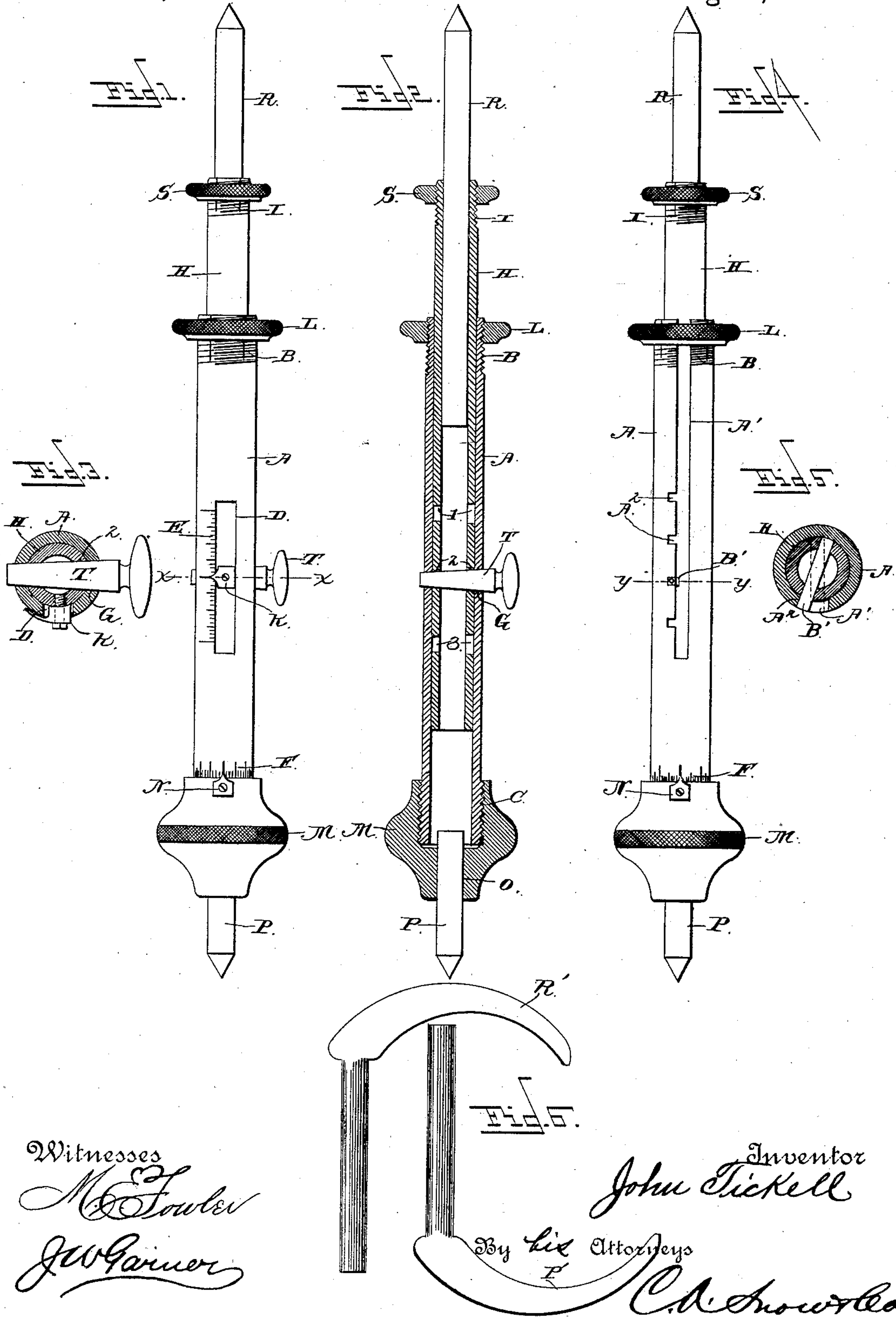


(No Model.)

J. TICKELL.
CALIPER GAGE.

No. 367,473.

Patented Aug. 2, 1887.



Witnesses
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UNITED STATES PATENT OFFICE.

JOHN TICKELL, OF CLEVELAND, OHIO.

CALIPER-GAGE.

SPECIFICATION forming part of Letters Patent No. 367,473, dated August 2, 1887.

Application filed February 18, 1887. Serial No. 223,088. (No model.)

To all whom it may concern:

Be it known that I, JOHN TICKELL, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Improvement in Caliper-Gages, of which the following is a specification.

My invention relates to an improvement in caliper-gages; and it consists in the peculiar construction and combination of devices, that will be more fully set forth hereinafter, and particularly pointed out in the claims.

This invention is an improvement on the caliper-gage for which Letters Patent of the United States No. 359,295 were granted to me March 15, 1887.

In the drawings, Figure 1 is an elevation of a caliper-gage embodying my improvements. Fig. 2 is a vertical sectional view of the same. Fig. 3 is a transverse sectional view taken on the line *xx* of Fig. 2. Fig. 4 is an elevation of a modified form of my invention. Fig. 5 is a transverse sectional view of the same, taken on the line *yy* of Fig. 4. Fig. 6 is a detailed view of caliper-arms.

A represents a cylindrical tube, of suitable length and diameter. This tube is provided at its upper end with screw-threads B, at its lower end with screw-threads C, and is further provided at its center with a longitudinal slot, D. Alongside the said slot is a graduated scale, E.

F represents an annular graduated scale, which is inscribed around the lower portion of the tube, just above the threads C.

G represents a conical opening made transversely through the center of the tube and arranged at right angles to the slot D. The upper end of the tube A is provided with open slits or kerfs, whereby the said upper end of the tube may be compressed, for the purpose to be hereinafter explained.

H represents a hollow cylindrical tube or sleeve, which is adapted to fit in the tube A and to slide vertically therein. This tube has its upper end slit or kerfed, to render it compressible, and provided with screw-threads I. Near the lower end of the tube H are a vertical series of transverse conical openings, 1, 2, and 3, adapted to register successively with the opening G in the tube A when the tube H

is moved in or out therein. A finger, K, is attached by a thread-and-nut connection to the tube H, works in the slot D of the tube A, and is adapted to sweep over the scale E alongside the said slot.

L represents a thumb nut or collar which screws onto the threads B at the upper end of the tube A, and is adapted to compress the said tube against the tube H, so as to clamp the latter at any desired adjustment. On the lower threaded end of the tube A works a nut, M, which has a finger, N, at its upper side to sweep over the annular graduated scale F, and is provided in its lower side with a socket, O, to receive and retain a pointed arm, P.

R represents a longer pointed arm which fits in the tube H, and is adapted to be adjusted lengthwise therein, the said pointed arm being held at any desired adjustment in the inner tube by a thumb nut or collar, S, which is interiorly threaded and works on the upper compressible threaded end of the tube H.

T represents a stop-pin adapted to fit in the opening G of the tube A and to enter either of the openings in the tube H.

The operation of my invention is as follows: To find the diameter of an opening or cavity, pull out the tapered stop-pin and slide the tube H outward until the opening 3 therein registers with the opening G, insert the pin in the said openings G and 3 to lock the tubes together, and slide out the arm R until its point comes in contact with one side of the diameter, the point of arm P being in contact with the other side thereof. The arm R is then clamped firmly in the tube H by turning the nut S. In order to obtain a fine adjustment, so as to determine the size of the diameter with great accuracy, the nut M is turned, thereby causing the finger N to sweep over the annular scale F. In order to remove the gage from the cavity, the stop-pin is withdrawn from the openings G and 3 and the tube H moved inward in the outer tube A, so as to shorten the gage and permit it to be withdrawn. The tube H is then moved out in the tube A until the openings 3 and G register, as before. The stop-pin is then inserted in the said openings, and the gage then indicates the exact diameter of the opening or cavity, as will be very readily understood.

In Fig. 4 I illustrate a modified form of my invention, in which I dispense with the scale E on the tube A and provide the latter with a longitudinal slot, A', and a series of openings, A², which are arranged on one side of the said slot and communicate therewith. A stop-pin, B', projects from the inner tube, works in the slot A', and is adapted to enter either of the openings A² by partly turning the inner tube when the stop-pin aligns with the desired opening. By this means it is not necessary to withdraw the stop-pin entirely from the gage when adjusting the inner tube in or out from the outer tube.

In order to adapt the gage to measure outside diameters, I provide caliper-arms P' and R', which are adapted to be substituted for the arms P and R, and are operated in the same manner. Such caliper-arms are shown at Fig. 6.

Having thus described by invention, I claim—

1. In a caliper-gage, the combination of the outer tube having the arm P, the inner sliding tube having the adjustable arm R, and the stop-pin to secure the said tubes together, for the purpose set forth, substantially as described.

2. In a caliper-gage, the combination of the outer tube having the arm P, the inner sliding tube having the adjustable arm R, the said tubes having the openings to align with each other at certain adjustments of the tubes, and the stop-pin to enter the said aligned openings to secure the tubes together, for the purpose set forth, substantially as described.

3. In a caliper-gage, the combination of the outer tube having the adjustable arm P, the inner tube adjustable longitudinally in the outer tube and having the adjustable arm R, the said tubes having the openings adapted to align with each other at various adjustments of the tubes, and the stop-pin to enter the said aligned openings, for the purpose set forth, substantially as described.

4. The combination, in a caliper-gage, of the outer tube having the threaded extremities, the clamping-nut L on one end thereof and the socket-nut M at the other end thereof adapted to receive an adjustable arm, and provided with an index to sweep over a scale on the lower end of the outer tube, the inner tube adjustable longitudinally in the outer tube and having the threaded upper end and the clamping-nut S thereon, the said inner tube being adapted to receive and hold an adjustable arm, both the inner and the outer tubes being provided with openings adapted to align with each other at various adjustments of the tubes, and the stop-pin to enter the said aligned openings, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

JOHN TICKELL.

Witnesses:

SIMON JOHNSON,

JAS. C. STANLEY.