No. 790,665. PATENTED MAY 23, 1905.

F. SPALDING.

MICROMETER CALIPERS.

APPLICATION FILED MAR. 28, 1904.

Fig. 1.

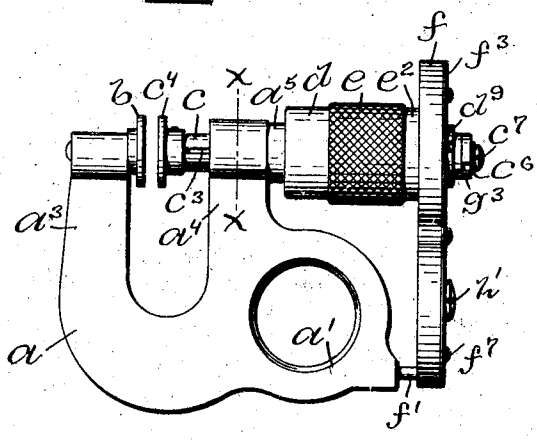


Fig. 2.

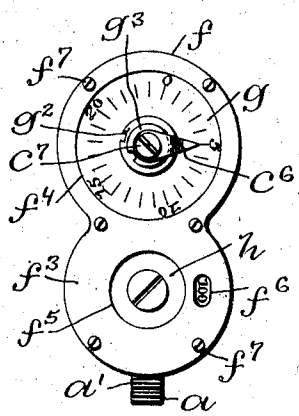


Fig. 3.

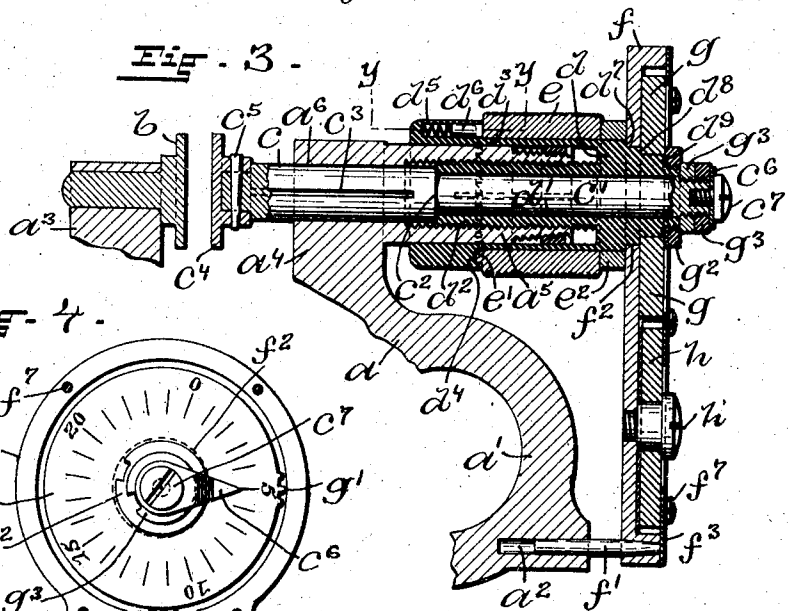


Fig. 4.

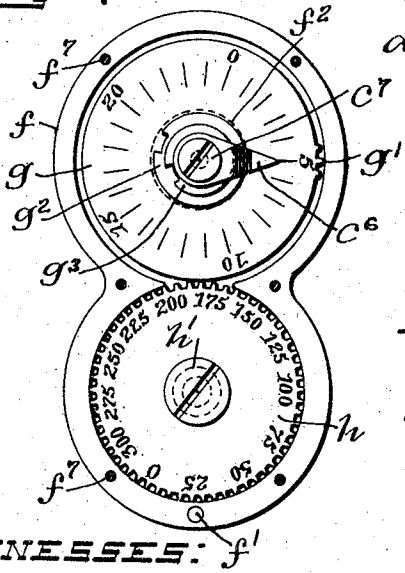


Fig. 5.

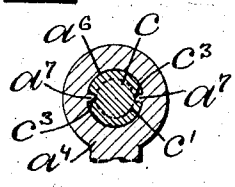
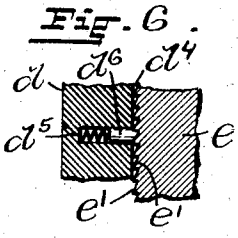


Fig. 6.



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No. 790,665. Patented May 23, 1905.

# UNITED STATES PATENT OFFICE.

FRANK SPALDING, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO BROWN & SHARPE MANUFACTURING COMPANY, OF PROVIDENCE, RHODE ISLAND.

## MICROMETER-CALIPERS.

SPECIFICATION forming part of Letters Patent No. 790,665, dated May 23, 1905.

Application filed March 28, 1904. Serial No. 200,315.

*To all whom it may concern:*

Be it known that I, FRANK SPALDING, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented a new and useful Improvement in Micrometer-Calipers, of which the following is a specification.

This invention has reference to an improvement in micrometer-calipers, and more particularly to an improvement in micrometer-calipers having dials indicating the readings of the calipers.

The object of my invention is to improve the construction of a dial micrometer-caliper whereby the readings of the caliper can be easily seen at a glance and are more accurate than has heretofore been attained.

A further object of my invention is to construct a micrometer-caliper with a reciprocating non-rotatable spindle, whereby the faces of the spindle and anvil are always in the same relative position with each other.

My invention consists in the peculiar and novel construction of a micrometer-caliper having approximately a U-shaped main frame with an offset handhold; an anvil in the frame; an internally-screw-threaded sleeve formed integral with the frame; a spindle extending through the sleeve and frame in alinement with the anvil; a pointer secured to the outer end of the spindle; a barrel on the spindle having an inner tube in screw-thread engagement with the sleeve and an outer shell surrounding the sleeve; means for rotatably securing the barrel to the spindle; a knurled ring on the barrel engaging with the barrel through a clutch; a dial-frame supported on the barrel and on the main frame by a sliding pin; a slip-gear dial secured to the end of the barrel in the dial-frame; a gear-dial pivotally secured in the dial-frame in a position to engage with the slip-gear dial; lines and numerals on the slip-gear dial indicating units of measurement, such as one to twenty-five one-thousandths of an inch; numerals on the gear-dial indicating units of measurement, such as twenty-five to three hundred one-thousandths of an inch; a cover secured to the dial-frame over the dials, having openings through which the lines and numerals on the dials are easily seen, and other details of construction, as will be more fully set forth hereinafter.

My improved micrometer-caliper is particularly adapted for calipering sheet metal or other sheet-stock, but may be used for calipering wire or other articles, if desired.

Figure 1 is a side view of my improved dial micrometer-caliper. Fig. 2 is an end view of the same, showing the dials. Fig. 3 is an enlarged sectional view taken lengthwise through the caliper on a line with the spindle. Fig. 4 is an enlarged view of the dial end of the caliper, showing the cover of the dial-frame removed. Fig. 5 is a detail sectional view taken on line X X of Fig. 1, showing the splines in the frame engaging with the grooves in the spindle to hold the spindle from rotating; and Fig. 6 is a detail sectional view taken on line Y Y of Fig. 3, showing the construction of the clutch through which the knurled ring operates the barrel.

In the drawings, $a$ indicates the frame; $b$, the anvil; $c$, the spindle; $d$, the barrel; $e$, the knurled ring; $f$, the dial-frame; $g$, the driving slip-gear dial, and $h$ the driven gear-dial.

The frame $a$ is formed approximately U-shaped, with the offset handhold $a'$, in which is the hole $a^2$, bored parallel with the spindle $c$, the outer arm $a^3$, in the end of which is the anvil $b$, and the inner arm $a^4$, on which is the internally-screw-threaded sleeve $a^5$, formed integral with the arm, as shown in Fig. 3. The hole $a^6$ extends through the arm $a^4$ into the sleeve $a^5$, and the oppositely-disposed splines $a^7$ $a^7$ extend into the hole $a^6$, as shown in Fig. 5.

The spindle $c$ has the reduced portion $c'$, forming the shoulder $c^2$, and the grooves $c^3$ $c^3$, coinciding with the splines $a^7$ $a^7$, which coacting together prevent rotation of the spindle. The cap $c^4$ is secured on the inner end of the spindle by the pin $c^5$, and the pointer $c^6$ is secured on the outer end of the spindle by the screw $c^7$.

The barrel $d$ has the central hole $d'$, through which the reduced portion $c'$ of the spindle extends, the inner tube $d^2$, which extends into and is in screw-thread engagement with the inter-

nal screw-thread in the sleeve $a^5$, the outer shell $d^3$, having its inner end enlarged to form a shoulder in which is the groove $d^4$, and extending inward from the groove $d^4$ is the hole $d^5$, in which is the spring-pressed pawl $d^6$, as shown in Fig. 3. The outer end of the barrel $d$ is stepped to form the shoulders $d^7$, $d^8$, and $d^9$.

The knurled ring $e$ is rotatably supported on the barrel $d$ and has the saw-teeth $e'$ $e'$ on its inner end, which enter the groove $d^4$ in the barrel $d$ and engage with the spring-pressed pawl $d^6$, forming a clutch between the ring and the barrel. The tension of the spring-pressed pawl $d^6$ on the angle of the teeth $e'$ is sufficient to revolve the barrel $d$ and move the spindle inward. When the spindle comes to a stop on the article to be calipered, the teeth $e'$ ride over the pawl $d^6$, but lock with the pawl in the reverse movement to move the spindle outward. The ring $e$ is separated from the dial-frame $f$ by the washer $e^2$ on the barrel $d$.

The dial-frame $f$ consists of a shallow box shaped to hold the dials $g$ and $h$ and supported on the outer end of the barrel $d$ between the shoulders $d^7$ and $d^8$ through the hole $f^2$ in the dial-frame. The pin $f'$ is secured to the dial-frame $f$ in a position to enter the hole $a^2$ in the frame $a$ in which it slides. The cover $f^3$, having the opening $f^4$ for the dial $g$ and the opening $f^5$ and the aperture $f^6$ for the dial $h$, is secured to the dial-frame $f$ by the screws $f^7$ $f^7$, as shown in Fig. 2.

The driving slip-gear dial $g$ in the frame $f$ has the tooth $g'$ on its periphery and is secured on the outer end of the barrel $d$ between the shoulders $d^8$ and $d^9$ by the nut $g^2$ and the lock-nuts $g^3$ $g^3$, in screw-thread engagement with the end of the barrel which extends through a central hole in the dial. The face of the dial $g$ is divided into twenty-five equal parts by lines which are numbered as shown in Fig. 4.

The driven gear-dial $h$ has continuous teeth on its periphery and is pivotally secured to the dial-frame $f$ by the screw-stud $h'$ through a central hole in the dial in a position for the tooth $g'$ on the dial $g$ to engage with the teeth on the dial $h$ and move it one-thirteenth of a revolution. The driven gear-dial $h$ is divided into thirteen equal parts, on which are numerals reading by twenty-fifths from "0" to "300," which are exposed successively through the aperture $f^6$ at each revolution of the dial $g$, as shown in Fig. 2.

When the parts of my improved dial micrometer-caliper are assembled, the spindle $c$ extends through the hole $a^6$, the internally-screw-threaded sleeve $a^5$, and the central hole $d'$ in the barrel $d$, the barrel $d$ being rotatably secured on the reduced portion $c'$ of the spindle, between the shoulder $c^2$ and the lock-nuts $g^3$ $g^3$, as shown in Fig. 3.

By this novel construction and arrangement of the parts the revolving of the barrel $d$ by the ring $e$ moves the spindle $c$ lengthwise, and with it the dial-frame $f$ and the dials $g$ and $h$. The dial $g$, revolving with the barrel $d$ under the fixed pointer $c^6$, intermittently rotates the dial $h$. The pin $f'$, sliding in the hole $a^2$ in the main frame $a$, holds the dial-frame $f$ in its relative position with the main frame.

It is evident that the construction of my improved dial micrometer-caliper could be altered to give any readings on the dials $g$ and $h$ desired without materially affecting the spirit of my invention.

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

1. In a micrometer-caliper, a frame, a screw-threaded sleeve on the frame, a spindle extending through the frame and the sleeve, means connecting the frame with the spindle to prevent rotation of the spindle, a barrel rotatably secured to the spindle and in screw-thread engagement with the sleeve, a driving-dial secured to the outer end of the barrel, a pointer secured to the outer end of the spindle over the driving-dial, a driven dial, means for pivotally securing the driven dial, and means on the dials adapted to give an intermittent motion to the driven dial, as described.

2. In a micrometer-caliper, a main frame, an internally-screw-threaded sleeve on the frame, a spindle extending through the frame and the sleeve, means connecting the frame with the spindle to prevent rotation of the spindle, a barrel rotatably secured to the spindle and in screw-thread engagement with the sleeve, a dial-frame supported on the outer end of the barrel and on the main frame, a driving-dial secured to the outer end of the barrel in the dial-frame, a pointer secured to the outer end of the spindle over the driving-dial, a driven dial pivotally secured in the dial-frame, and means on the dials adapted to give an intermittent motion to the driven dial, as described.

3. In a micrometer-caliper, the combination with a main frame having an internally-screw-threaded sleeve formed integral with the frame and a hole extending through the frame into the sleeve, of a spindle extending through the hole in the frame and the sleeve, means connecting the frame with the spindle to prevent rotation of the spindle, a barrel rotatably secured to the spindle and in screw-thread engagement with the sleeve, a knurled ring rotatably secured to the barrel, means for rotating the barrel by the ring to move the spindle lengthwise, consisting of teeth on the ring engaging with a spring-pressed pawl in the barrel forming a clutch, a dial-frame supported on the outer end of the barrel through a hole in the dial-frame and connected to the main frame by a sliding pin, a driving-dial secured to the outer end of the barrel in the dial-frame, a pointer secured to the outer end of the spindle over the driving-dial,

a driven dial pivotally secured in the dial-frame by a screw-stud, means on the dials for giving an intermittent motion to the driven dial, consisting of a tooth on the driving-dial engaging with teeth on the driven dial, lines and numerals on the dials indicating units of measurement, and a cover on the dial-frame having apertures through which the lines and numerals on the dials are easily seen, as described.

4. In a micrometer-caliper, the combination of the frame *a*, the anvil *b*, the spindle *c*, the barrel *d*, the knurled ring *e*, the dial-frame *f*, the driving slip-gear dial *g*, and the driven gear-dial *h*, all constructed as shown and for the purpose as described.

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

FRANK SPALDING.

Witnesses:
ADA E. HAGERTY,
J. A. MILLER, Jr.