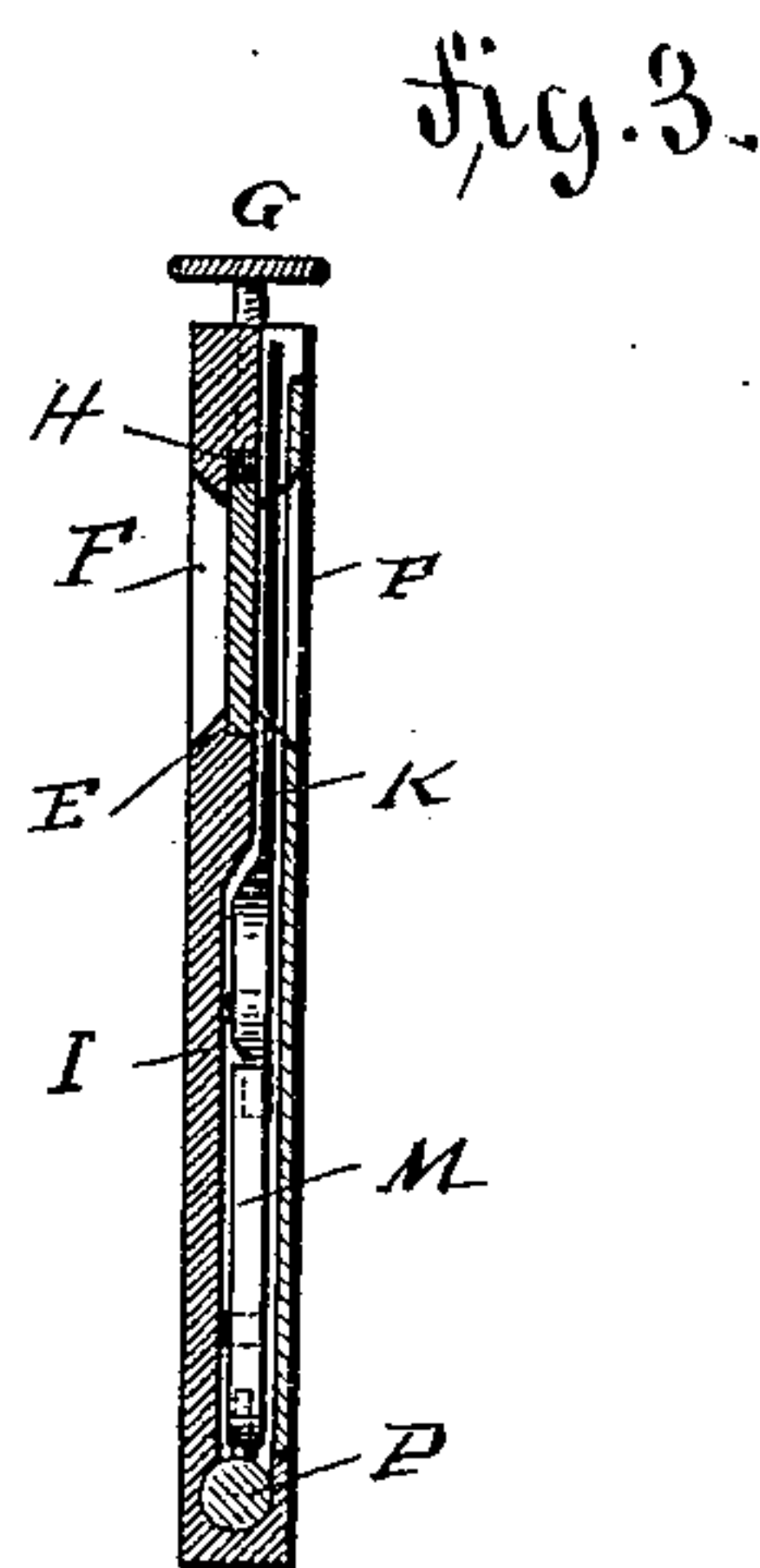
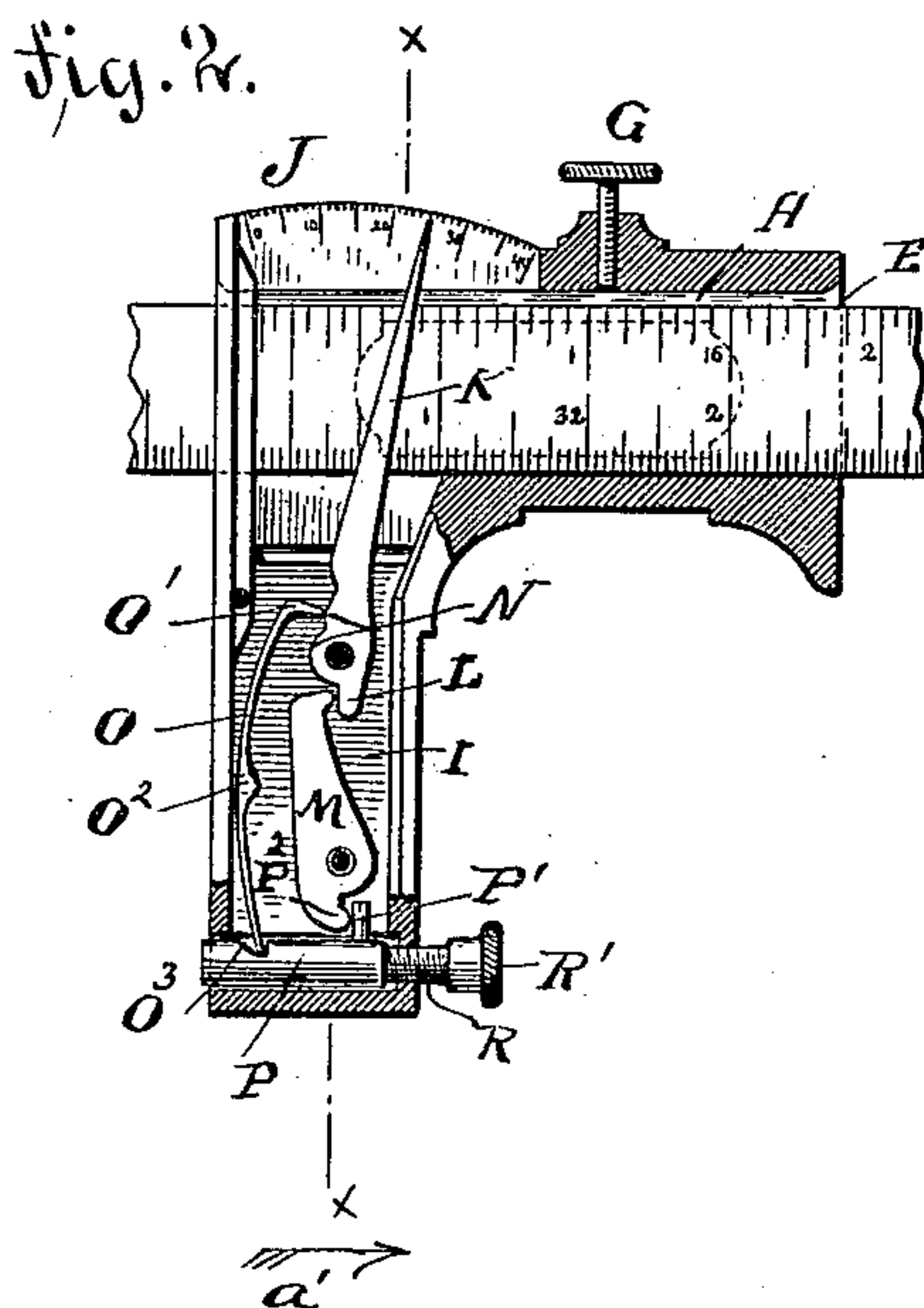
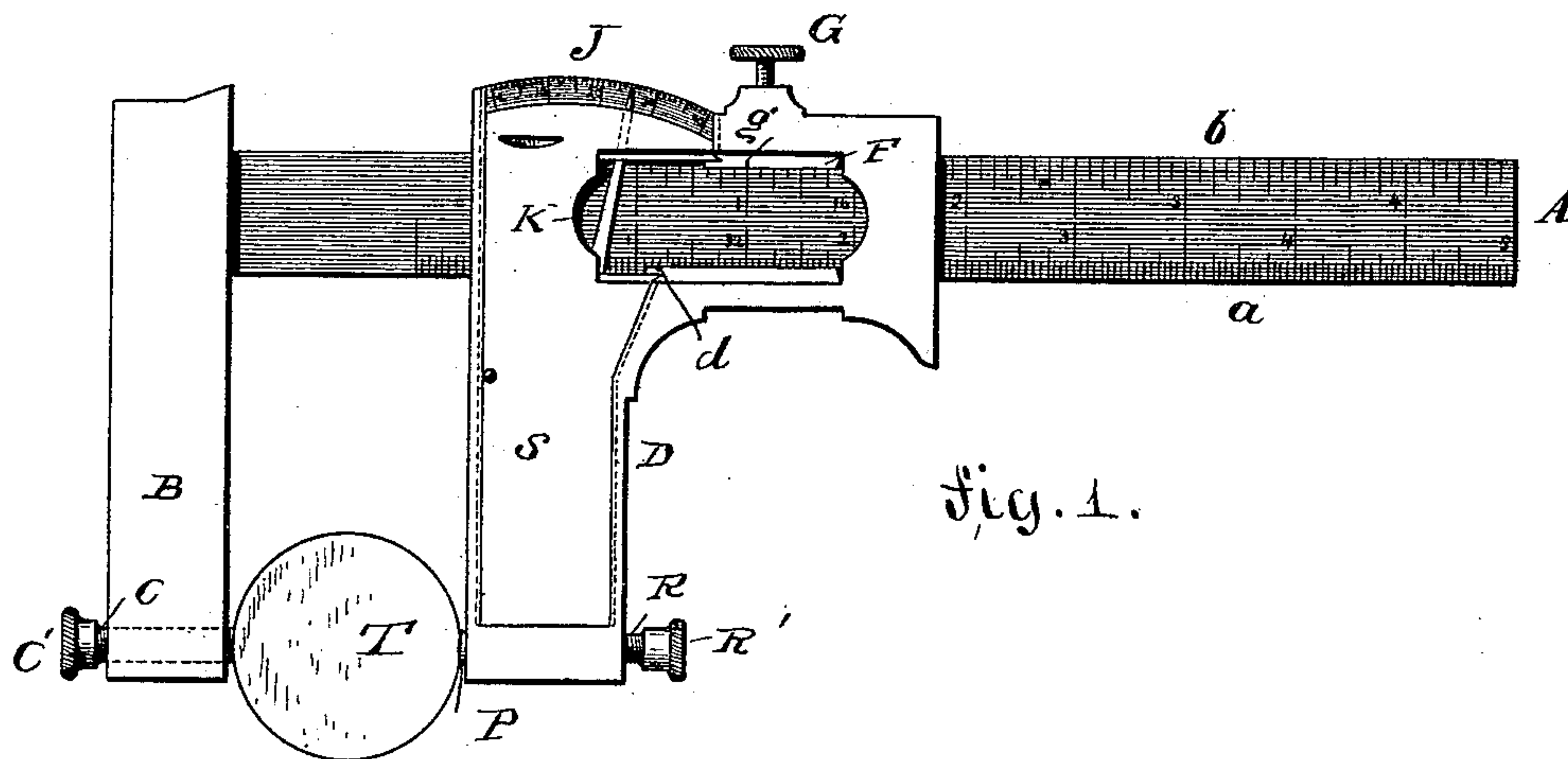


(No Model.)

J. HURST.
SLIDE CALIPERS.

No. 353,561.

Patented Nov. 30, 1886.



WITNESSES:

F. H. Rosenbaum.
Carl Karp

INVENTOR

INVENTOR
Jakob Hurst
BY *Looney & Regener*
ATTORNEYS,

UNITED STATES PATENT OFFICE.

JAKOB HURST, OF SYRACUSE, NEW YORK.

SLIDE-CALIPERS.

SPECIFICATION forming part of Letters Patent No. 353,561, dated November 30, 1886.

Application filed June 16, 1886. Serial No. 205,301. (No model.)

To all whom it may concern:

Be it known that I, JAKOB HURST, of Syracuse, in the county of Onondaga and State of New York, have invented certain new and useful Improvements in Calipers, of which the following is a specification.

This invention relates to certain new and useful improvements in slide-calipers; and the object of my invention is to provide calipers of this kind, by means of which ordinary measurements, and also measurements down to thousandths of an inch, can be made; and the further object of my invention is to facilitate the adjustment of the movable member of the calipers and to obtain an absolutely-accurate measurement.

The invention consists in the combination, with a scale-bar having a fixed cross-piece, of a sliding cross-piece, a scale representing thousandths of inches on the slide, and a hand or pointer mounted to move over the thousandths-scale and actuated by a screw in the slide, all as will be fully described and set forth hereinafter.

In the accompanying drawings, Figure 1 is a side view of my improved calipers. Fig. 2 is a detail longitudinal sectional view of part of the same. Fig. 3 is a cross-sectional view of the same on the line $x x$, Fig. 2.

Similar letters of reference indicate corresponding parts.

On one end of the scale-bar A the cross-piece B is fixed, in the free end of which the screw C is mounted, said screw being provided at its outer end with a head, C'.

The scale-bar A is provided at one edge with a scale, a , in which the inches are subdivided into thirty seconds, and at the opposite edge with a scale, b , in which the inches are subdivided into sixteenths. On the scale-bar A the rectangular slide D is mounted, which is provided in one shank with a longitudinal aperture, E, and in the same shank with the slots F F. A binding-screw, G, is provided on the slide, for the purpose of locking the same in place on the scale-bar.

To prevent the binding-screw cutting into the edge of the rule or scale bar A, a loose strip, H, is interposed between one side of the opening in the slide and the edge of the rule or scale bar, on which strip H the stem of the screw G acts, thereby pressing said strip

on the edge of the scale-bar. On the outer edge of that shank of the rectangular slide D through which the scale-bar passes, and at the inner end of the other shank, a segmental scale, J, is formed, which is divided into forty parts, the face of the scale J being flush with the face of the rule or gage bar A, and for this purpose part of the side wall of the slide is cut out. That shank of the slide at right angles to the scale-bar has a recess, I, formed in one face, and in said recess a hand, K, is pivoted, which is provided below the pivot with a projection, L, on which one end of a lever, M, pivoted in the recess can act.

Above its pivot the hand K is provided with a cam-edge, N, against which the projection O' on one end of a spring-strip, O, rests, which spring-strip is pivoted at O² and has its other end passed into a notch, O³, of a piece, P, mounted to slide transversely in the free end of that shank of the slide at right angles to the gage-bar—that is, so that said piece P slides parallel with the scale-bar. A pin, P', on the sliding piece P acts on a projection, P², formed on one end of the lever M, beyond the pivot of the same, so that the pivot of the lever M is between that end of the lever resting against the projection L of the pivoted hand K, and that end resting against the pin P'. A screw, R, having a head, R', is screwed into that side edge of the shank of the slide opposite the edge facing the edge of the fixed cross-piece B, the other end of the screw resting against the sliding piece P. A covering-plate, S, having dovetailed edges, covers the recess I, the pointer or hand K, the lever M, the spring O, and the slide-piece P.

The operation is as follows: When the calipers are used to take ordinary measurements, the screws C and R are so adjusted that the inner end of the screw R and the adjacent end of the piece P on which the screw R acts do not project from the adjacent edges of the cross-piece B and slide D. The bar or rod T, or other object to be measured, is inserted between the cross-piece B and slide D and the slide D moved toward said object until both the slide and the cross-piece rest against the same. Then the slide D is locked in place by the screw G, and the thickness of the object to be measured is shown by the gage-mark d on the scale a of the scale-bar A. In case

very accurate measurement is required, the screw R is turned until the pointer or hand K is at the subdivision *o* of the scale J, and the screw C is turned until the inner end of its stem projects from the inner edge of the cross-piece B. When the end of the screw C and the end of the slide-piece P are in contact, the adjacent edges of the cross-piece and slide will be separated one-eighth of an inch. The length of the scale J corresponds to one twenty-fifth of an inch of the movement of the slide-piece P—that is to say, in order to move the hand or pointer K over the scale J, the slide-piece P must be moved in the direction of its length one twenty-fifth of an inch. When the end of the screw C and the slide-piece P are in contact, the cross-piece B and the slide D are one-eighth of an inch apart. As the scale J is divided into forty parts, each subdivision will correspond to one one-thousandth of an inch. The object to be measured is placed between the cross-piece B and the slide D, and the slide D moved toward said object T as close as possible, care being taken that the gage-mark *g* of the slide D is on one of the subdivisions of the scale *b*. The screw R is then turned so as to bring the end of the slide-piece P in contact with the object T between the cross-piece and slide-piece, and thereby the pointer or hand K is moved, and shows the thousandths of inches in addition to the measurements given on the gage-mark *g* on the scale *b*. When the sliding piece P is moved in the direction opposite to that of the arrow *a'*, its pin P', acting on the projection P² of the lever M, causes the upper end of the lever to move the lower end of the hand K in the direction of the arrow *a'*, whereby the pointer end of the hand is moved in the inverse direction of the arrow *a'*—that is, in the same direction in which the piece P is moved. When the screw R is turned to move in the direction of the arrow *a'*, the spring O, acting on the sliding piece P, moves the same in the direction of the arrow *a'*, and at the same time the projection O' of the spring O acts on the cam part N of the hand or pointer K, whereby the pointer end of the hand is moved in the direction of the arrow *a'*.

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

1. Calipers constructed with a scale bar or rule, a fixed cross-piece, a slide on the rule, a scale on the slide, a hand or pointer pivoted on the slide and extending over the scale on the slide, and of a screw for moving said hand or pointer, substantially as shown and described.

2. Calipers constructed with a rule or scale bar, a fixed cross-bar on the same, a slide on the scale-bar, a scale on the slide, a hand or pointer pivoted to the slide, a lever pivoted on the slide and acting on the hand, and a screw for actuating said lever, substantially as shown and described.

3. Calipers constructed with a scale bar or rule, a fixed cross-piece on the same, a slide on the scale-bar, a scale on the slide, a hand or pointer pivoted on the slide, a lever pivoted on the slide and acting on the hand, a sliding piece acting on the lever, serving as a contact-piece for the article to be measured, and a screw for actuating said slide-piece, substantially as shown and described.

4. Calipers constructed with a scale bar or rule, a fixed cross-piece on the same, a slide on the scale-bar, a scale on the slide, a hand or pointer pivoted on the slide, a lever pivoted on the slide, acting on the hand, and serving as a contact-piece for the article to be measured, a sliding piece acting on the lever, a screw for actuating said slide-piece, and a spring resting on the hand and the slide-piece, substantially as shown and described.

5. The combination, with a scale bar having a fixed cross-piece, of a slide provided with a scale, a hand or pointer pivoted to the slide, a spring acting on the pointer, and a screw for adjusting the position of the pointer, substantially as shown and described.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

JAKOB HURST.

Witnesses:

JOHN HAUZLER,
JOHN B. EISENSCHINK.