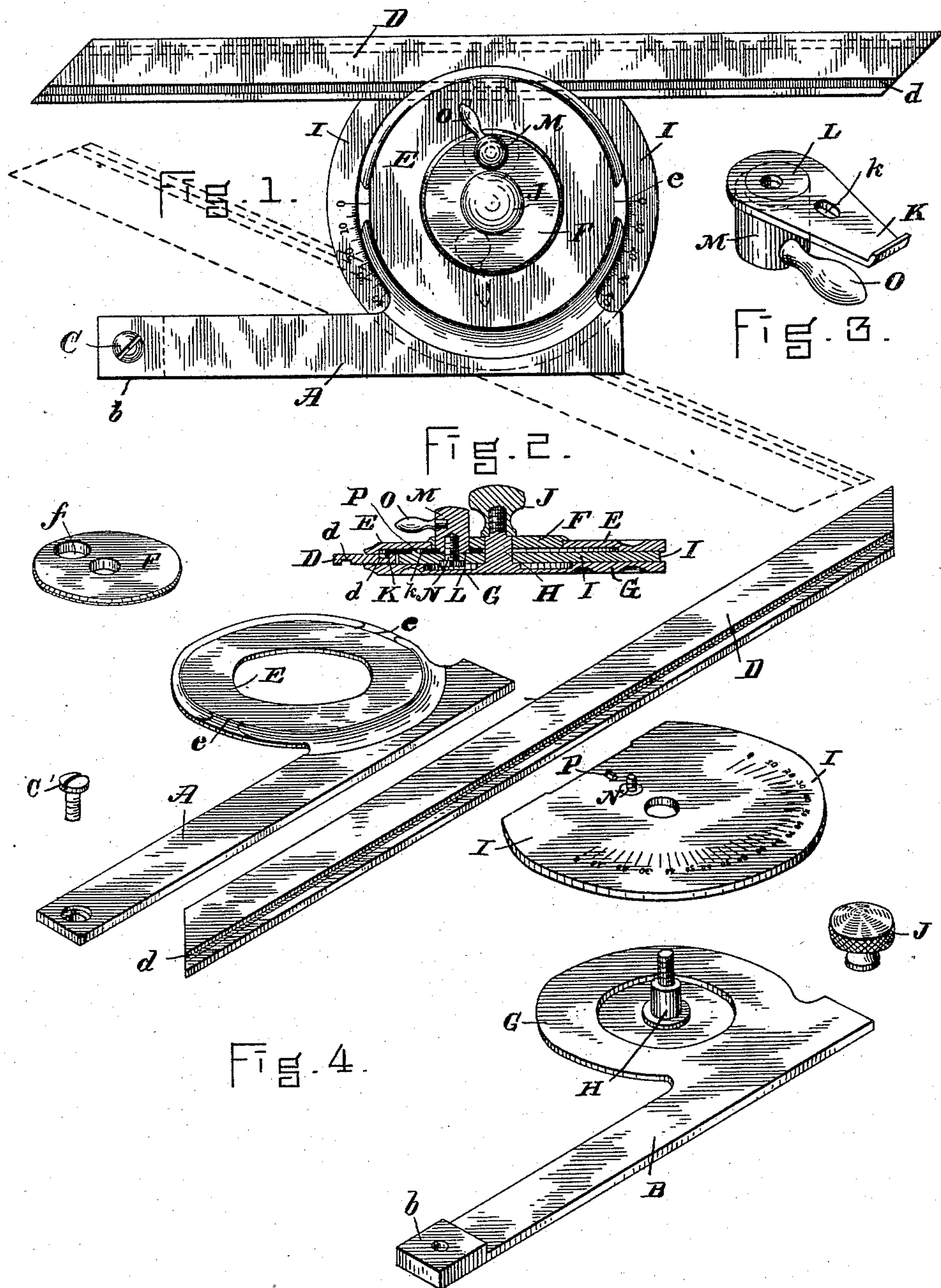


(No Model.)

L. S. STARRETT.  
BEVEL PROTRACTOR.

No. 474,699.

Patented May 10, 1892.



WITNESSES.

*Henry Marsh.*  
*James D. Prince*

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*attorney*



# UNITED STATES PATENT OFFICE.

LAROY S. STARRETT, OF ATHOL, MASSACHUSETTS.

## BEVEL-PROTRACTOR.

SPECIFICATION forming part of Letters Patent No. 474,629, dated May 10, 1892.

Application filed August 29, 1889. Serial No. 322,360. (No model.)

*To all whom it may concern:*

Be it known that I, LAROY S. STARRETT, of Athol, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Bevel-Protractors, of which the following, taken in connection with the accompanying drawings, is a specification.

The object of my invention is to furnish a bevel-protractor which will accurately show and register every angle or degree around the entire circle and one so constructed that the blade may be set and used to measure angles on either side of the straight-edged base or stock, the instrument being thus adapted for use in many more positions than are those heretofore made. The frame or case consists of two parallel straight bars secured to each other at one end only, with space between them for movement of the blade, the other ends of the bars having two broad cheeks or side pieces with a central stud and clamp-screw, the graduated disk being held by and between these parts, so as to be revolved when desired with the blade, which is slotted or grooved and held in place by a hooked plate and cam or like fastening. This fastening is mounted upon an independent plate, which forms the movable center of one of the cheeks. The hook and cam hold the blade firmly to or permit it to slide lengthwise along the flattened edge of the graduated plate, and the clamp-screw holds said plate firmly with the blade at any given angle to the base-bars.

In the drawings, Figure 1 is a side view of the instrument, the blade being shown in full lines in a position parallel to the base and in dotted lines at an angle thereto. Fig. 2 is a transverse section on the line *xx*, Fig. 1. Fig. 3 is a perspective detail of the hook and cam for fastening the blade, and Fig. 4 represents the other parts detached.

A B are the two straight-edged parallel bars constituting the base of the frame, secured to each other at one end by a screw C and separated by a space equal in width to the thickness of the blade D, which may therefore play between them. To insure this space I, prefer to form a boss *b* on one of the bars, with a threaded perforation to receive the screw C,

the other bar being flat and having a countersunk hole for the screw-head.

The base-bar A has integral with its other end the annular cheek or side piece E, the open center of which is adapted to be filled by the rotatable washer F, while the bar B has the corresponding cheek or side G, made solid at its center and furnished with the cylindrical stud H as a permanent axis for the graduated disk I and rotatable washer F. The outer end of this stud is screw-threaded to receive the clamping-screw J, which bears upon the center of the washer F, which has a peripheral flange overlapping the annular side piece E. (See Fig. 2.) Pressure of the clamp-screw J therefore draws the sides E and G toward each other and against the faces of the graduated disk. The side pieces are recessed on their inner faces for the double purpose of bringing this surface contact near the outer portion of the disk in order to hold it more securely when adjusted to any desired position and to form a space for the clamp-hook between the cheeks sufficient to permit it to extend over the grooved edge of the blade to connect with the same.

The disk I is graduated around its margin in a semicircle divided into two series of ninety degrees each, the zero-points of which are diametrically opposite to each other and in line with the axis of the stud H. Parallel to such line one edge of the disk is cut away to afford a smooth straight bearing for the edge of the blade D, which is of the same thickness as the disk and moves with it, between the cheeks E and G, around the central stud H, so as to be placed at any desired angle to the base A B. The blade is formed with a groove *d* parallel with each edge and is held fast against the flat edge of the disk I by a hooked plate K and an eccentric L, the hook at the tip of the plate, Fig. 3, entering the groove and the eccentric being formed at the inner end of a hub M, which projects through a circular aperture *f* in the movable washer F. This hub is connected to the graduated disk by a screw N, the neck of which may turn in said disk, and a short lever O, fixed in the side of the hub, serves to oscillate it, and the movement of the eccentric thus



produced slides the hooked plate K (represented in black, Fig. 2) and secures or releases the blade. A slight protuberance P on the face of the disk I enters a slot  $k$  in the hooked plate, Fig. 3, and prevents it from swinging out of place. It will be seen, therefore, that while the side pieces E and G are integral with the base-bars A B the disk I and blade D may move between them and with the flanged washer F around the stud H. The side piece E has at each edge a beveled portion, on which the base-line  $e$  is marked at points opposite to the axis of rotation and equidistant from the base-bars A B. Hence any angle of the blade with relation to said bars is registered on one or other edge of the disk I by the figures in the semicircular graduation coming opposite to such base-line  $e$ .

It is obvious that the graduation might be upon the edge of the cheek E or G and the index-point or base-line  $e$  upon the disk with similar results and without departing from my invention. The construction illustrated and described is, however, decidedly preferable.

I claim as my invention—

1. The parallel base-bars A B, united at one end only, and the cheeks E G, connected by a central stud, in combination with the disk I, having one edge flattened or cut off, and the blade D, held in edgewise contact only therewith, such disk and blade being of equal thickness and adapted to revolve together between said bars and cheeks, substantially as set forth.

2. The base-bars A B and their integral cheeks E G, separated by a space equal in width to the thickness of the blade, in combination with the semicircularly-graduated disk I, having one edge cut off flat on a line parallel to a line through the zero-points of such graduation, and with the blade D, bearing

edgewise against and adjustably secured to said disk and projecting at each end therefrom, substantially as set forth.

3. The bars A B, formed in one with the cheeks E G and united only by the screw C and the stud H, with its screw-clamp J, one of said cheeks having the index-point or base-line  $e$  parallel to the bars and one cheek having its interior hollowed out to cause the clamp-pressure to bear marginally upon the interposed disk, in combination with the graduated disk I and the blade D, made adjustable with relation to said disk, substantially as set forth.

4. The bars A B and cheeks E G and the flanged washer F, forming a movable center for the cheek E, in combination with the rotatable disk and blade and with a fastening for said parts mounted on said washer, substantially as set forth.

5. The straight parallel bars A B, secured to each other at their outer ends, the cheeks E G, and independent washer F, in combination with the disk I, cut away at one edge, the blade D, bearing edgewise against the flattened edge of said disk, and a suitable fastening therefor, substantially as set forth.

6. The straight parallel bars A B, secured to each other at their outer ends, the cheeks E G, movable washer F, flattened rotating disk I, and grooved blade D  $d$ , in combination with the hooked plate K and clamping means L M N O, constructed and arranged substantially as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 16th day of August, A. D. 1889.

LARROY S. STARRETT.

Witnesses:

CHARLES E. SMITH,  
ANDREW J. HAMILTON.