(No Model.)

G. ALMORTH.

PROTRACTOR.

No. 387,481. Patented Aug. 7, 1888.

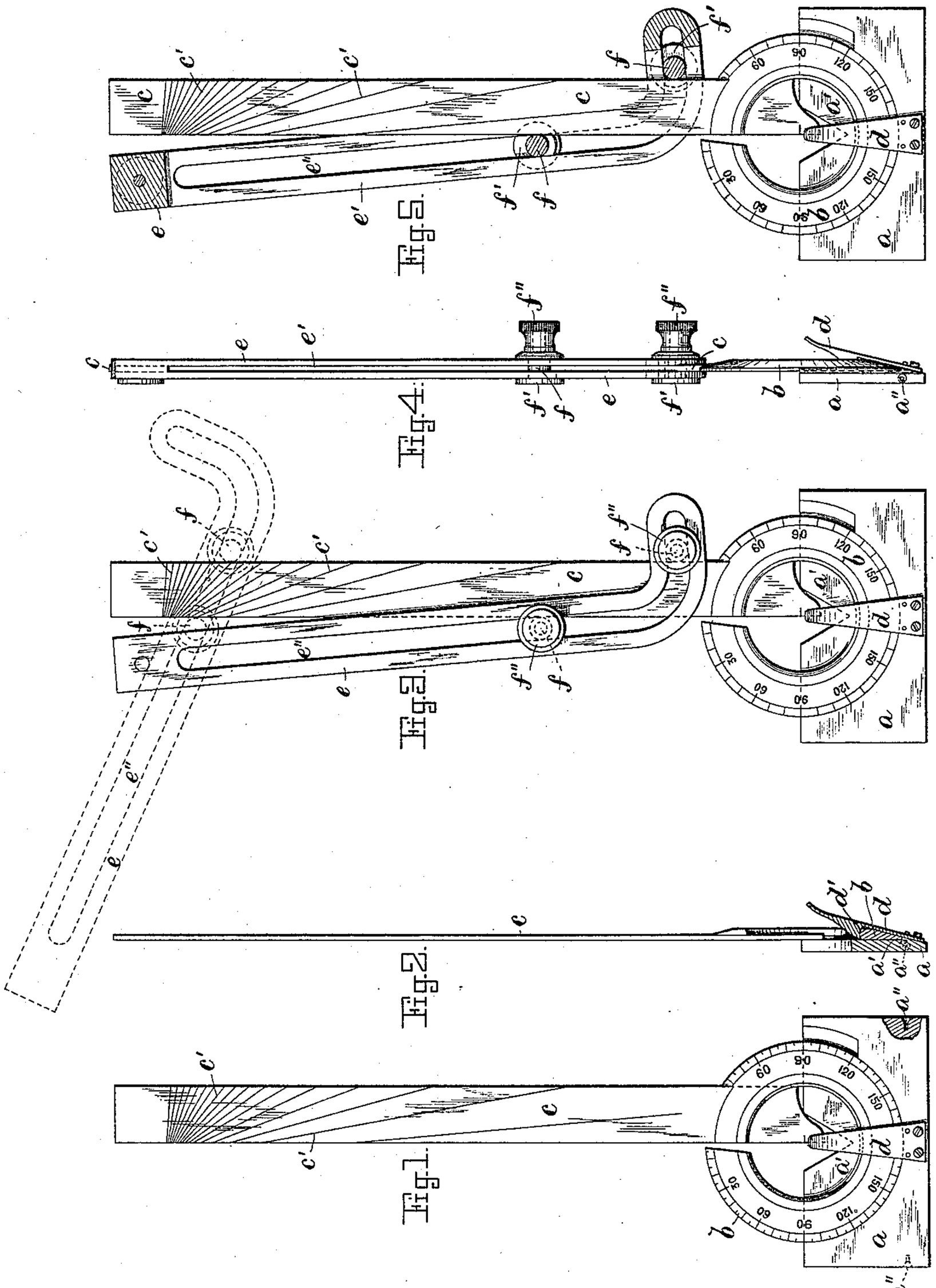

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Witnesses
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by Albert Andrén. his atty.

UNITED STATES PATENT OFFICE.

GUSTAF ALMORTH, OF WALTHAM, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO JOHN STARK, OF SAME PLACE.

PROTRACTOR.

SPECIFICATION forming part of Letters Patent No. 387,481, dated August 7, 1888.

Application filed May 4, 1888. Serial No. 272,807. (No model.)

To all whom it may concern:

Be it known that I, GUSTAF ALMORTH, a citizen of Sweden, and a resident of Waltham, in the county of Middlesex and State of Massachusetts, have invented new and useful Improvements in Protractors, of which the following, taken in connection with the accompanying drawings, is a specification.

This invention relates to improvements in protractors, and it is carried out as follows, reference being had to the accompanying drawings, wherein—

Figure 1 represents a plan view of the invention, and Fig. 2 represents a central longitudinal section of it. Fig. 3 represents a plan view of the protractor and the detachable blade secured to the rule of the open ring, and Fig. 4 represents an edge view of the same. Fig. 5 represents a plan view of the device, with the detachable blade shown in section.

Similar letters refer to similar parts wherever they occur on the different parts of the drawings.

a is the bed-plate, which is of rectangular form, so that either of its four sides may be used as a base-line from which to lay out the desired angle. Said bed-plate has on one of its sides a semicircular recess, *a'*, in which is fitted the detachable open ring *b*, that is beveled, as shown in Figs. 2 and 4, and divided or marked on its outer edge with numbers and degrees, as shown in Figs. 1, 3, and 5. To said graduated open ring *b* is secured the blade or rule *c*, the inner end of which extends to or beyond the center of the ring *b*, as shown.

To the front of the plate *a* is secured the spring-pawl *d*, having an undercut locking projection or tooth, *d'*, near its upper end, as shown in Fig. 2, the object of which is to lock the ring *b* to the bed-plate *a* after the said parts have been adjusted in position relative to each other according to the desired angle. By raising the spring-pawl *d d'* a little, but not sufficiently to disengage the plate *a* from the ring *b*, the latter may be turned to the right or left, according to the desired angle, as above mentioned. By raising the spring-pawl *d* so that its locking projection *d'* is disengaged from the beveled ring *b* the latter may be removed from the bed-plate *a*, and the ring *b* and its attached rule or blade *c* may then be used as a protractor for laying out or measuring angles on flat surfaces or for other purposes, as may be desired.

The bed-plate *a* has on two of its opposite edges the centering depressions or recesses *a'' a''*, (shown in Figs. 1 and 4,) adapted to receive the diametrically-opposed centers in a lathe or milling-machine for the purpose of laying out angles on the work held in front or rear of such lathe or milling-machine centers.

The rule or blade *c* is graduated with lines *c' c' c'*, each line preferably varying five degrees from the line next in the series, as shown in Figs. 1, 3, and 5.

e represents a slitted and slotted blade, which is adapted to be secured to the main blade *c* for the purpose of measuring angles, and thus enable such parts to be used in the same manner as a carpenter's or machinist's bevel is employed to lay out or measure angles. The said blade *e* has a slit, *e'*, adapted to receive the blade or rule *c*, as shown in Fig. 4, which slit extends nearly to the ends of said blade *e*, as shown in Fig. 5. The blade *e* is slotted, as shown at *e''* in Figs. 3 and 5, said slot extending nearly to the ends of the said blade *e*, as shown in Figs. 3 and 5, and it serves for the purpose of receiving the fastening-bolts *f f*, having heads *f' f'* in one of their ends and made with a screw-thread in their opposite ends, to which the thumb-nuts *f'' f''* are screwed, as shown in Figs. 3 and 4.

The bolts *f f* are flattened where they pass through the slot *e''*, so as to prevent their turning around when the thumb-nuts *f'' f''* are screwed up or down. By this arrangement and construction the utility of the protractor is materially increased. As shown in Fig. 1, it may be used as a T-square adjustable to any desired angle; as a protractor to measure or lay out angles with any of the sides of the bed-plate *a* as a base; or it may be secured between the centers of a lathe or similar or equivalent tool to measure or lay out angles on the work. By removing the bed-plate *a* the open ring *b* and rule or blade *c* may be used as a protractor in the usual manner.

By securing the blade *e* to the graduated blade *c*, as shown in Figs. 3, 4, and 5, angles

may be laid out or measured in the same way as "bevels" are used.

Having thus fully described the nature, construction, and operation of my invention, I wish to secure by Letters Patent and claim—

1. The rectangular bed-plate *a*, having the semicircular recess *a'*, combined with the open graduated and beveled ring *b*, its rule *c*, and the spring locking device *d d'*, as and for the purpose set forth.

2. The graduated beveled ring *b* and the graduated rule *c c'*, secured to it, in combination with the detachable and adjustable slotted blade *e e' e''* and its fastening bolts and nuts *f f' f''*, as and for the purpose set forth.

3. The rectangular bed-plate *a*, having the semicircular recess *a'* and side recesses or depressions, *a'' a''*, combined with the open graduated and beveled ring *b*, its rule *c*, and spring locking device *d d'*, as and for the purpose set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 30th day of April, A. D. 1888.

GUSTAF ALMORTH.

Witnesses:
WM. H. JOHNSON,
R. M. STARK.