(No Model.)

J. W. PORTER.

AUTOMATIC INDICATING CALIPERS.

No. 486,810. Patented Nov. 22, 1892.

FIG. 1.

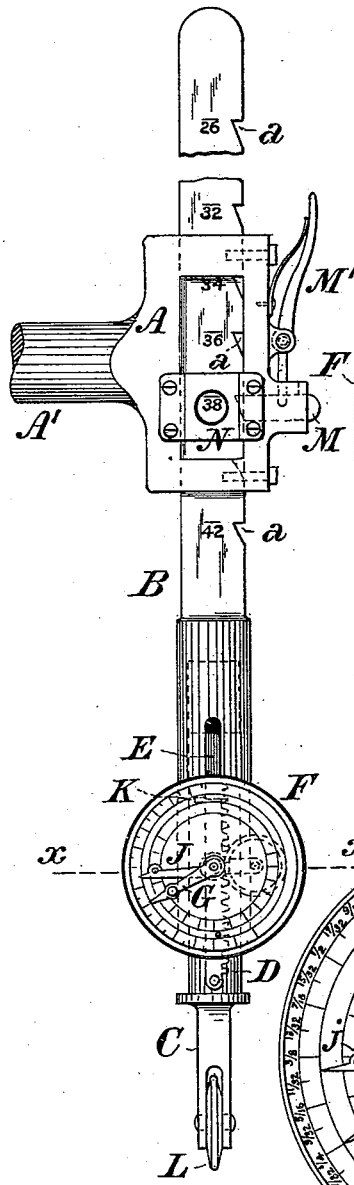


FIG. 3.

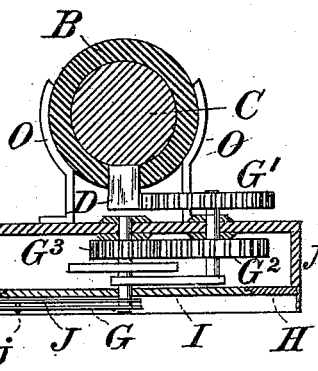


FIG. 2.

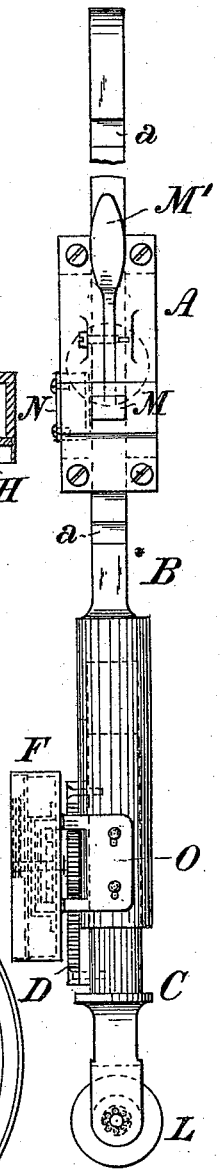
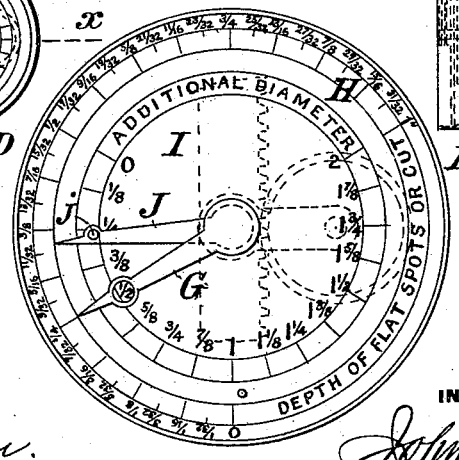


FIG. 4.



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UNITED STATES PATENT OFFICE.

JOHN W. PORTER, OF WAUKESHA, WISCONSIN, ASSIGNOR OF ONE-HALF TO JAMES McNAUGHTON, OF SAME PLACE.

AUTOMATIC INDICATING-CALIPERS.

SPECIFICATION forming part of Letters Patent No. 486,810, dated November 22, 1892.

Application filed August 15, 1892. Serial No. 443,094. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. PORTER, of Waukesha, in the county of Waukesha and State of Wisconsin, have invented a certain new and useful Improvement in Automatic Indicating-Calipers, of which improvement the following is a specification.

My invention relates to measuring appliances for use in connection with lathes for turning or boring car and locomotive wheels, pulleys, rolls, and other descriptions of work; and its object is to provide a simple and effective instrument for automatically indicating variations from desired and determined dimensions of finish in the work and enabling uniformity and accuracy to be attained in the finished pieces.

To this end my invention consists in certain devices and combinations hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a front view, in elevation, of an automatic indicating-caliper, illustrating an application of my invention; Fig. 2, a side view, in elevation, of the same; Fig. 3, a transverse section at the line $x\,x$ of Fig. 1; and Fig. 4 a front view, in elevation and on a larger scale, of the indicating-gage.

In the practice of my invention I provide a rectangular head or frame A, having a lateral arm A′, by which it is supported in a lathe, preferably by standards fixed to the lathe-head, so as to provide for lateral adjustment. A radius bar B is fitted to slide vertically in the head A, said bar having a series of notches or recesses a, formed at determined distances—as, say, one inch apart—on one of its sides. The bar B is supported and locked in vertical adjustment by a latch M, sliding in a guide in the head A transversely to the line of traverse of the bar B and having its inner end adapted to engage either of the series of notches, the latch M being engaged with and disengaged from the notches a by a thumb-lever M′, pivoted to the head. The bar B is adjustable to approximate different radii of the work, and the lines of the contact-faces of its notches a, which are preferably spaced one inch apart, are marked and numbered on the front face of the bar, as shown by the numerals "26" "32" "34," &c., Fig. 1. These numerals for inch spaces advance by twos in order to give direct readings for diameters. An index-plate N, having an opening in line centrally with the series of numerals on the bar B, is fixed to the head A, the numeral which in any position of the bar is visible through the opening of the index-plate being that used in the corresponding registration.

The lower end of the radius-bar B is of hollow or tubular form and is fitted to receive and guide a supplemental or indicator bar C, which slides freely longitudinally within it. A rack D is connected to one side of the indicator-bar C and projects outwardly from the tubular portion of the bar B through a slot E formed therein. An indicating-gage F is fixed to the bar B near its lower end, the primary or main index or pointer G of the gage being actuated through a train of intermediate gearing $G'\,G^2\,G^3$ by the rack D in the vertical movements of the latter with the connected indicator-bar C. Vertical adjustment of the gage F on the bar B is provided for by slotted holes in the side brackets O, through which the gage is attached to the bar. Downward movement of the bar C and rack D in accordance with reduction of radius of the work causes the index G to move forward over the dial of the gage F in a direction as with the hands of a clock, this movement being in a direction from the numeral "2" toward the "0" of the inner series of graduations of the dial, and upward movement of the bar and rack in accordance with increase of radius of the work effects a reverse movement of the index G, as against the hands of a clock, or in a direction from "0" toward the numeral "2."

The dial of the gage F is composed of two independent and concentric sections H I, the inner section I being fixed and the outer H free to move about it. The inner section I, which to facilitate registration may be marked with the words "Additional Diameter," is graduated in fractional parts of an inch from two inches to zero, reading from right to left. The outer section H is graduated in thirty seconds of an inch in the same direction as the numerals on the dial of a clock, these graduations corresponding accurately with the degree of movement

of the indicator-bar C. The limit of movement of the index G is indicated by a telltale-pointer J, mounted upon the gage concentric with the dial-sections and having a shoulder or projection *j*, against which the primary index is adapted to bear in its traverse forward. The outer dial-section may be marked, as shown, with the words "Depth of Flat Spots or Cuts."

The lower end of the indicator-bar C bears on the periphery of the work through a steel traveler-wheel L, journaled on roller-bearings in the lower end of the bar, so that the bar C coincides radially with the work, and the graduations on the dial-section I, when added to the readings at the index-plate N, indicate the full diameter of the work. The downward movement of the bar C is limited within proper range by a stop-pin K, and it is held in position by a small catch when raised to bring the index G to the numeral "2" of the inner dial-section I, which is its normal position before adjusting the radius-bar B to the work.

In the operation of the device as applied, for example, to a car-wheel lathe, it is suitably supported therein, and the car-wheels having been set in proper position, the radius-bar B, through the latch M, is adjusted to the notch which will admit of the closest proximity of the traveler-wheel L to the work without actual contact therewith. Assuming that in this position the figures "28" are visible through the opening of the index-plate N, this indication, together with the two inches additional diameter, as indicated on the dial-section I by the index G, would represent the total diameter of the work as being forty inches if the traveler L were in contact with it. The catch sustaining the indicator-bar C is then released, when the bar C descends until the traveler comes in contact with the work. In this movement the index G has moved from its normal position to, say, the graduation one inch, reducing the indication of additional diameter to one inch, which, added to the reading at the index-plate N, shows the actual diameter of the work to be thirty-nine inches. The telltale-index J is then turned to coincide with the forward side of index G, and the outer dial-section H is turned until a pin or abutment *h*, fixed upon it tangential to the radial line of its zero graduation, comes in contact with the opposite side of the index G. The device being thus adjusted and the work set in motion, the traveller L follows the contour of the wheel-tread, any irregularities in which—such as flat or high spots—will cause vertical movement of the indicator-bar C, upward movement causing the index G to turn backward, carrying with it the dial-section H, and downward movement causing the index G to turn forward, carrying with it the telltale-index J. At the completion of a revolution of the work the distance between the telltale-index J and the "0" on the inner dial I will, when added to the indication at the index-plate N on the head A, represent the minimum diameter to which the work will finish when trued in diameter. Any high spot on the periphery of the work will raise the indicator-bar C and rack D, causing the index G to move the "0" of the dial H from the telltale-index J. The distance between the telltale-index J and the "0" of the dial H, read by the graduations on said dial, is therefore the maximum variation in the radius of the work. The distance between the "0" of the outer dial H and the "0" of the inner dial I, read from the graduations on the latter dial, will, when added to the indication at the index-plate N, give the maximum diameter of the work. The position of the parts, as shown in the drawings, indicates that at the commencement of the turning of the wheel-tread the maximum diameter of the latter was thirty-nine inches, that it will be thirty-eight five-sixteenths inches in diameter when trued up, that one-fourth of an inch has already been taken off, that three thirty-seconds of an inch have yet to be taken off, and that the variation in radius was eleven thirty-seconds of an inch and in diameter eleven-sixteenths of an inch.

By the employment of the caliper, substantially as above described, on each wheel of a pair, it is merely a matter of a single revolution of the wheels to ascertain which of the two is the smaller and the degree of variation between the diameters of the respective wheels. The operation of turning can be contued without interruption until both wheels are finished with absolute accuracy and equality. In the case of locomotive driving wheels the actual diameter is obtained and uniformity in the wheels of a pair and between a series of pairs insured in a simple, ready, and effective manner.

My improvement, which is of inexpensive construction and adaptable to use in connection with lathes of any of the ordinary patterns, constitutes a useful and economical adjunct in their operation by enabling the workman to be correctly informed of the condition of his work in all of its stages and by affording a safeguard against the loss due to the frequent and serious errors which occur in the employment of cheap labor on wheel-lathes when unaided by means for the automatic and accurate obtention and registration of measurements of the work both initially and as it proceeds.

I claim as my invention and desire to secure by Letters Patent—

1. The combination, in an indicating-caliper, of a radius-bar which is adjustable in position relatively to a fixed support to indicate approximately the diameter of a piece of work, an indicator-bar adapted to bear on the periphery of the work and to traverse freely longitudinally on the radius-bar, a fixed dial, a primary index actuated by the indicator-bar to indicate the complement of the diameter on said dial, and a movable dial and telltale-

index, each adjustable relatively to the primary index, for automatically indicating variations from the initially-ascertained diameter of the work, substantially as set forth.

2. The combination, in an indicating-caliper, of a supporting head or frame, a radius-bar fitting adjustably therein, an indicator-bar sliding freely in the radius-bar, an indicating-dial fixed to the radius-bar, a primary index traversing around said dial and actuated by movements of the indicator-bar, and a movable dial and telltale-index, each adjustable relatively to the primary index, substantially as set forth.

3. The combination, in an indicating-caliper, of a supporting head or frame, a radius-bar fitting adjustably therein, an indicator-bar sliding freely in the radius-bar, an indicating-dial fixed upon the radius-bar, a primary index traversing around said dial and actuated by movements of the indicator-bar, a movable dial mounted upon and concentric with the fixed dial and carrying a pin or abutment against which the primary index bears in its traverse in one direction, and a telltale-index mounted concentric with the fixed and movable dials and carrying a shoulder or projection against which the primary index bears in its traverse in the opposite direction, substantially as set forth.

4. The combination, in a registering-caliper, of a supporting head or frame, a radius-bar having a series of lateral notches or recesses spaced at regular intervals and provided with numeral indications, said bar being fitted to traverse longitudinally in the head, an adjusting-latch adapted to engage either of the notches of the radius-bar and hold the latter in position in the head, an index-plate fixed to the head in the line of traverse of the numeral indications of the radius-bar, an indicator-bar sliding freely in the radius-bar, an indicating-dial fixed upon the radius-bar, a primary index traversing around said dial and actuated by movements of the indicator-bar, a movable dial mounted upon and concentric with the fixed dial, and a telltale-index mounted concentric with the fixed dial and movable thereon independently of the movable dial, substantially as set forth.

5. The combination, in an indicating-caliper, of a supporting head or frame, a radius-bar fitting adjustably therein, an indicator-bar sliding freely in the radius-bar and carrying a lateral rack exterior thereto, an indicating-dial fixed to the radius-bar, a primary index mounted on said dial, intermediate gearing transmitting motion from the rack of the indicator-bar to the primary index, and a movable dial and telltale-index, each adjustable relatively to the primary index, substantially as set forth.

6. The combination, in an indicating-caliper, of a radius-bar having a hollow or tubular end portion, an indicator-bar fitted to slide freely therein, an indicating-gage connected with the capacity of longitudinal adjustment to the tubular portion of the radius-bar, and a primary index mounted on said gage and actuated by the movements of the indicator-bar, substantially as set forth.

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Witnesses:
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