

No. 672,382.

Patented Apr. 16, 1901.

A. J. LUCY.  
GAGE.

(Application filed Oct. 23, 1900.)

(No Model.)

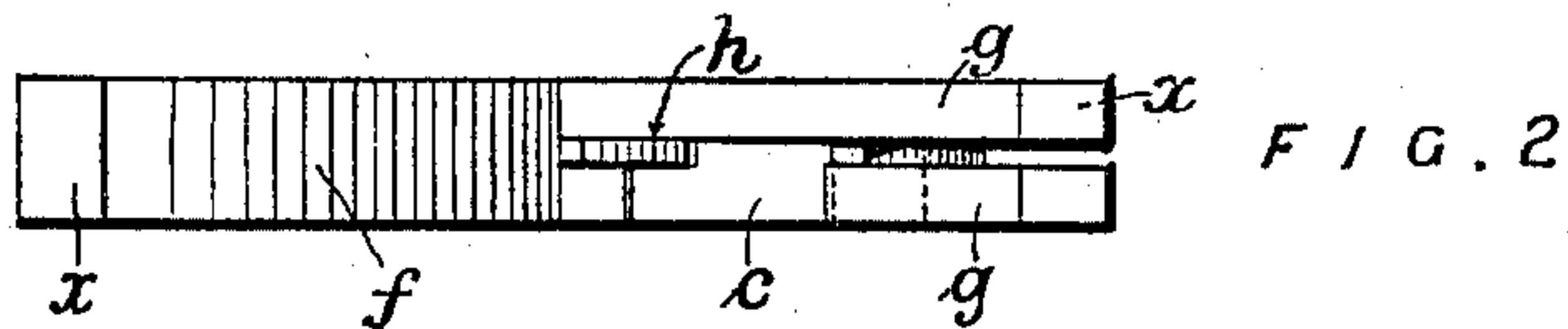


FIG. 1.

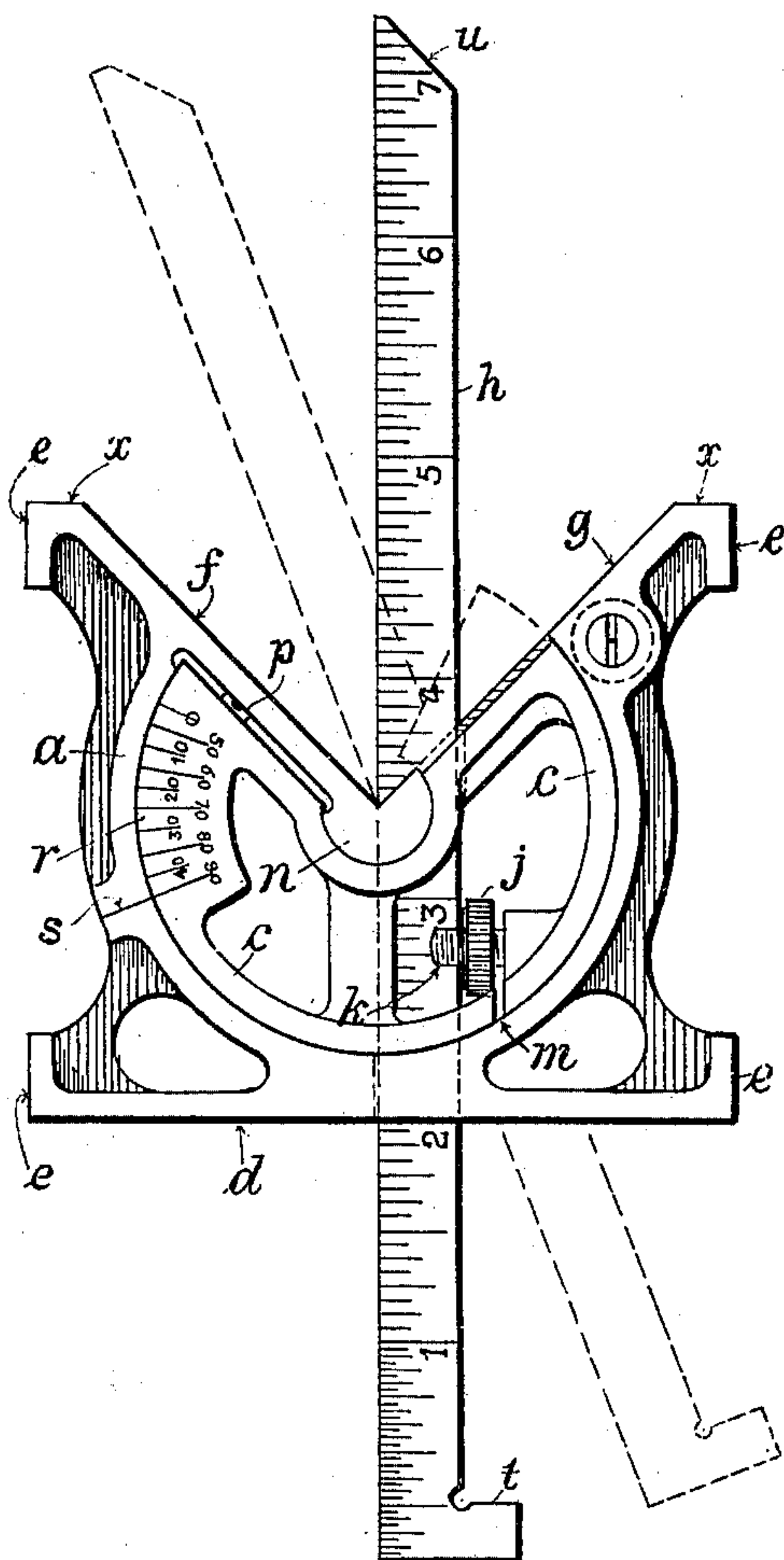


FIG. 3.



Witnesses  
Paul Hunter  
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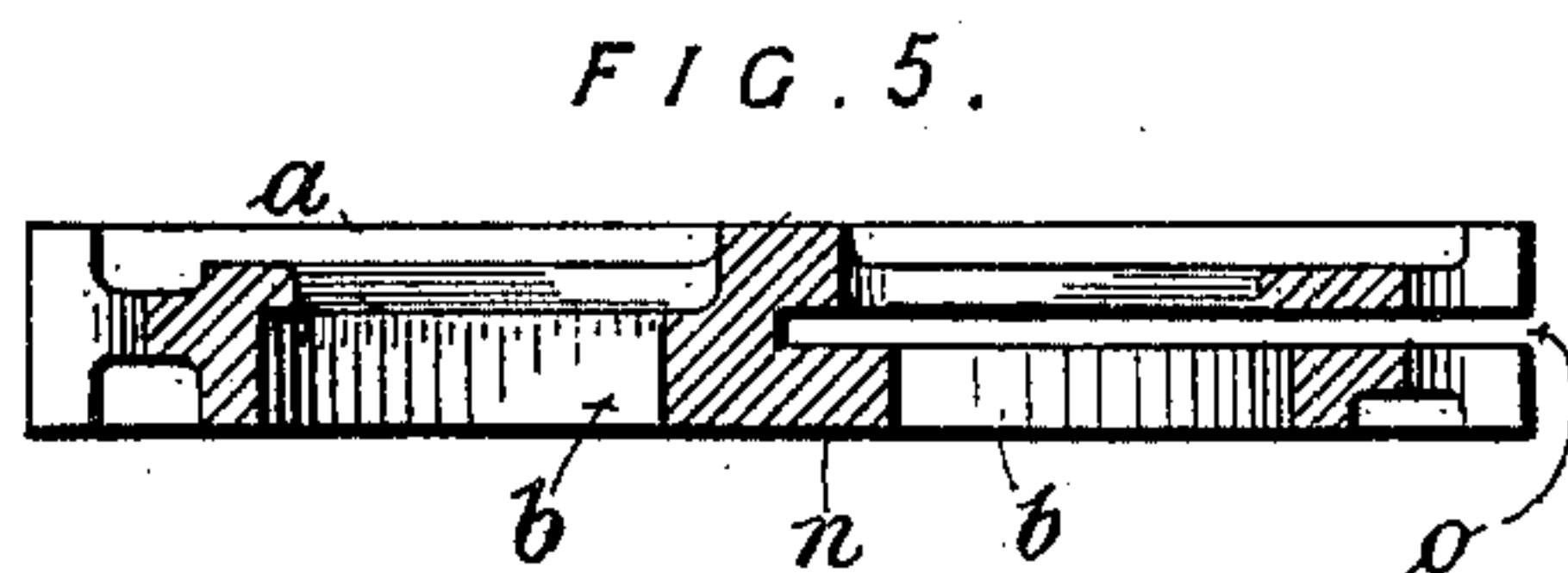


FIG. 5.

FIG. 6.

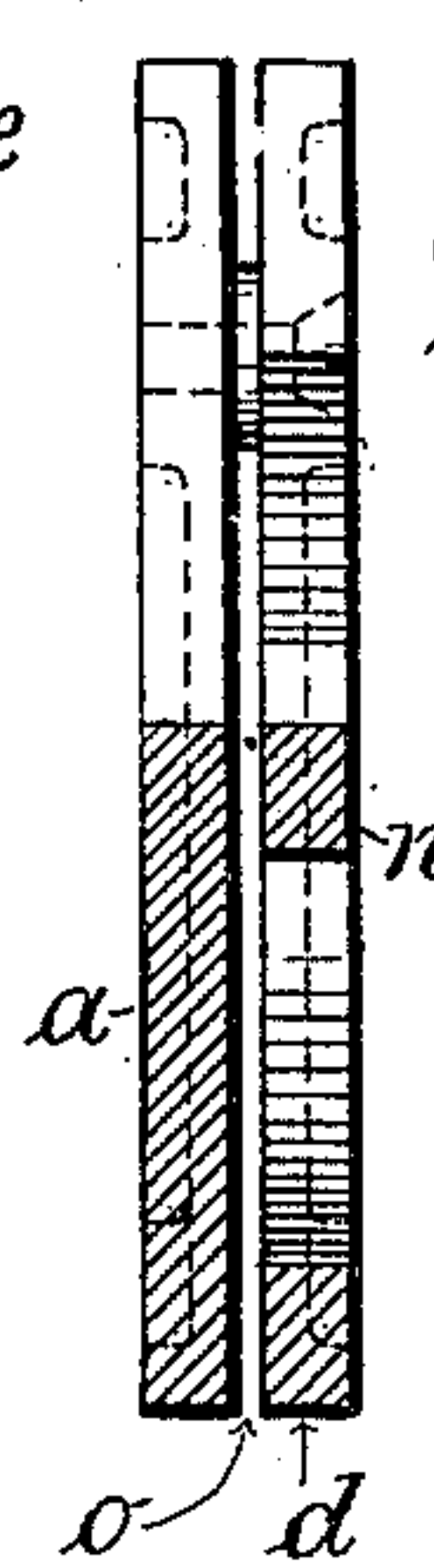


FIG. 4.

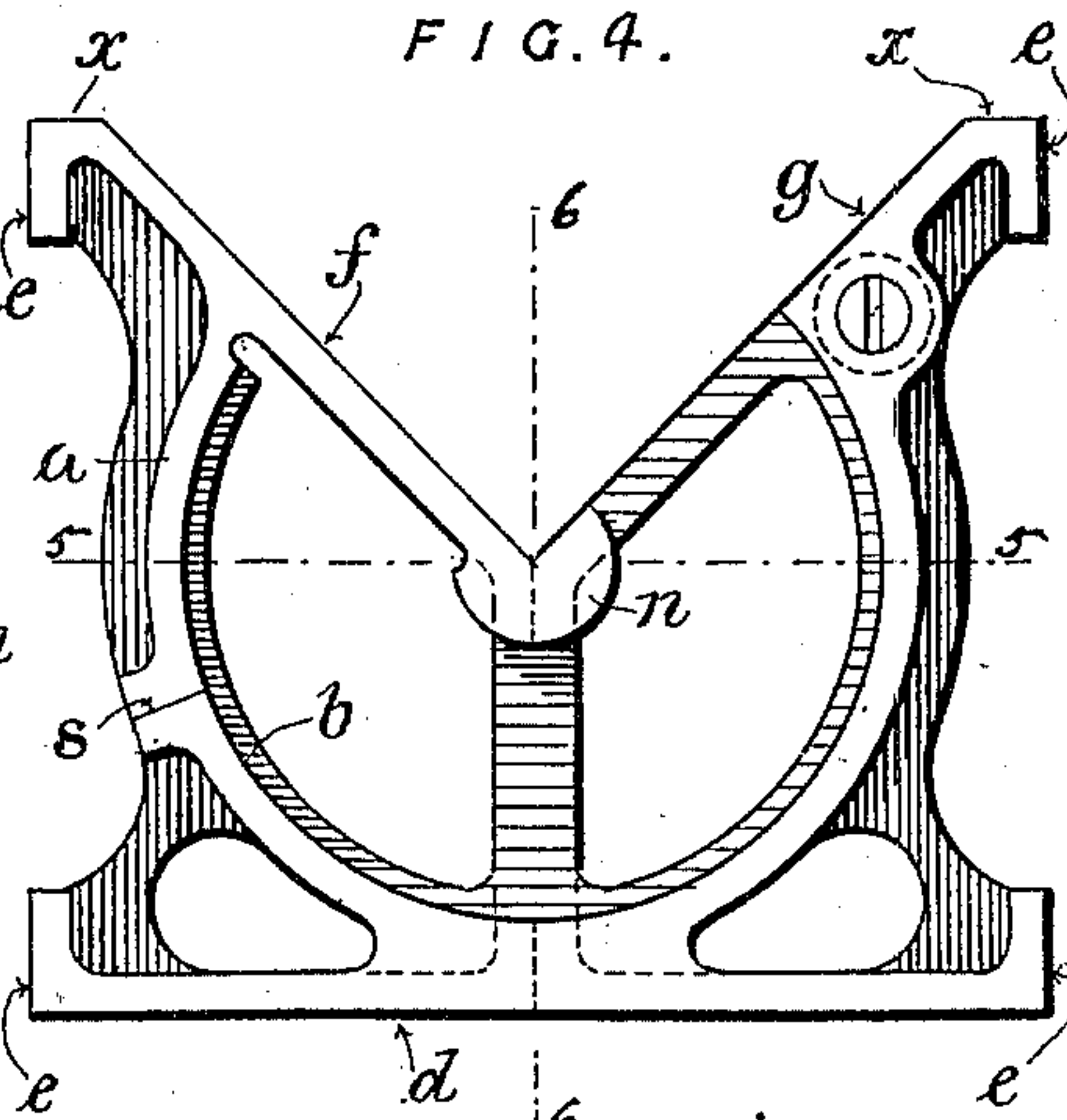


FIG. 8.

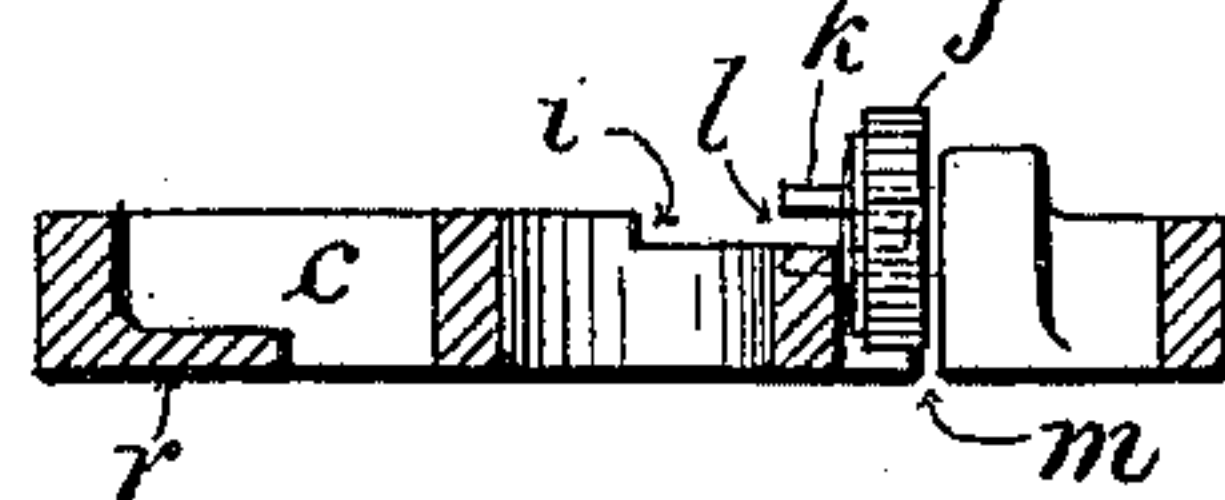
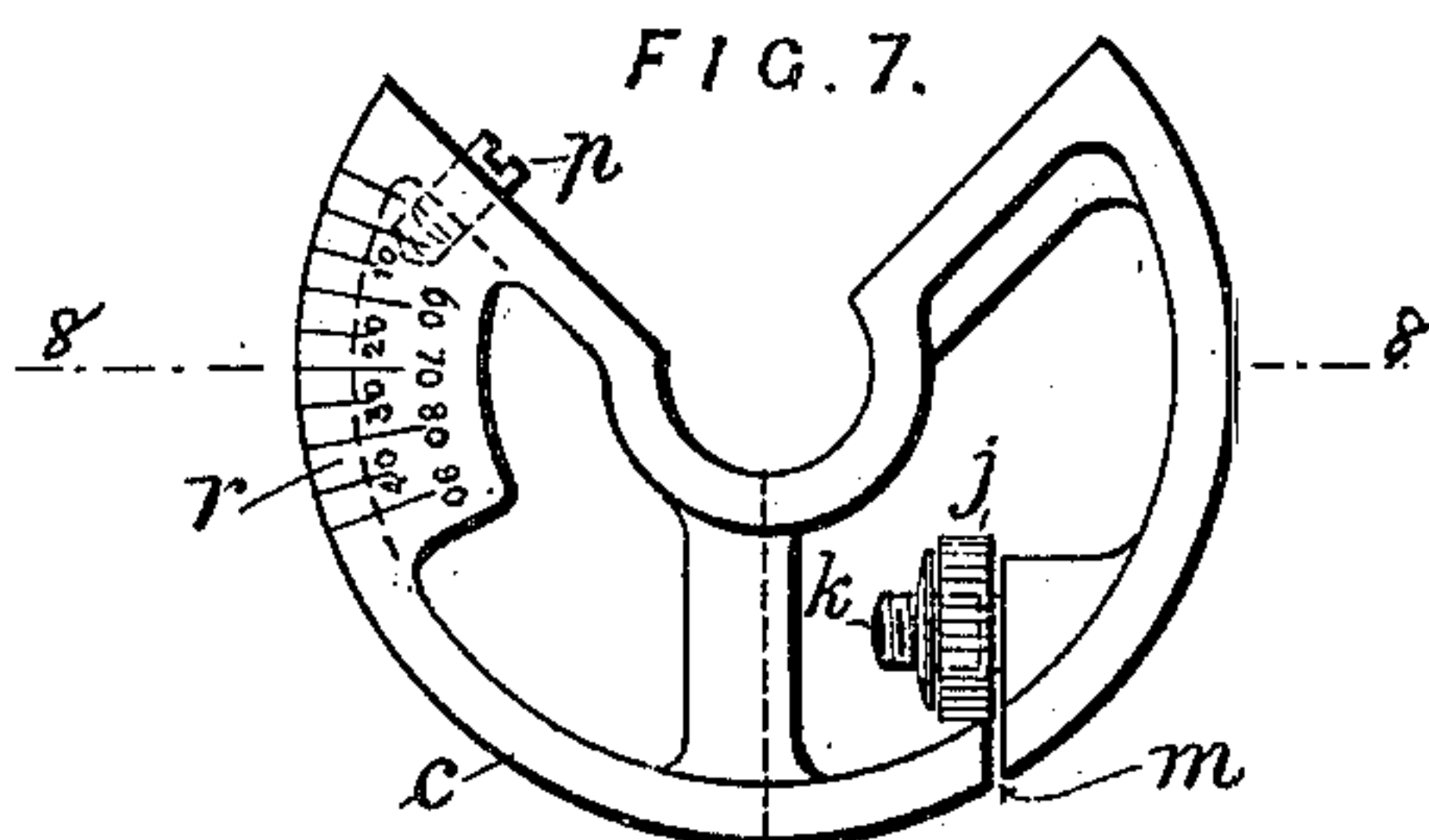


FIG. 7.



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# UNITED STATES PATENT OFFICE.

ARTHUR JOHN LUCY, OF CROYDON, ENGLAND, ASSIGNOR OF ONE-HALF TO  
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## GAGE.

SPECIFICATION forming part of Letters Patent No. 672,382, dated April 16, 1901.

Application filed October 23, 1900. Serial No. 34,040. (No model.)

*To all whom it may concern:*

Be it known that I, ARTHUR JOHN LUCY, mechanical engineer, a subject of the Queen of Great Britain, residing at Meadowcraft, Penn road, Croydon, in the county of Surrey, England, have invented an improved gage or protractor for use in gaging, marking off, and testing engineers' work and setting or adjusting tools and the like operations, of which the following is a specification.

This invention consists of an instrument for workshop use adapted to fulfil various operations, such as marking off and setting out centers, the teeth of wheels, and the like, gaging and testing bevels and other work, and gaging, setting, and adjusting tools, and for similar operations.

The instrument consists of a stock, a sector circularly adjustable in the plane of the stock and adapted to act as a carrier for a rule or straight-edge slidably fitted therein and which by the circular adjustment of the sector may be brought into any desired angular relation to the base or other datum edge or edges of the stock, the sector and stock being provided with scales whereon this angular relation may be read off.

Reference is to be had to the accompanying drawings, wherein—

Figure 1 is a face view of the instrument, and Figs. 2 and 3 are opposite end views thereof. The other figures show the principal parts separately, Fig. 4 being a face view of the stock and Figs. 5 and 6 sections thereof on lines A B and C D, respectively, while Fig. 7 is a face view of the sector, and Fig. 8 a section of the same on line E F, Fig. 7.

The same letters of reference indicate the same parts in all the figures.

The stock *a*, which may either be a casting or be formed of three stampings of sheet metal riveted together, is formed with a circular seat *b*, extending, preferably, through three-fourths of a circle, in which the sector *c* is accurately fitted, so as to be circularly adjustable therein. The base *d* of the stock is straight, and the two sides *e* are preferably at right angles thereto, while the fourth side of the stock opposite to the base is formed by members whose faces *f g* make with each other a reëntering angle, (preferably a right

angle,) whose vertex is coincident with the center of motion of the sector *c*, from which center the faces *f g* therefore radiate. The faces *f g* are of equal length, make equal angles with the base *d*, and preferably terminate in short flat faces *x*, parallel to the base *d*.

The sector *c* is preferably of more than semicircular form, and it is circularly adjustable in the corresponding seat *b* in the stock, which seat opens through the one angular member *g* of the stock, so as to permit of the sector emerging therefrom when circularly adjusted, as hereinafter described. The sector is preferably fitted in the stock, so as to be flush with one face thereof, as shown, and the rule *h* is slidably held in a seat or groove *i* in the under side of the sector, so that the front or working edge of the rule *h* passes diametrically through the center of motion of the sector, the rule being held to its seat by a set-nut *j*, working on a screw-stud *k*, fixed in the sector in the plane of and at right angles to the length of the rule, the end of which stud is cross-notched, as at *l*, to engage with the other or back edge of the rule *h*, the nut pressing against the back edge of the rule, preferably through the medium of a spring-washer. The sector is preferably formed of an open frame comprising a circumferential member and radial arms, and the circumferential member is cross-cut, as at *m*, between the points of abutment and of application of the screw-pressure, so that the screw *k* and nut *j* when tightened so as to clamp the rule also have for effect to tend to slightly expand the sector in such manner as to make it bind tightly in its seat *b* in the stock *a*, the same nut and screw thus serving to fix the rule *h* in its seat and to lock the rule *h* and sector *c* in whatever angular position in the stock they may be adjusted.

The sector *c*, besides working in a circumferential seat *b*, is preferably also fitted toward its center to work around a concentric circular boss *n* in one with the radially-disposed members *f g* of the stock, so as to avoid liability of shake of the sector in the stock, (especially if the sector be only semicircular or less in angular extent,) and the rule *h* when secured in the sector, as above described, passes through a slot *o* in the central plane of the



stock, said slot extending at least up to a radius from the center of motion at right angles to the base  $d$ .

The angular movement of the sector  $c$  in the one direction is limited by its end or by a stop  $p$  thereon coming against the rear side of the radial member  $f$  of the stock, in which position, which is that shown in Fig. 1, the one end of the rule  $h$ , if caused to project from the base  $d$  of the stock, will have its working edge at right angles thereto, while the working edge of the other end of the rule bisects the reëntering angle formed by the faces  $f g$  of the stock. By the angular movement of the sector and rule, as indicated by the dotted lines in Fig. 1, the first-mentioned arm of the rule makes angles greater than ninety degrees with the base  $d$ , while the other arm makes any angle less than forty-five degrees with the side or face  $f$ , the adjustment in this direction being only limited by the edge of the rule coming against the whole length of that face.

The sector and stock are marked, the one with a peripheral scale  $r$ , graduated to indicate with reference to an index  $s$  on the other the angular relation of the rule to the base  $d$  and the face  $f$  of the stock, the graduations of the scale having two series of numbers, the one, ranging from zero to forty-five degrees, serving to denote the amplitude of the angle made by the rule with the face  $f$  of the stock and the other, ranging from ninety to forty-five degrees, serving to denote the amplitude not of the angle made by the rule and the base of the stock, but of the complementary angle. The end of the rule which projects from the base terminates in a right-angled lug  $t$  for use in conjunction with the base for calipering purposes, while the other extremity  $u$  is beveled to a known angle (forty-five degrees) for use in certain cases in conjunction with the angular adjustment of the rule. The angular adjustment of the stock may also be used in conjunction with the side faces  $e$  of the stock or with the flats  $x$ , according to the exigences of the work.

I claim—

1. A gage or instrument for marking off, gaging, setting and adjusting work and tools, comprising a stock, a sector-shaped rule-carrier circularly adjustable in the plane of the stock, and a longitudinally-slidable rule fixed in a seat in the sector-shaped carrier so that the working edge of the rule passed through the center of motion of the carrier in all positions of longitudinal and angular adjustment, the stock having at one end a straight

face or base, and the opposite end in the form of a reëntering right angle, whose sides are of equal length and make equal angles with the said base, and whose vertex coincides with the center of motion of the rule-carrier, the rule being adapted to project from the base of the stock and also to intersect the reëntering angle and to make with the said base and with one of the sides of the reëntering angle various degrees of angular adjustment, as described.

2. In the herein-described gage or instrument, the combination with the stock, the sector-shaped rule-carrier circularly adjustable therein and the rule slidably held in a seat in the sector, of the means of simultaneously fixing the rule in the sector and the sector in its seat, such means consisting of a device adapted to apply pressure between the circumferential member of the sector as an abutment, and the back edge of the rule, the circumferential member of the sector being cross-cut between the points of abutment and of application of pressure so that the pressure will tend to expand it and thus simultaneously bind the rule and sector in their respective seats in such manner as to prevent any sliding or angular movement of the rule.

3. In the herein-described gage or instrument, the combination with the stock, the sector-shaped rule-carrier circularly adjustable therein, of a rule slidably held in a seat in the sector and projecting at opposite ends through a slot in the thickness of the stock so as to be presented in proper relation to the base and reëntering angular faces of the stock, for application to bevels and other angular work, the slot extending through a sufficient portion of the stock to permit of angular adjustment of the rule, as described.

4. A gage or instrument for workshop use for marking off, setting out gaging and testing work, and gaging, setting, and adjusting tools, comprising a stock, a sector-shaped rule-carrier fitted so as to be circularly adjustable between a circumferential circular seat in the stock and a circular boss concentric with such seat, and a rule slidably fixed in a seat in the sector and adapted to project from the base of the stock and also through the center of the boss and the coincident vertex of a reëntering right angle formed by the faces of the stock opposite to the base, as described.

Dated October 3, 1900.

ARTHUR JOHN LUCY.

Witnesses:

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T. W. KENNARD.