No. 820,303. PATENTED MAY 8, 1906.

G. L. HANSEN.

MEASUREMENT INDICATOR.

APPLICATION FILED SEPT. 1, 1905.

Fig. 1.

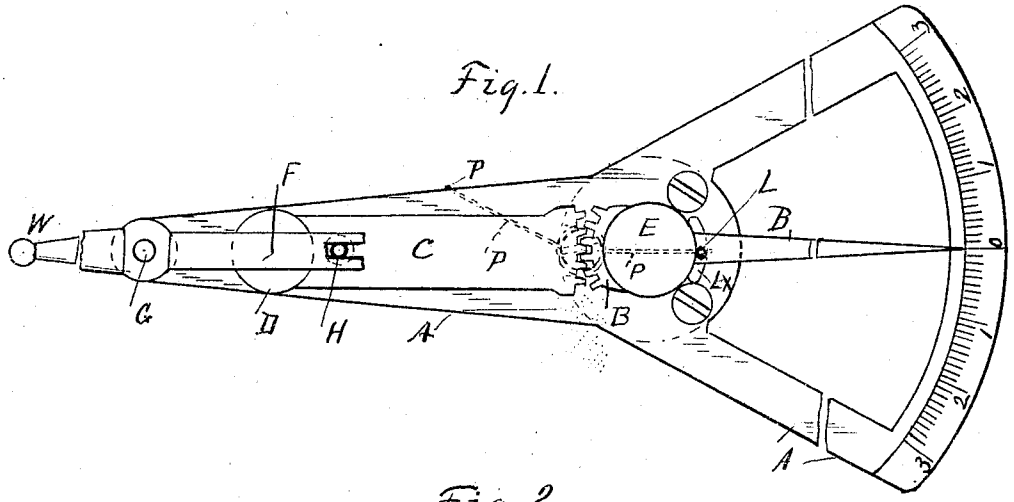


Fig. 2.

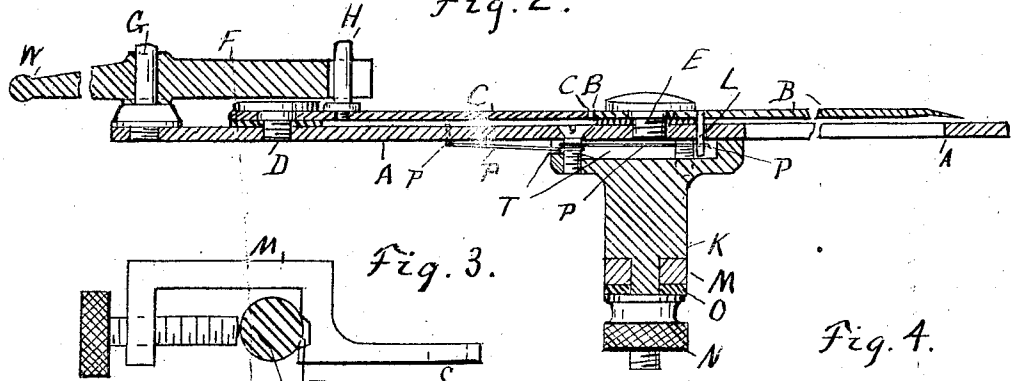


Fig. 3.

Fig. 4.

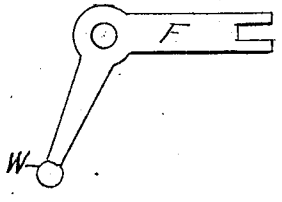


Fig. 5.

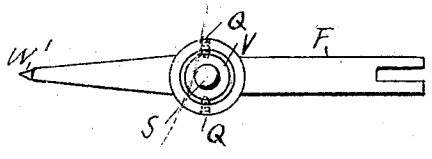


Fig. 6.

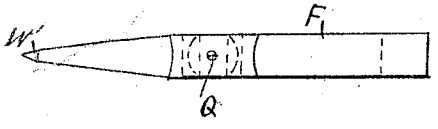


Fig. 7.



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GUSTAF LIVEN HANSEN, OF ROCKFORD, ILLINOIS.

MEASUREMENT-INDICATOR.

No. 820,303. Specification of Letters Patent. Patented May 8, 1906.

Application filed September 1, 1905. Serial No. 276,752.

To all whom it may concern:

Be it known that I, GUSTAF LIVEN HANSEN, a resident of Rockford, in the county of Winnebago and State of Illinois, have invented certain new and useful Improvements in Measurement-Indicators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

The invention relates to indicators suitable for use in lathework and in other like work requiring indication of an exact size or form or of variations therefrom.

The object is to increase the efficiency, convenience, and range of action of such instruments.

The invention consists in the construction hereinafter described and pointed out.

In the accompanying drawings, which form part of this specification, Figure 1 is a plan view of the instrument. Fig. 2 is a central vertical section of the same. Fig. 3 is a plan of a clamping device. Fig. 4 is a plan of a modified detail. Figs. 5, 6, and 7 are respectively a plan, longitudinal section, and transverse section, of a second modification of said detail.

A denotes a frame secured in any suitable manner, as by screws, to a post K.

M denotes a clamping device, having a suitable opening at S to fit the reduced end of the post.

O denotes a washer, and N a milled nut, for securing the clamp to the post.

Z denotes a groove in the clamp opposite a milled screw, whereby the clamp may be fastened on a tool, lathe, or other structure.

C denotes a lever of the third order, having a fulcrum at D, which is a screw, stud, or pin, fixed in frame A.

B is a lever of the first order, having a screw, stud, or pin E as a fulcrum. The long arm of this lever B is a pointer coacting with a graduated scale, as indicated in the drawings. The short end of lever B is provided with a rack, which meshes with a similar rack on the end of lever C, as shown in Figs. 1 and 2. A function of these levers is to multiply any movement given to lever C through the medium of a work-bearing finger W at the free end of an arm F. The lever-arms will be so proportioned as to give indications on an enlarged scale of minute movements of the finger end bearing on the work. Thus if the arms of lever C have a ratio of five to one and those of B have the ratio of six to one and the minimum graduations of the scale be .03 of an inch each such graduation will indicate .001 of an inch at the free end of the finger of arm F, said arm being at its longitudinal center pivoted on a stud G and connected, by means of its slotted end, to a stud H, fixed to lever C, as shown. To hold the lever-pointer B and the finger W to its work and obviate lost motion, a spring P is secured to said pointer by a pin L and near its middle connected to a frame-securing screw, as shown. This pin extends into a slot $L^{\times}$ in frame A.

The spring P surrounds the forward screw that connects the frame A to post K. Normally the pin will rest at one end of the slot $L^{\times}$. As illustrated in Fig. 1, the graduated end of frame A has been so moved as to bring zero of the scale under the pointer B, the end of arm W being conceived as held by bearing on the work (not shown) or otherwise. In this situation the spring is under tension, and its tendency is to put its three several points of bearing or connection with the device in alinement, whereby the pointer would be moved over the scale. The action of the spring is reversed to move the pointer over the scale situated on the opposite side of *o* by disengaging it from one edge of A and engaging the other.

To adapt the indicator for both right and left hand work, zero of the scale is placed at its center in alinement with the center line of levers B and C, and similar graduations are provided on each side, as shown. To cooperate with this duplication of the scale, the spring P is made adjustable, as before stated, to bear on either edge of frame A, according as one part of the scale or the other is to be used.

T denotes a shallow recess in post K to avoid friction on the spring.

The form of arm F may be varied. In some cases it will be bent as indicated in Fig. 4, which form would be adapted to work in a shallow groove or in other situations where a straight arm might be inoperative.

In Figs. 5, 6, and 7 is shown an arm F suspended by pivots Q, bearing in a hollow sleeve V, said sleeve providing a bearing for a stud S, fixed to the frame. This construction is in the nature of a universal joint and provides for movement of the point W′ of the

arm in any direction, as is desirable if the indicator is required for use in testing the accuracy or trueness of a center or center-punch.

Having described the invention, what I claim is—

1. In an indicator, the combination of a frame-plate having thereon a scale, multiplying-levers having at their proximate ends gears that mesh with each other, a pivoted arm connected to one of said levers and adapted to move them by contact of its free end with work whose variations from a true form are to be indicated, said frame-plate being parallel to the levers and arm and the arm and levers pivoted to the plate.

2. In an indicator, the combination of a frame-plate having thereon a scale, multiplying-levers having at their proximate ends gears that mesh with each other, a pivoted arm connected to one of said levers and adapted to move them by the contact of its free end with work whose variations from a true form are to be indicated, said frame-plate being slotted, a pin fixed to one of the levers and movable in the slot whereby its path is limited, and a spring tending to hold said lever, being an indicator, in either of two normal positions, and said scale being in duplicate for right and left hand work.

3. In an indicator, the combination of a frame or support, a scale on said support, multiplying-levers having at their proximate ends gears that mesh with each other, a pivoted arm connected to one of said levers and adapted to move them by the contact of its free end with work whose variations from a true form are to be indicated, said scale being in duplicate, and a spring one end operatively connected to one of the levers and the other bearing on the frame, each end being movable with respect to the frame, and reversible for right and left hand work.

4. In an indicator, the combination of a scale, multiplying-levers having at their proximate ends gears that mesh with each other, a pivoted arm connected to one of said levers and adapted to move them by contact of its free end with work whose variation from a true form is to be indicated, said levers and their gears being adapted to be alined in the same plane, and a frame having thereon said scale, the arm and levers being pivoted to said frame and the arm loosely connected to the proximate lever.

5. In an indicator, the combination of the frame-plate having thereon a scale, the lever-pointer, the coacting lever, and the arm loosely connected to the said latter lever, said lever being pivotally supported on the frame and situated in the same plane as the pointer, and washers adjacent the pivots to prevent contact of the levers and frame.

6. In an indicator, the combination of the slotted frame-plate having a scale, a pointer, a spring, the post fixed to the plate and having a recess for the spring, a pin fixed to the pointer movable in the frame-slot, said spring bearing at one end on the frame and at the other on the pin and having both ends movable with respect to the frame, and a fixed point on the frame to hold the intermediate part of the spring.

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

GUSTAF LIVEN HANSEN.

Witnesses:
F. E. VAN TASSEL,
ANNA HANSEN.