B. NEFEDOV.

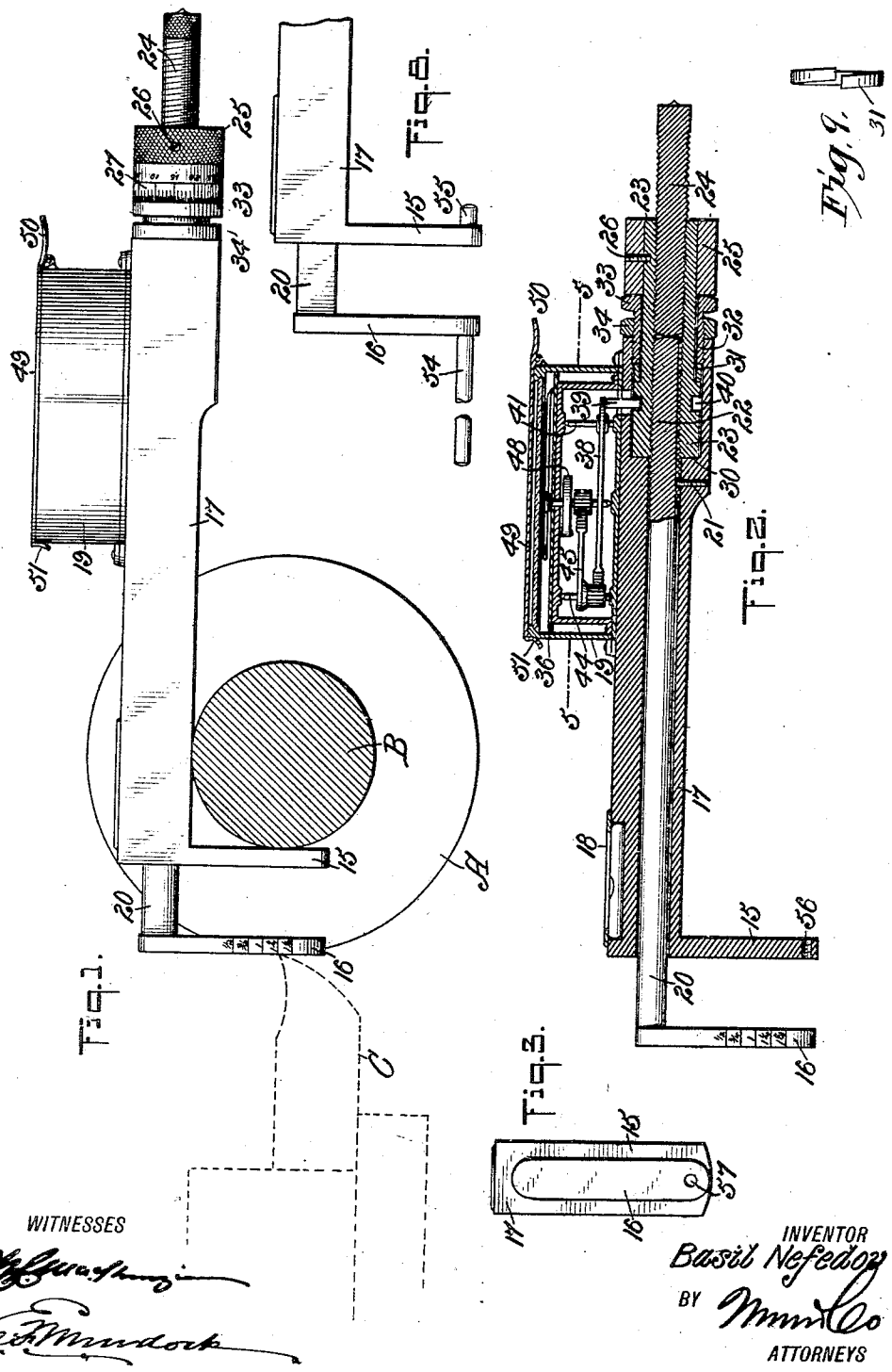
MICROMETRIC CALIPERS.

APPLICATION FILED JUNE 27, 1916.

1,243,545.

Patented Oct. 16, 1917.

2 SHEETS—SHEET 1.



WITNESSES

INVENTOR

Basil Nefedov

BY Munn & Co

ATTORNEYS

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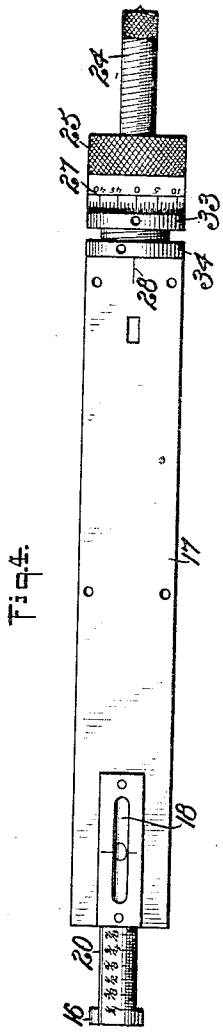


Fig. 4.

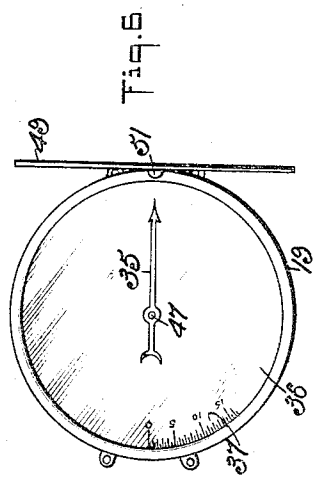


Fig. 6

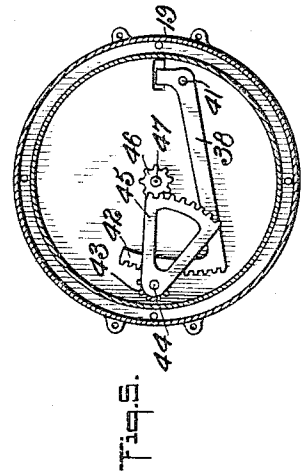


Fig. 5.

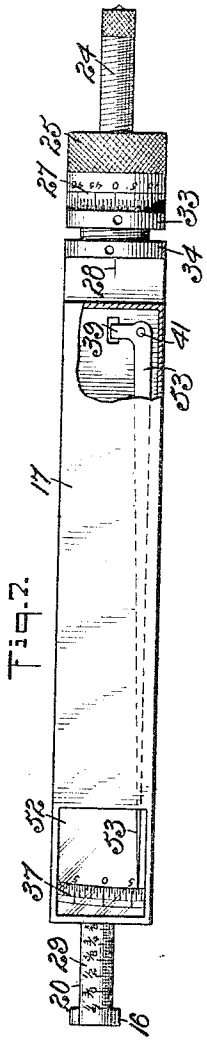


Fig. 7.

WITNESSES

INVENTOR

Basil Nefedov

BY Munn & Co

ATTORNEYS

UNITED STATES PATENT OFFICE.

BASIL NEFEDOV, OF NEW YORK, N. Y.

MICROMETRIC CALIPERS.

1,243,545. Specification of Letters Patent. Patented Oct. 16, 1917.

Application filed June 27, 1916. Serial No. 106,126.

To all whom it may concern:

Be it known that I, BASIL NEFEDOV, a subject of the Czar of Russia, 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 Micrometric Calipers, of which the following is a full, clear, and exact description.

Among the principal objects which the present invention has in view are: to provide means for disclosing with accuracy the disposition of a metal cutting tool with reference to the work upon which the cutting is to be performed; to provide means for predetermining the proper set of a tool of the character mentioned for performing the work for which it is intended; to clearly indicate the disadjustment of a tool of the character mentioned; and to avoid errors in setting tools arising from resiliency of the tool parts or indenture of the metal being operated upon.

Drawings.

Figure 1 is a side elevation of an instrument of the character mentioned showing the same disposed as in service;

Fig. 2 is a longitudinal vertical section of the same, the section being taken as on the median line;

Fig. 3 is an end view of the same, the registering mechanism being omitted;

Fig. 4 is a top plan view of the body of the instrument, the register being removed;

Fig. 5 is a horizontal section of the register, the section being taken as on the line 5—5 in Fig. 2;

Fig. 6 is a top plan view of the register;

Fig. 7 is a top plan view of a modified form of the invention, partly cut away to show the attachment of the pointer to the yielding nut;

Fig. 8 is a detail view showing an end fragment of the caliper blades and extensions therefor;

Fig. 9 is an edge view of a spring collar used in the present invention.

Description.

As seen in the drawings, the instrument is provided with contact jaws 15 and 16. The jaw 15 is disposed on the end of the body 17. The body 17 has mounted thereon, a spirit level 18 and a case 19. The body 17 is longitudinally bored to receive the extension bar 20, at the outer end of which is mounted the jaw 16. The bar 20 is slidably mounted in the body 17, and is provided with a keyway into which the end of a retaining screw 21 extends. The screw 21 is suitably threaded for engagement with a tapped perforation provided therefor in the body 17, as shown best in Fig. 2 of the drawings. The bar 20 has a threaded end section 22 engaged by an elongated nut 23. As the nut 23 is turned, the bar 20 and jaw 16 mounted thereon is projected or retracted from and to the jaw 15. The nut 23 has a central bore, which is adapted to receive the section 22 of the bar 20, and a lock screw 24.

At the outer end of the nut 23, a knurled collar 25 is mounted and permanently held thereon by a screw 26. The collar 25 is provided to facilitate the manipulation of the nut 23 for adjusting the bar 20.

Also the collar 25 is employed for setting the calipers to the proposed work. To this end, the collar is provided with calibrated markings forming a scale 27, the markings whereon correspond to the service separation of the jaws 15 and 16. As seen in the drawings, each of the scale divisions of the calibrations indicates one-half of 1/1000 of an inch. That is to say, if the collar 25 is moved from the position shown in Fig. 4 of the drawings, to a point where the mark opposite "10" is opposite the indicating line 28, the retraction of the bar 20 is set to provide a cut determined at the 5/1000 of an inch. It will be understood that the minute division thus indicated is in excess of the measurement indicated by the larger divisions of the larger scale shown by the calibrations 29 on the bar 20. The method of arranging the calipers with reference to the scale will be set forth more fully hereinafter.

The nut 23 is normally held in contact with an abutment 30 formed at the inner end of the bore provided in the body 17 to receive the said nut. To hold the nut 23 against the abutment 30, is the office of a spring expansion collar 31. The collar 31 rests between a shoulder formed on a reduced portion of the nut 23 and the threaded shank 32 of a compensating nut 33. The thread on the shank of the nut 33 engages an internal thread formed adjacent the outer edge of the bore in the body 17. The end of the shank 32 presses on the collar 31, which expansively holds the nut 23 against the abutment 30, and the jaw 16 in its ex-

tended position. The nut 33 is held in its adjusted position by the lock nut 34.

The indicating mechanism contained in the case 19, is provided to show the accurate set of the caliper-jaws to the measurement predetermined. To this end, a pointer 35 is visibly mounted to move over a dial 36, which is provided with calibrations 37 having predetermined indexes. The pointer 35 is operatively connected with the nut 23 by a transmission mechanism embodying a lever 38, from the short end of which extends a finger 39 into an annular groove 40 formed in the nut 23. As seen best in Fig. 2 of the drawings, the lever 38 is pivoted on a spindle 41, below the dial 36, shown in Figs. 2 and 5, and is furnished at the extremity of its long arm with a toothed quadrant 42. The teeth of the quadrant 42 are meshed with the pinion 43 on a spindle 44. Extended from the spindle 44 is a toothed sector 45, the teeth whereof engage a small pinion 46 on the pivot post 47, which extends through the dial 36 and upon which the pointer 35 is mounted.

The pointer 35 is normally held in a position removed from the "0" point of the calibrations 37, as will be seen best in Fig. 6 of the drawings. The pointer is thus held by a flat coil spring 48.

The case 19 is closed by a protective cover 49. The cover 49 is provided with a handle 50, which when pressed upon throws the cover to the open position, such as shown in Fig. 6 of the drawings. Normally the cover is held in closed position by a spring latch 51.

Operation.

To operate the calipers shown in the drawings, the screw 24 is retracted to relieve the tension on the threads of the section 22 of the bar 20.

It will be understood that the divisions on the calibrations 29 are equal to the movement of the bar by the nut 23 by one revolution of said nut. As a rule, the calibrations 29 are provided to give what may be termed the "roughing" set. The micrometric divisions are indicated in the scale 27 on the collar 25. For example, if the "work" A is held in a conventional lathe on the "center" B of known diameter, and the finished diameter of the work is known: The rod 20 is adjusted in the nut 23 until the scale 27 indicates the excess over the radius of the "center" B to which the designed "roughing" cut of the "work" A will be carried. That is, if the "center" B has a $\frac{3}{4}$-inch radius and the "roughing" cut for the "work" A is to be $1\frac{1}{2}$-inch radius, the set of the bar 20 will indicate three-quarters of an inch from the face of the jaw 15 to the face of the jaw 16. If it is then designed to produce a "finish" cut of 5/1000 of an inch, the collar 25 is turned until the numeral "10" on the scale 27 is opposite the line 28 on the body 17. The resultant radius of the finished work will be $1\frac{1}{2}$ inches less 5/1000 of an inch.

When the instrument is set, the jaws 15 and 16 are parallel and the screw 24 is manipulated to lock the bar 20 in position. In this condition of the parts, the collar 31 presses the nut 23 against the abutment 30. The pointer 35 on the indicator is in the position shown in Fig. 6, or removed from the "0" point of the scale marked on the dial 36.

When now the cutting tool C is advanced to the caliper jaw 16, as shown by dotted lines in Fig. 1, the said tool moves the said jaw and the bar 20 connected therewith, together with the nut 23, against the finger 39 of the transmission mechanism in the indicator for moving the pointer 35.

The multiplication in the transmission mechanism is such that the pointer 35 is turned one complete revolution for a relatively slight movement of the bar 20.

According to the set of the instrument, sufficient pressure should be brought to bear on the jaw 16 to move the same until the pointer 35 registers with the "0" mark on the scale.

It is obvious that with an indicator as sensitive as that described, the operator is at once advised of the contact of the cutting tool C with the jaw 16, and is on guard to arrest the feed of the said cutting tool when the pointer 35 registers with the "0" mark on the scale.

Modification.

In Fig. 7 of the drawings, is shown a modified form of the invention. The modification consists in substituting for the circular indicator having the dial 36, an indicator having a dial 52. The dial 52 has a limited scale section over which the end of the long pointer 53 passes. The pointer 53 is substituted in the construction for the lever 38 of the preferred form, and has a pendent finger 39 as provided for the lever 38. The disparity in the length of the short arm of the pointer 53 with the long arm thereof, multiplies the ratio of the movement sufficient to move the end of the pointer 53 over a relatively wide space for a relatively small movement of the finger 39 and the nut 23 with which the same is connected.

In Fig. 8 of the drawings is shown an attachment in the form of extension pins 54 and 55. These pins are of known length, which length is added to the measurement of the calibrations 29. The pins 54 and 55 are attached to the jaws 15 and 16, by inserting threaded ends thereof into the tapped perforations 56 and 57 in the said jaws 15 and 16, respectively.

The pins 54 and 55 are particularly de-

sirable for use when the calipers are employed for internal measurement.

Claims.

1. An implement as characterized comprising a plurality of co-extensive members slidably connected; a plurality of contact jaws, one of said jaws being mounted rigidly on each of said members at the adjacent ends thereof; manually operated means for spreading said jaws, said means embodying calibrations, the initial index whereof corresponds with the total thickness of said jaws; yielding means normally expanding said jaws a predetermined extent in excess of the indication of said calibrations; and automatic means for detecting the movement of said jaws when compressing said yielding means, said means embodying a movement-multiplying lever, the short end whereof is operatively connected with one of said members, the other end whereof is visible in co-operation with said calibrations.

2. An implement as characterized comprising a plurality of co-extensive members slidably connected; a plurality of contact jaws, one of said jaws being mounted rigidly on each of said members at the adjacent ends thereof, the total thickness of said jaws being known and the exposed surfaces thereof being parallel; manually-operated means for spreading said jaws, said means embodying calibrations, the initial index whereof corresponds with the total thickness of said jaws; and automatic means for detecting the movement of said jaws during the final movement from the manual adjustment.

3. An implement as characterized comprising a plurality of co-extensive members slidably connected; a plurality of contact jaws, one of said jaws being mounted rigidly on each of said members at the adjacent ends thereof; manually operated means for spreading said jaws, said means embodying calibrations, the initial index whereof corresponds with the total thickness of said jaws; yielding means normally expanding said jaws a predetermined extent in excess of the indication of said calibrations; automatic means for detecting the movement of said jaws when compressing said yielding means, said means embodying a movement-multiplying lever, the short end whereof is operatively connected with one of said members, the other or free end whereof is visible; and means for determining the extent of movement of the free end of said lever, said means embodying calibrations, the same being divisions of the entire movement of said free end corresponding with the full contraction of said yielding means.

BASIL NEFEDOV.

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