K. BERGLOF.

MICROMETER PROTRACTOR.

APPLICATION FILED JUNE 28, 1920.

1,382,460. Patented June 21, 1921.

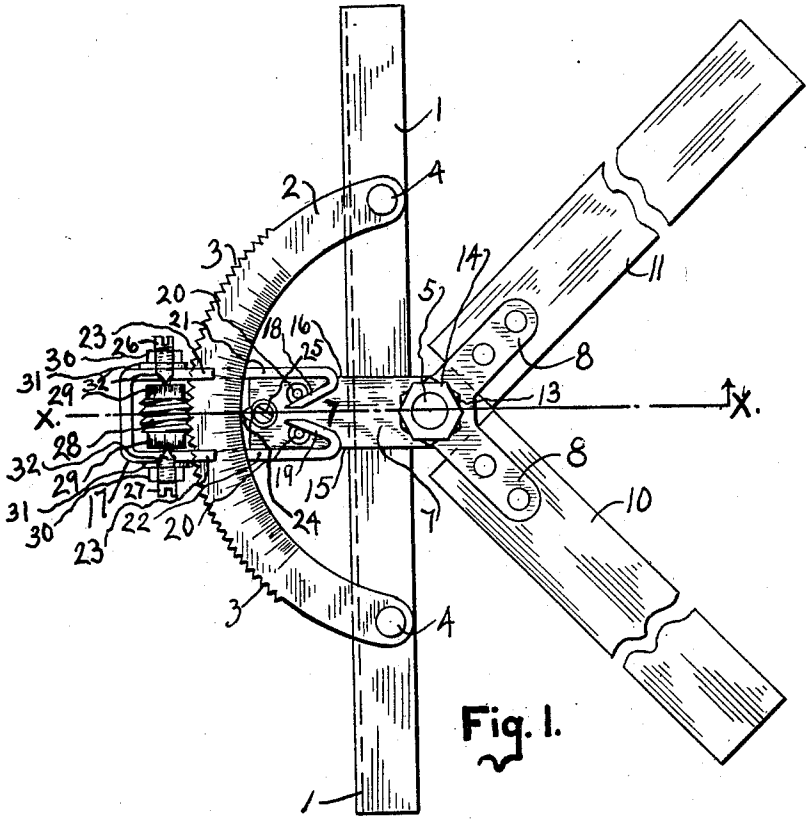


Fig. 1.

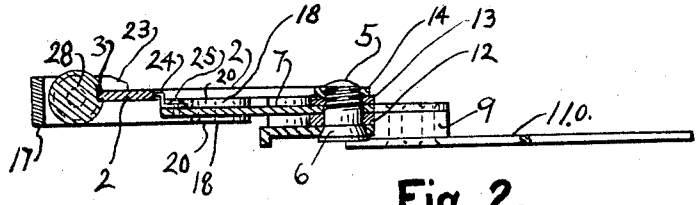


Fig. 2.

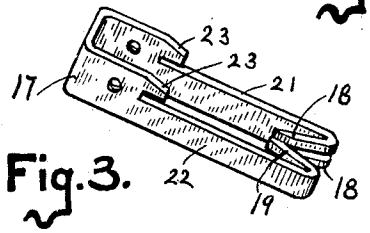


Fig. 3.

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MICROMETER-PROTRACTOR.

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To all whom it may concern:

Be it known that I, KNUT BERGLOF, a subject of the King of Sweden, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Micrometer-Protractors; and I do hereby declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to figures of reference marked thereon, which form part of this specification.

Like figures of reference refer to like parts.

This invention relates to micrometer protractors.

One of the objects of this invention is to provide a protractor having means for quickly setting the straight edges thereof at approximately the desired angle with one another and subsequently adjusting the same by the micrometer attachment to the particular degree and number of minutes or parts thereof, desired.

Another object of this invention is to provide a protractor with micrometer parts, in spring pressed engagement, so that these parts can be quickly disengaged in setting the straight edges of the protractor at the approximate angle desired and allowing the spring to reëngage the parts in the new approximate angle for subsequent adjustment.

A further object of this invention is to provide a protractor with a micrometer attachment, whereby three straight edges of the said protractor may be so set, that two of them, being fixed relative to one another at right angles, are adjusted as a square to the third straight edge.

With these and other objects my invention resides in certain construction, one embodiment of which is illustrated in the drawings, is hereinafter described, its use and operation is explained, and what I claim is set forth.

In the drawings,

Figure 1 is a top plan view of a micrometer protractor embodying my invention.

Fig. 2 is a section taken on the line X—X of Fig. 1.

Fig. 3 is a perspective view of the spring-forked worm frame.

In the figures, there is shown fixed upon and spaced from the flat straight bar 1, the toothed segment 2, having teeth 3, regularly cut to some desired pitch. The segment 2 is fixed by rivets 4, in spaced relation, upon the bar 1. Fitting in an extension upon the bar 1, is the pivotal bolt 5, having a tapered head 6 directly engaging a beveled hole in the bar 1. Journaled with the bolt 5, is the Y-frame 7, having extensions 8, which are fixed in spaced relation, by the pieces 9, to the respective bars 10 and 11, which latter bars are fixed at right angles to one another, and at an angle of 45° to the axis of the Y-frame 7. The Y-frame 7 is spaced from the bar 1 by the spacing washer 12. The parts engaging the bolt 5 are held together by the nut 13 and the lock nut 14.

Engaging the outer end of the Y-frame 7, at its parallel edges 15 and 16 is the spring-forked worm frame 17, having two sets of spring-forks 18 and 19, having the tines thereof engaging the upper and lower parallel surfaces of the Y-frame 7. There are two tines in each set of forks 18 and 19, having the Y-frame 7 between, and each pair of tines engages a roller 20, journaled with the Y-frame 7. The parallel side portions 21 and 22, of the worm frame 17, are in sliding engagement with the edges 15 and 16 of the Y-frame 7, and are integrally formed with the frame 17. The flat segment 2 is in sliding engagement with the upper surfaces of the side portions 21 and 22 of the frame 17, and fingers 23 integral with the frame 17, are in sliding engagement with the upper surface of the segment 2. The segment 2 is subdivided into degree marks radiating from its inner edge, as shown, and which cover 45° of arc on each side of the center of the segment 2. An index pointer 24 is positioned next to the graduations of the arc of the segment 2, and is fixed by the screw 25 to the Y-frame 7. There is journaled upon the tapered ends of screws 26 and 27, a graduated worm 28, graduated around the surface of its ends 29, to give the desired indication correlated with the frame 17, and also with the lock nuts 30, there being provided a washer 31, with each screw, and each washer is provided with a pointer 32, registering with the graduations on the ends 29 of the worm 28; and each reading the same. Or the pointers may be set one-half a division relative to one another while the graduations of worm ends are correspondingly opposite one another.

In operation, the bars 10 and 11 are posi-

tioned in relation to the bar 1, by first pulling outwardly upon the frame 17, causing the tines 18 and 19 to yield as against the rollers 20 and permit the worm 28 to be disengaged with the teeth 3. During the time that the worm 28 is so held disengaged, the frame 17, with its engaged Y-frame 7, and the bars 10 and 11, is swung to the desired angle, as roughly indicated by the pointer 24, upon the graduated arc of the segment 2, after which the operator releases hold upon the frame 17, permitting the spring tines 18 to exert themselves to draw the frame 17 inwardly and cause the worm 28 to engage the teeth 3, after which the desired fractional angle, in degrees and minutes or parts of minutes, is fixed by turning the graduations on the worm ends 29 to register the proper reading against the pointer 32.

The action of the spring tines 18 and 19 is twofold, being each inclined to the parallel portions 21 and 22 of the frame 17. The action is to draw these parallel portions closely in contact with the parallel straight edges 15 and 16, and also to exert a force in the direction of axis of the Y-frame 7, to draw the worm 28 in contact with the teeth 3.

Inasmuch as changes in the spring action and other changes in the details of construction, can be made without departing from the spirit and scope of my invention, I do not wish to be confined to the one embodiment herein illustrated and described, hence I claim,

1. A protractor comprising a bar, a circular segment fixed to said bar, a frame pivotally mounted upon said bar, positioned to turn about an axis common to the center of the said circular segment, means in engagement with said frame, positioned to slide thereon in a direction radial to the pivotal axis of said frame, an adjusting element on said means engaging said segment and releasable means for holding said element in releasable engagement with said segment.

2. A protractor comprising a bar, a circular segment fixed to said bar, a frame pivotally mounted upon said bar and positioned to turn about an axis common to the center of said segment, a member on said frame, said segment having a plurality of teeth positioned concentrically thereon, a worm pivotally mounted upon said frame to engage said teeth, said worm having a graduated extension, and an indicator fixed on said member next the graduations of said extension.

3. A protractor comprising a bar, a circular segment fixed to said bar, a frame pivotally mounted upon said bar and positioned to turn about an axis common to the center of said segment, a member in sliding engagement with said frame, positioned to slide thereon in a direction radial to the pivotal axis of said frame, said segment having a plurality of teeth positioned concentrically thereon, a worm pivotally mounted upon said frame to engage said teeth, said worm having a graduated extension, an indicator fixed on said member next the graduations of said extension, and means for releasably holding said worm in engagement with said teeth.

4. In a micrometer protractor, a straight edged bar, a frame pivoted to said bar, a circular segment fixed to said bar concentric to the pivotal point of said frame with said bar, a plurality of teeth on one of the circular edges of said segment, a member in sliding engagement with said frame to slide radially thereon, said member being also in sliding engagement with said segment, a spring-forked element on said member in sliding engagement with said frame, a guide on said frame in sliding engagement with said element, said element extending at an angle to the longitudinal axis of said frame and positioned to bear against said guide, a worm pivotally mounted upon said member and in engagement with said teeth, said worm having a graduated portion and an indicator fixed to said member next said graduated portion.

5. A protractor comprising a bar, a graduated circular segment fixed to said bar, a frame radially positioned in sliding contact with said segment and pivoted to turn about a point common to the center of said segment on said bar, a plurality of teeth on one edge of said segment, a worm pivotally mounted upon said frame to engage said teeth said worm having a graduated extension, an indicator fixed on said member next the graduations of said extension, and two ruling bars fixed to said frame, at right angles to one another.

KNUT BERGLOF.