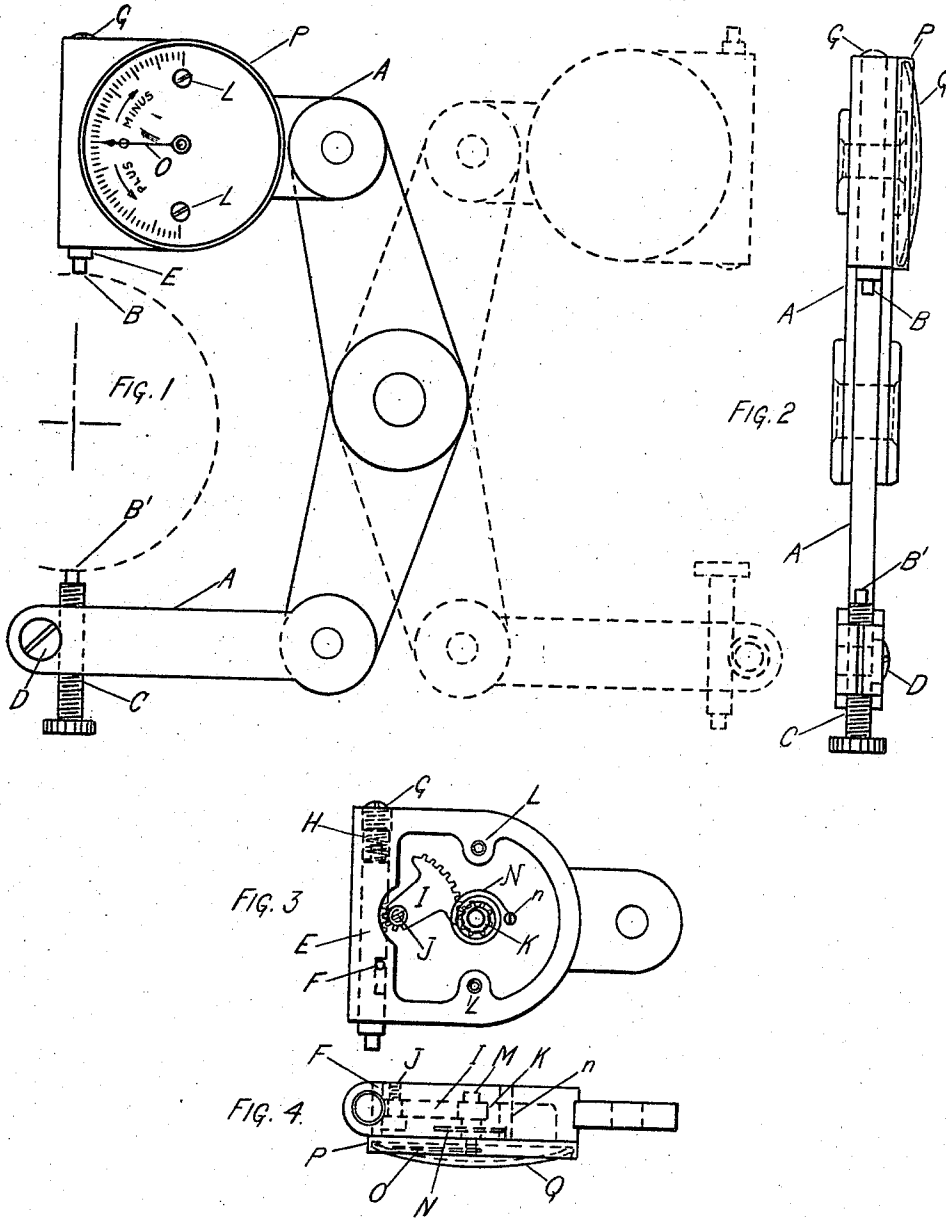


F. W. HORSTMANN,
INDICATING CALIPER,
APPLICATION FILED JUNE 12, 1917.

1,300,837.

Patented Apr. 15, 1919.



WITNESSES:

Peter B. auto
Frank G. Horstmann

Frederick William Horstmann INVENTOR.

UNITED STATES PATENT OFFICE.

FREDERICK WILLIAM HORSTMANN, OF KEARNEY, NEW JERSEY.

INDICATING-CALIPER.

1,300,837.

Specification of Letters Patent. Patented Apr. 15, 1919.

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To all whom it may concern:

Be it known that I, FREDERICK WILLIAM HORSTMANN, a citizen of the United States, residing in Kearney, in the county of Hudson and State of New Jersey, have invented a new and useful Indicating-Caliper, of which the following is a specification.

My invention relates to that well known measuring device for accurately determining size, thickness, width or length, and it consists in combining with it a means for indicating in such a manner that it becomes more useful and reliable than any other known gage or caliper.

It further consists of means whereby the sense of sight is used instead of feeling as in the simple caliper and by the sight indication to fill a need not given by either the caliper or even micrometer. It also consists of the construction of its operative parts, their adaptability, size, weight and form to make operative and useful what might be otherwise.

The object is to make a new article of manufacture and a useful means in the hands of a skilled workman—to make his work easier and more certain of a good result by its use and to so make the parts that the same is constructed as a complete article, salable, handy and satisfactory in respects not heretofore attained.

In the drawing Figures 1 and 2 are exterior views at right angles to each other, Fig. 3 is an elevation of the movable mechanism of the dial and Fig. 4 a plan of same.

In Fig. 1 is shown what is termed an "outside caliper" and by the dotted lines it is made clear how the same may be made into an inside caliper.

A is a jointed beam consisting of a series of parts riveted or bolted together but for special uses this beam may be without any joints and made to any required size or design; the jointed construction is for making it an inside and outside caliper.

This beam has for its extreme ends the points B and B' upper and lower respectively, the said points being the contacts in taking size or measurement. It is by the beam that the user handles the article for it is intended and meant to be always applied to the work and not the work brought to it.

The lower point B' is at the end or apex of the adjustable screw C, the said screw engaging screw threads through a part of the body at its lower end, which being bifur-

cated from the extreme end into the screw threads provides for a clamping effect to be given the adjusting screw by a tightening screw D.

This construction provides the means whereby the point B' is set and fixed so as to be absolutely tight and unyielding for any exact size or measure of work.

The upper point B is at the lower end of the toothed bar E which has a guided path of motion to and from and axially in line with the lower point B'.

This bar has a limited scope of movement inwardly by the stationary pin acting as a stop to the said bar against a flat surface contact as shown at F and in an opposite direction by the set screw G and the upper end of the bar. The pressure of the spring H is sufficient to overcome the light pressure of the spring *n* so that the bar E is in constant contact at the stop F when not in use.

A part of the bar is of lesser diameter to provide an annular space for the interposition of an open spiral spring H which presses the bar concentrically and in line with said bar against the stop, so that while there is a movement of the said bar in both directions, it is acted upon in the one and reacted in the other automatically simply by passing the caliper over the work as may be seen in Fig. 1.

I is a double segment gear, each segment in the same plane and of different radii, both having a common center at J and mounted upon a stationary stud J to oscillate thereon.

The toothed bar E engages the segment of least radius which gives an increased motion to the segment of larger radius to engage a pinion K.

This double segment gear I serves as the connecting means from the toothed bar E to the pinion K to give an increased and same motion alike in both directions; both segments are in the same plane of motion as is also the said bar and pinion.

Reference is now made to the dial case shown in Figs. 1, 2, and 4 L. L. are screw holes through the case and into the body by which they are secured together in proper alinement for the engagement of the pinion K which is an integral part of the gudgeon M to which is secured a helical hair spring N and the indicating finger O.

P is the dial case; the dial is pressed into the case which has a central bearing for the gudgeon M so that the said bearing is be-

tween the spring N and the indicating finger O, the other gudgeon bearing is at the end and close to the pinion K.

Transverse movement or end play of the gudgeon is prevented by the end near the pinion coming in proximity to the end of the bearing in the body; and a shoulder close to the back of the dial case. The outer end of the spring N is made fast to the stationary part *n* and a proper tension put into the said spring so that when in place all the lost motion of all the gears is taken out, the spring N exerting its mild influence against the stronger pressure or influence of the spring H upon the stop at F; in this position the indicating finger O is made fast upon the gudgeon pointing directly upward. It is apparent by the means herein described that the motion of the finger over the stationary dial is not only increased, it is multiplied and it is also to be seen that the scope of motion is ninety degrees more or less each side of a zero mark in equally marked divisions with a corresponding motion of the said finger also each side alike of the said zero mark and with the increase of motion obtained even with use of a shorter finger a steadier and more perceptible reading of the indication is given and seen.

In the use of this indicating caliper let the supposition be to take a measurement and then to duplicate it. The measure is taken by bringing the points B, B' to the work, see Fig. 1, and setting the adjusting screw C until the finger O points to the zero mark as shown on Fig. 1 on the horizontal center line at the left of the dial; on withdrawal the finger will move to its set upright position.

The work to be duplicated is now tried by passing the contact points of the caliper over the work and the finger moves automatically to a position past the zero mark being plus the required size, the indication showing exactly how much too large; if too small the finger will not move to the zero mark and will show exactly how much it is too small. It is thus apparent that the sense of sight is only used and is made more reliable than that of feeling and with the multiplied, steady and exact movement alike either plus or minus in automatic indication it has proved its utility; it may also be observed that owing to the extreme lightness of the movable parts it is devoid of the bad results of inertia; and that it is possessed of means for taking up its wear by the construction shown.

The dial is stationary and protected by the ordinary crystal Q, as is shown in Fig. 4.

The zero mark is shown and fixed at a certain point, the said point being at the tangent of a parallel line to the axis of the contact points would be in touch with the circle described by the indicating finger. In

this position the indication is always in the line of vision of the user and therefore the better discerned and easier read.

While all kinds of dials are common, it is only by the use of a circular dial and the smallest obtainable that this improvement becomes useful; it is obvious for good results that the smallest finger be used and that the scope of motion be all that is possible, so that it is imperative a full circle should and must be used to be in harmony with the operative parts.

Having described my invention what I claim as new and desire to secure by Letters Patent is:—

1. As an article of manufacture an indicating caliper composed of a beam with an adjustably fixed contact point at one end and at the other a means to operate from a movable contact point to move an indicating finger upon a dial, said means consisting of a toothed rack, a double segment gear and pinion all in engagement in the same plane of motion.

2. As an article of manufacture an indicating caliper composed of a beam with an adjustably fixed contact point at one end and a means to carry a movable contact point at the other, connecting mechanism therefrom to a pinion all moving in the same plane the said pinion, a helical spring and an indicating finger all rigidly attached so as to be relatively operative.

3. The combination in an indicating caliper with a beam having an adjustably fixed terminal point and another operatively movable in both directions, of a circular dial with a centrally mounted gudgeon upon the said beam, a helical spring secured to said gudgeon and said beam, the said gudgeon provided with an indicating finger and means to make its exact indication at a point tangent from the circle of the indicating finger and parallel to the axial line of the contact points.

4. The combination in an indicating caliper with a beam having terminal contact points, one adjustably fixed and the other automatically movable; of a multiplying and connecting mechanism therefrom to a dial finger consisting of a toothed bar engaging the teeth of a mounted double segment gear on its lesser radius and said gear engaging a pinion on its greater radius, the said pinion mounted with the said finger upon the said beam and said mechanism all moving in the same plane.

5. The combination in an indicating caliper with a beam having terminal points, one of which is adjustably fixed and the other automatically movable in both directions; of a concentrically pressed tooth bar, a mounted double segment gear of different radii, a mounted gudgeon with an integral pinion; an indicating finger and an open

helical tension spring connected to said gudgeon and said spring to the said beam.

5 6. The combination in an indicating caliper with a beam provided with terminal contact points, the one adjustably fixed and the other automatically movable; of means for taking up wear and lost motion consisting of connecting mechanism interposing a strong centrally placed spring upon the said
10 movable point and a weak spring axially secured to the gudgeon carrying the indicating finger.

15 7. In an indicating caliper a beam carrying two contact points the one having means to make it adjustable and positively fixed and the other independently movable of the said beam, in combination with means to hold the said movable point to a determined position, connecting mechanism therefrom
20 to a finger, the said finger indicating upon a dial mounted upon the said beam and pro-

vided with a means to turn the said finger against or to the said determined position so as to take up from the said determined connecting mechanism all lost motion.

25 8. The combination in an indicating caliper with a beam provided with terminal contact points one of which is operatively responsive to indicate in both directions upon a dial secured to said beam, of said
30 dial having a centrally mounted gudgeon with an indicating finger rigidly attached to said gudgeon, an interposed linear train of gearing from said responsive contact point to the said gudgeon and a helical
35 spring attached thereto and to the said beam.

FREDERICK WILLIAM HORSTMANN.

Witnesses:

PETER BANTA,
FRANK G. HORSTMANN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."