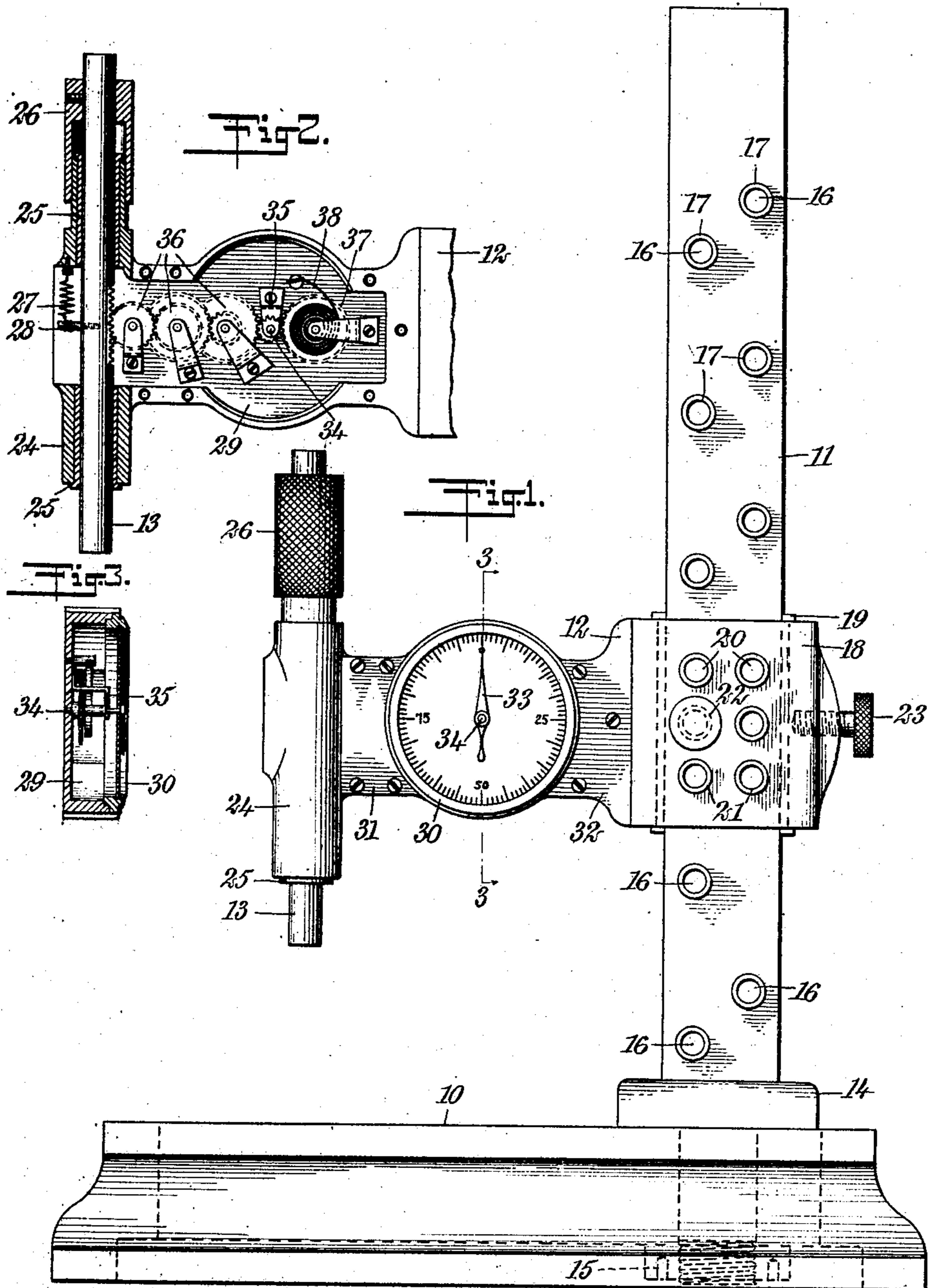


L. MASTRANGEL.  
MICROMETER GAGE.  
APPLICATION FILED MAY 26, 1908.

914,855.

Patented Mar. 9, 1909.



WITNESSES  
J. B. Hackenbug.

C. W. Fairbank

INVENTOR  
Louis Mastrangel  
BY *Munroe*  
ATTORNEYS

# UNITED STATES PATENT OFFICE.

LOUIS MASTRANGEL, OF NEW YORK, N. Y.

## MICROMETER-GAGE.

No. 914,855.

Specification of Letters Patent.

Patented March 9, 1909.

Application filed May 25, 1908. Serial No. 435,031.

*To all whom it may concern:*

Be it known that I, LOUIS MASTRANGEL, a subject of the King of Italy, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Micrometer-Gage, of which the following is a full, clear, and exact description.

This invention relates to certain improvements in micrometer gages, and the main object of the invention is to provide means whereby the distance between a stationary base or a known surface and a given point, may be accurately determined.

I contemplate in my invention the provision of a standard serving as a support for a laterally-extending arm, and at the end of the arm I provide an indicating mechanism whereby the distance between the end of a movable member at the end of the arm and the base or support for the standard, may be read on a suitable dial carried by the arm.

A further object of my invention is to provide an indicator for indicating the movement of a longitudinally-movable member, the connecting mechanism between the pointer of the indicating means and said member being so mounted that there will be no back lash or lost motion.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures, and in which—

Figure 1 is a side elevation of an instrument constructed in accordance with my invention; Fig. 2 is a detail showing the cover of a portion of the arm removed and the support for the longitudinally-movable member in section; and Fig. 3 is a transverse section on the line 3—3 of Fig. 1.

In the specific form of my improved micrometer gage illustrated, I employ a base 10, serving to support a standard 11, and extending outwardly laterally from the standard is an arm 12. The arm carries a member 13 movable toward and from the base 10, and also carries an indicating means whereby the extent of the movement of said member may be determined. The base may be of any suitable character, but is preferably provided with a slot extending lengthwise thereof, as illustrated in dotted lines. The standard 11 carries a collar 14 which engages with the upper surface of the base, and the lower end of the standard extends through the

slot and is threaded to receive a lock nut 15, shown in dotted lines. The standard may be shifted along the slot in the base, and may be rigidly secured in position by the tightening of the lock nut. The standard is provided with a plurality of apertures 16, arranged in two parallel lines, and each having a bushing 17 constituting a lining for the opening. One end of the arm 12 is in the form of a sleeve 18, encircling the standard 11, and provided with a lining or bushing 19 to form an accurate and close fit with the standard. At one side of the sleeve there are a plurality of apertures 20, each provided with its bushing 21, and these apertures are preferably arranged in two parallel lines corresponding with the two parallel rows of apertures in the standard. A suitable pin 22 is provided for insertion through registering apertures of the sleeve and standard, and a suitable set screw 23 is threaded through the sleeve for engagement with the side of the aperture to lock the parts in position.

The arm at its outer end forms a sleeve 24, extending at substantially right angles to the general direction of the arm and substantially parallel to the standard 11. The sleeve is provided with bushings or linings 25 adjacent the opposite ends thereof, and serves to support the longitudinally-movable member 13. This member is preferably in the form of a rod or bar and moves in a line at right angles to the plane of the upper surface of the base 10. At the upper end of the rod, it is provided with a knurled or roughened collar 26, which serves as a gripping portion to facilitate the raising of the rod 13, and also serves for engagement with a shoulder on the sleeve 24 to limit the downward movement. In conjunction with the rod, I employ a spring 27, so mounted as to neutralize to a partial extent the action of gravity on the rod and permit the rod to rest lightly against the object being measured, irrespective of the weight of the rod. As shown, this spring has one end thereof secured to a pin 28 carried by the rod, and the other end secured to a portion of the arm. It is evident that any suitable spring may be employed for accomplishing the desired result.

Intermediate the ends of the arm I provide a chamber 29 having the central portion thereof covered by a rotatable dial 30, and having the end portions thereof closed

by suitable end plates 31 and 32, each having one side thereof curved to correspond to the curvature of the dial. A pointer 33 is mounted on an arbor 34 mounted in the back of the chamber 29 and in a bracket 35 secured to said back. A portion of the rod 13 is provided with teeth to form a rack bar, and within the chamber 29 is a train of gears for transmitting motion from the rack bar to the arbor 34 and the pointer 33 carried thereby. Any suitable number of gear wheels 36 may be employed to make up this train, the number of gears and their relative sizes being dependent upon the length of movement of the rod or bar required to swing the pointer 33 through one revolution. If the instrument is designed for measuring in inches and fractions thereof, I would use such a train of gears that a longitudinal movement of the rod 13 through one-half of an inch would cause the pointer to swing through five complete revolutions, and by subdividing the dial 30 into one hundred equal parts, measurements of one-thousandth of an inch may be made with accuracy. By subdividing the dial in a different manner and employing a different train of gears, greater or less delicacy may be secured as desired. Within the cavity or chamber 29, I mount a gear wheel 37 in engagement with a gear wheel on the arbor 34, and in connection with said gear wheel I employ a coil spring 38 normally tending to rotate all of the gears and the pointer in one direction. The strength of the spring is such that it does not produce any movement of the rod or bar 43, but merely serves to take up back lash or lost motion. The distance between the apertures in the standard 11 bears a direct relationship to the length of movement of the rod 13 and the resulting movement of the pointer. The arm 12 may be secured to the standard with the end of the rod 13 any desired number of half-inches from the base 10. In using the device, the object to be measured may be placed on the base and the arm 12 raised or lowered to such a position that the lower end of the rod 13 will be at the nearest half-inch below the total

height of the object. The dial 30 is rotated to bring the zero directly beneath the pointer and the rod is raised and the object inserted therebeneath. The rod is then permitted to descend until it engages lightly with the uppermost portion of the object, and the extent to which the pointer has been rotated may be read on the dial. This taken in addition to the particular point on the standard to which the arm is secured, will give the total height of the object. The dial is rotatable so that the zero may be brought beneath the pointer when the latter is in any position about the circumference, so that I may often avoid the necessity for adding or subtracting when determining small differences in height between different objects. The dial fits friction tight, so that it will remain stationary unless positively rotated.

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

In a micrometer gage, a stationary base serving to support the gage and also serving to support the object to be measured, a standard extending upwardly from said base and carried thereby, an arm extending outwardly from said standard and movable longitudinally of the standard, a vertically-disposed rod carried by said arm adjacent its outer end and movable toward and from said base, said arm having a cavity or chamber therein intermediate the rod and the standard, a rack bar carried by said rod, a pointer, a train of gears within said cavity or chamber for transmitting motion from said rod to said pointer, and a normally stationary dial adjacent said pointer and covering said cavity or chamber, to conceal said gears, said dial being rotatable to bring any portion thereof opposite said pointer.

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

LOUIS MASTRANGEL.

Witnesses:

W. V. HOUCK,  
A. A. HIEBER.