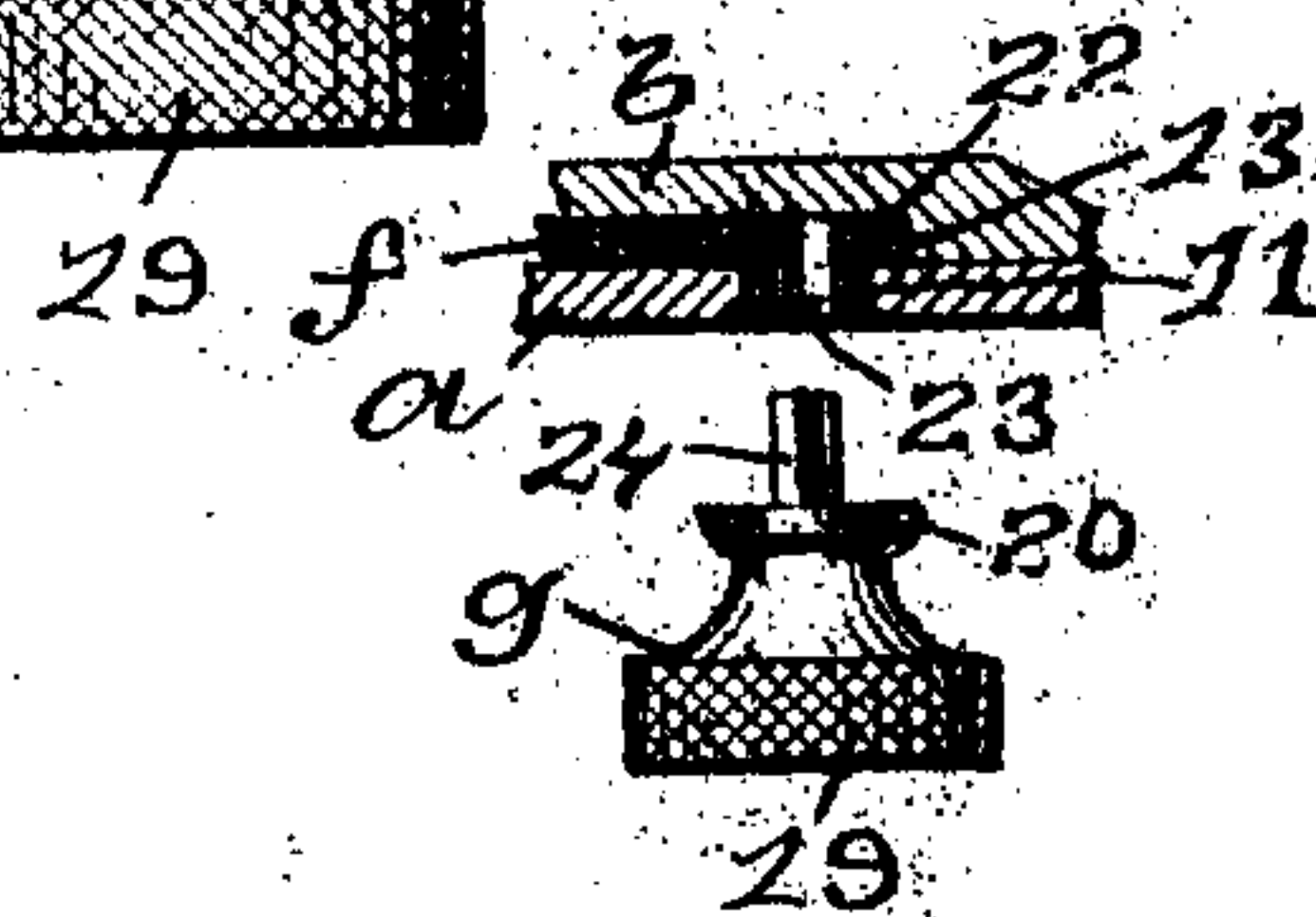
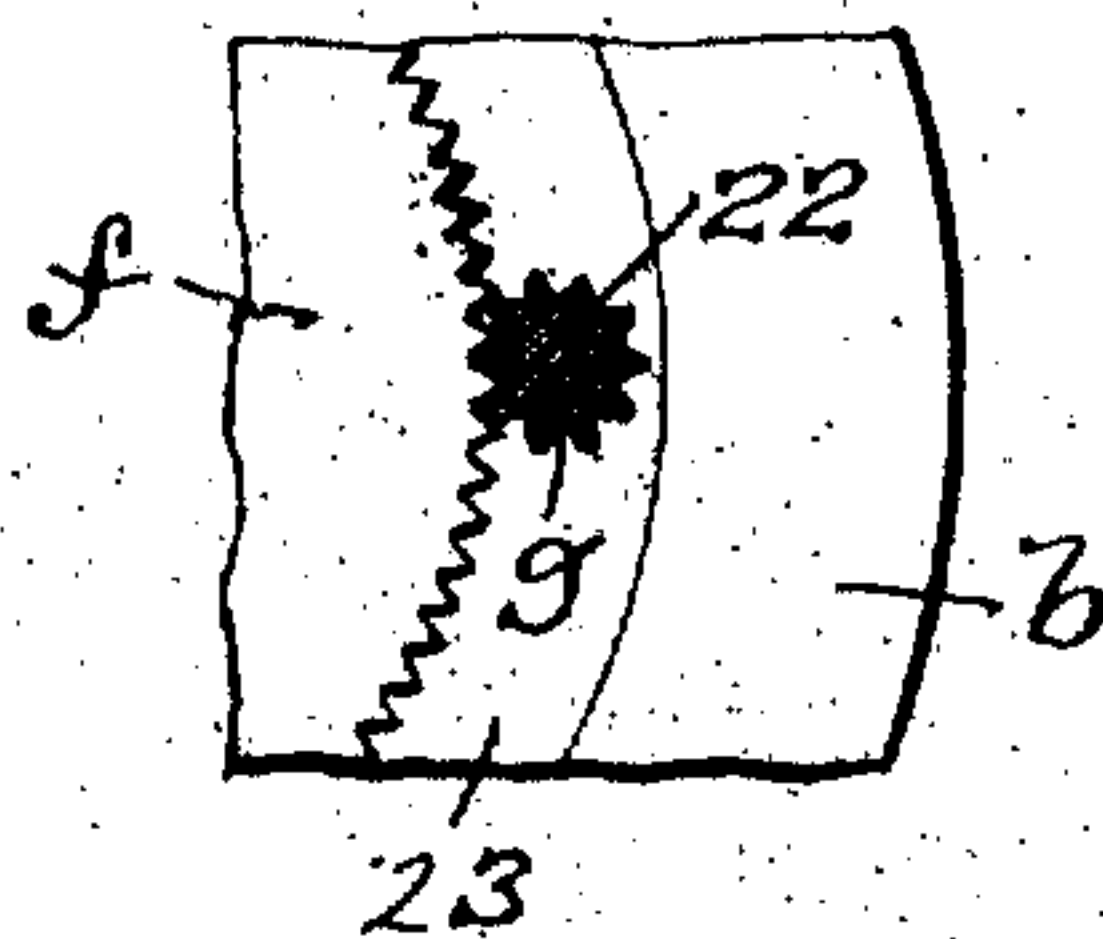
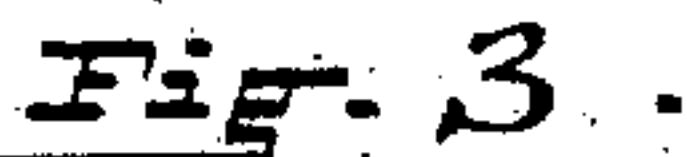
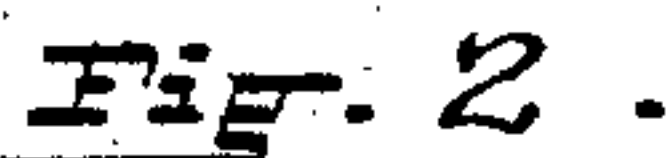


**991,839.**

**Fig. 1**



WITNESSE:

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INVENTOR:

Leon Fuchs  
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 ATTORNEYS.

# UNITED STATES PATENT OFFICE.

LEON FUCHS, OF DAYTON, OHIO, ASSIGNOR TO BROWN & SHARPE MANUFACTURING COMPANY, OF PROVIDENCE, RHODE ISLAND, A CORPORATION OF RHODE ISLAND.

## MICROMETER-PROTRACTOR.

991,839.

Specification of Letters Patent.

Patented May 9, 1911.

Application filed August 3, 1908. Serial No. 446,574.

*To all whom it may concern:*

Be it known that I, LEON FUCHS, a citizen of Switzerland, residing at Dayton, in the county of Montgomery and State of Ohio, have invented a new and useful Improvement in Micrometer-Protractors, of which the following is a specification.

This invention has reference to an improvement in instruments for measuring angles and more particularly to an improvement in micrometer protractors, bevel gages or similar instruments.

Micrometer protractors or similar instruments as heretofore constructed, usually have a multiplicity of parts for micrometric adjustment, which wear out easily and the instruments to contain those parts are heavy and cumbersome to handle, particularly for drafting or light machinists' work.

The object of my invention is to improve the construction of a micrometer protractor or similar instrument, whereby the micrometric adjustment is simplified and the thickness and weight of the instrument reduced to a minimum.

A further object of my invention is to provide a micrometer protractor or similar instrument with a detachable key adapted to operate the micrometric adjustment of the instrument.

A still further object of my invention is to reduce the cost of manufacturing micrometer protractors or similar instruments.

My invention consists in the peculiar and novel construction of a micrometer protractor or similar instrument, said instrument having details of construction, as will more fully set forth hereinafter and claimed.

Figure 1 is a top plan view of a protractor provided with my improved micrometric adjustment. Fig. 2 is an edge view of the protractor. Fig. 3 is an enlarged vertical sectional view through the protractor taken on line 3-3 of Fig. 1. Fig. 4 is an enlarged detail view showing the key-hole in the underside of the protractor. Fig. 5 is an enlarged detail sectional view taken on line 5-5 of Fig. 3 with the key in its operative position in the instrument, and Fig. 6 is an enlarged detail sectional view of a modified form of micrometric adjustment.

In the drawings, *a* indicates the flat body, *b* the indicating disk, *c* the movable blade, *d* the washer, *e* the thumb nut, *f* the micro-

metric gear, and *g* the micrometric key of my improved micrometer protractor.

The flat body *a* has a fixed bifurcated blade 7, a circular head 8 with a central screw-threaded stud 9, a concentric scale 10 and an off-center key-hole 11 which extends through the head 8 in a predetermined position relative to the stud 9, as shown in Fig. 3.

The indicating disk *b* has a beveled edge 12, an indicating line on the edge, a concentric circular depression 13 in its underside, a central hole 14, and an arm 15 having a boss 16 in which is a hole 17 and secured radially to the disk *b* in a position for the boss 16 to enter the hole 14 in the disk and for the stud 9 to extend through the hole 17 in the boss 16, thereby rotatably securing the disk *b* to the stud 9. The movable blade *c* is detachably secured to the outer end of the arm 15 in any well known way. The washer *d* is placed on the stud 9 over the arm 15 and the thumb nut *e* (which forms a convenient means for handling the instrument) is screwed down on the stud 9 onto the washer *d*, thereby clamping the disk *b* to the head 8 after adjustment. The micrometric gear *f* has the central hole 18 for the boss 16 and is secured concentrically to the disk *b* in the depression 13 by a pin or other means. The size of the gear *f* is such that the teeth on the gear will extend the depth of the teeth over the inner edge of the key-hole 11, as shown in Figs. 3 and 4. The key *g* has a knurled head 19, a circular flange 20, and a stem 21, the end of which is formed into a pinion 22 adapted to be inserted through the key-hole 11 in the underside of the head 8 and mesh with the micrometric gear *f*, as shown in Fig. 5.

In the modified form, as shown in Fig. 6, the pinion 22 has preferably a square hole 23 and is rotatably and permanently secured in the hole 11 in a position to mesh with the gear *f*, and the key *g* has a square end 24 adapted to enter the square hole 23 in the pinion 22.

The movable blade *c* is moved by hand for ordinary purposes to the angle required, indicated by the line on the disk *b* and the scale 10 on the head 8 and secured in the adjusted position by tightening the thumb nut *e*. When greater accuracy is required the blade *c* is moved approximately the angle wanted, the key *g* inserted into the key-hole 11, thereby bringing the pinion 22 into



mesh with the gear *f*, and the key *g* is turned until the line on the disk *b* indicates the required degree or minute on the scale, when the thumb nut *e* is tightened and the key *g* removed from the instrument.

By the use of my improved construction in micrometer protractors or similar instruments, all of the parts heretofore used for connecting or dis-connecting the micrometric mechanism are discarded, thereby simplifying the construction and reducing the thickness of the instrument.

Having thus described my invention, I claim as new and desire to secure by Letters Patent;—

1. In a micrometer protractor, a stationary member having an opening, a revoluble member superimposed on said stationary member, and means to actuate the revoluble member including a key for operating said means, said key being removably insertible in said opening.

2. In a micrometer protractor or similar instrument, a stationary member provided with a hole, a movable member, a micrometric actuating member intermediate the stationary and movable members and a detachable member adapted to engage with the micrometric actuating member through the hole in the stationary member.

3. In a micrometer protractor or similar instrument, a stationary member provided with a hole, a movable member rotatably secured to the stationary member, a micrometric actuating member secured to the movable member intermediate the stationary and movable members, and a detachable member adapted to engage with the micrometric actuating member through the hole in the stationary member.

4. In a micrometer protractor or similar instrument, a stationary member provided with a hole and having a fixed arm, a movable member rotatably secured to the stationary member, an arm adjustably secured to the movable member, a micrometric actuating member secured to the movable member intermediate the stationary and movable

members, and a detachable member adapted to engage with the micrometric actuating member through the hole in the stationary member.

5. In a micrometer protractor or similar instrument, a flat stationary member having a key-hole, a fixed arm, and a scale, an indicating member rotatably secured to the stationary member concentric with the scale, an arm adjustably secured to the rotatable indicating member, a gear secured to the rotatable indicating member intermediate the stationary and indicating members, and a detachable key having a pinion adapted to be inserted through the key-hole in the stationary member in a position for the pinion on the key to mesh with the gear on the indicating member.

6. In a micrometer protractor or similar instrument, a flat stationary member having a fixed arm and a scale, an indicating member rotatably secured to the stationary member concentric with the scale, an arm adjustably secured to the rotatable indicating member, a gear secured to the rotatable indicating member, and detachable means adapted to operate the gear, as described.

7. In a micrometer protractor or similar instrument, the combination of the following instrumentalities: a flat body member *b* having the fixed blade 7, the screw-threaded stud 9, the scale 10, and a key-hole 11, an indicating disk *b* rotatably secured to the body *a* by the stud 9, a movable blade *c* detachably secured to the indicating disk *b*, a washer *d* on the stud 9 over the disk *b*, a thumb nut *e* on the stud 9 over the washer *d*, a micrometric gear *f* secured to the disk *b* and a key *g* having a pinion 22 adapted to be inserted through the key-hole 11 in a position to mesh with the gear *f*, as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LEON FUCHS.

Witnesses:

ADA E. HAGERTY,  
LUTHER D. BURLINGAME.