Feb. 10, 1925. 1,526,305

J. NEUMAIER

MICROMETER CALIPER

Filed Feb. 28. 1919 2 Sheets-Sheet 1

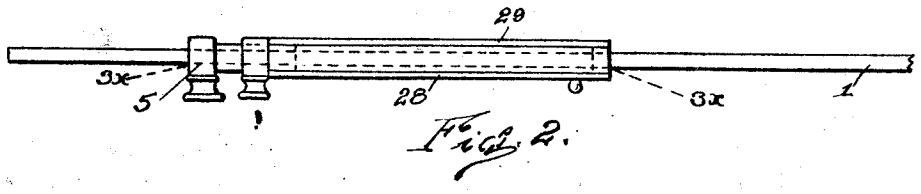


Fig. 2.

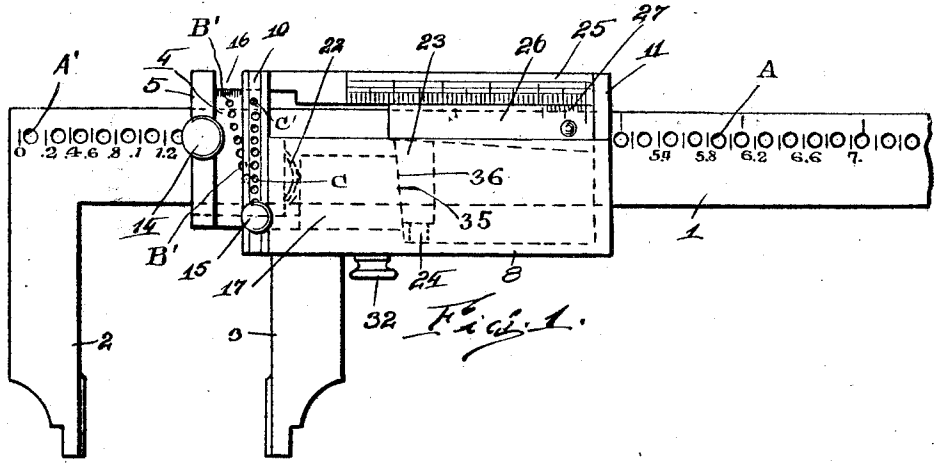


Fig. 1.

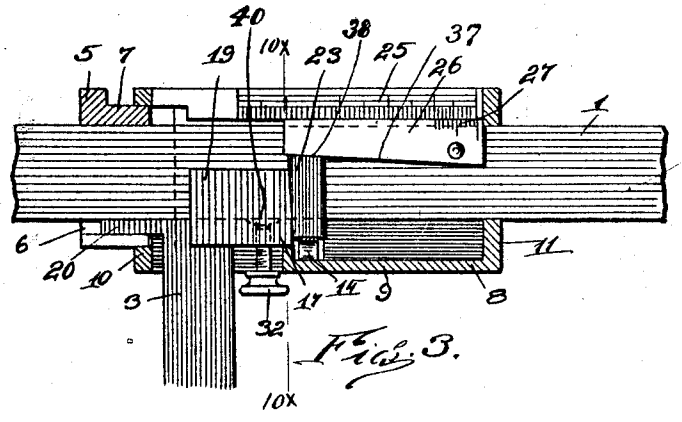


Fig. 3.

Witness
Eric Schinger.

Inventor
John Neumaier

By Frank Keiper
Attorney

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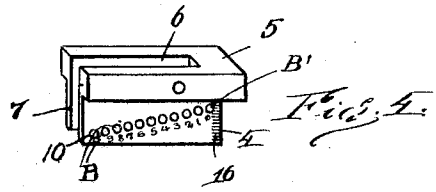


Fig. 4.

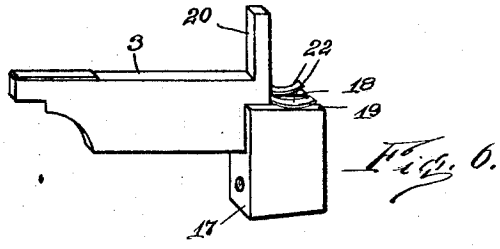


Fig. 6.

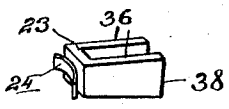


Fig. 7.

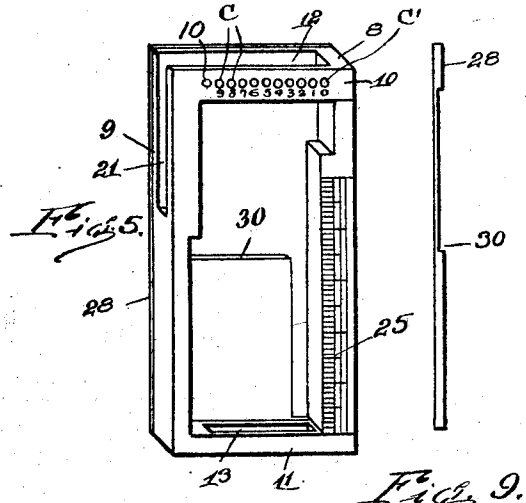


Fig. 5.

Fig. 9.

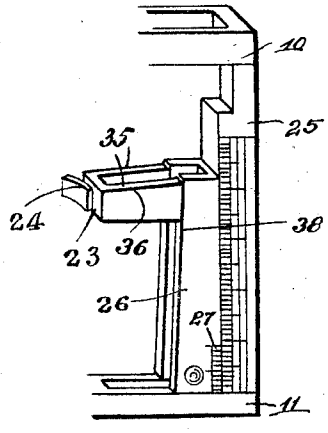


Fig. 8.

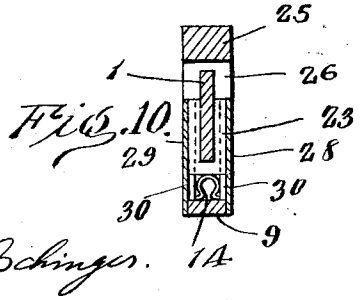


Fig. 10.

Witness
Eric Schinger.

Inventor
John Neumaier

By Frank Kuist
Attorney

Patented Feb. 10, 1925. 1,526,305

UNITED STATES PATENT OFFICE.

JOHN NEUMAIER, OF DAYTON, OHIO, ASSIGNOR OF ONE-HALF TO FRANK PLATZER AND RUDOLPH PLATZER, BOTH OF DAYTON, OHIO.

MICROMETER CALIPER.

Application filed February 28, 1919. Serial No. 279,826.

To all whom it may concern:

Be it known that I, JOHN NEUMAIER, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Micrometer Calipers, of which the following is a specification.

The object of this invention is to provide an improved form of micrometer caliper.

This and other objects of my invention will be illustrated in the drawings, described in the specification and pointed out in the claims at the end thereof.

In the drawings:

Figure 1 is a plan view of the complete micrometer.

Figure 2 is a side elevation of the complete micrometer.

Figure 3 is a section thru the micrometer on the line 3^x—3^x of Figure 2.

Figure 4 is a perspective view of the first adjusting block of the micrometer.

Figure 5 is a perspective view of the second adjusting block of the micrometer.

Figure 6 is a perspective view of the third adjusting block of the micrometer.

Figure 7 is a perspective view of the fourth adjusting block of the micrometer.

Figure 8 shows the combination of the fifth adjusting block and the gage on which it slides, the fourth adjusting block being shown in engagement with the fifth block.

Figure 9 is a side elevation of the plates used to cover the sides of the block.

Figure 10 is a section on the line 10^x—10^x of Figure 3.

In the drawings, like reference numerals indicate like parts.

In the drawings, reference numeral 1 indicates the beam of the micrometer and 2 indicates the stationary jaw. 3 indicates the movable jaw.

On the beam is a series of holes A therethru which holes are shown spaced .200 inch between centers, although it will be understood that any other unit of measurement may be used on the beam instead. The zero hole is indicated at A′.

On the beam slides a series of blocks which are used for the purpose of adjusting the movable jaw 3 with different degrees of fineness. These blocks will now be described.

Reference numeral 4 indicates the first movable block, which block is T-shaped and is formed out of a single piece of metal. It has a plate 5 on the end thereof, which plate extends transversely of the beam and a stem 7 which extends perpendicularly thereto along the beam. The slot 6 extends thru both the plate 5 and the stem 7 and is intended to receive the beam 1 of the micrometer. The stem 7 is perforated with a series of eleven holes B, which holes are arranged in a diagonal line as shown in Figure 4, these holes being spaced apart on the horizontal ordinates .020 inch between centers. The vertical spacing may be with any convenient unit. The zero hole is indicated at B′.

Next to the first block is the second block 8 which is also formed of a single piece of metal and is U-shaped having a base 9 and two arms 10 and 11 thereon. Each of the arms 10 and 11 is slotted as indicated at 12 and 13. The slot 13 receives the beam 1 and the slot 12 receives the stem 7 of the first block thru which the beam extends.

The arm 10 is perforated with a series of eleven holes C arranged in a straight line extending at right angles to the beam of the micrometer. These holes are spaced vertically the same distance between centers as the holes shown in the stem 7 of the first block. The zero hole is indicated at C′.

The first block carries a pin 14 which passes thru a single hole in the plate 5 and can engage with any of the holes shown in the beam. By this pin the initial setting of the micrometer is secured.

The second setting of the micrometer is secured as follows:

A pin 15 is shown which engages with one of the holes in the arm 10 and one of the holes in the stem 7. The first hole shown in each series is the zero hole and when the pin 15 has passed thru the zero hole of both series and the setting of the micrometer is otherwise at zero, as will hereinafter be explained, the jaws will be spaced apart by the distance indicated on the beam, the marks on which indicate .200 inch between centers. The showing in Figure 1 shows an opening between the jaws of 1.6 inch. By taking the pin out of the hole marked nine in the series B and C and putting it in the hole marked 8 of each series, the second block will be

moved inward on the first block by .020 inch and this will reduce the opening between the jaws by that amount so that the opening between the jaws will be the measurement indicated on the beam less .020 inch. By setting the pin in the hole marked seven of each series, the movable jaw 3 will be moved inward .040 inch and this will reduce the opening between the jaws by that amount so that the space between them will be the measurement indicated on the beam less .040 inch. In like manner the movable jaw 3 will be moved inward .020 inch for each hole in the two series that is used for the purpose of receiving the pin 15. It will be understood, of course, that the jaw 3 is moved inward each time so that the corresponding holes of each series come in line with each other and the pin will then be passed thru the pin holes one of each series.

At 16 I have indicated a micrometer scale which indicates the linear measurement represented by the horizontal spacing between the holes on the first block so that the operator can set the second block in line with the desired mark and the desired holes of the two series will register with each other so that the pin 15 can pass thru the two holes. When the pin is placed in the hole marked zero of each series the head of the second block will be held closely against the head of the first block so that the two blocks will apparently be all one piece. Mounted to slide in the second block is the third block 17 which carries the moving jaw 3 of the micrometer, this jaw being integral with the block. This block is U-shaped and has the arms 18 and 19 thereon which straddle the beam of the micrometer and has the tongue 20 thereon which engages in the slot 6 of the first block 4. The jaw 3 extends thru a slot 21 in the base 9 of the second block 8 and is adapted to slide along the slot. Between the arms 18 and 19 of the block 17 and the arm 10 of the second block are interposed the springs 22 shown in Figures 1 and 6, which are compressed as the third block 17 moves forward in the second block 8. The springs 22 take up the lost motion between the jaw 3 and the arms 10 of the block 8, the springs tending to move the jaw to the right in Figure 1 and the block 23 tending to move it to the left in Figure 1 so that between the two the jaw is held in correct position following the various adjustments of it.

The forward movement of the third block 17 is secured as follows:

Mounted to slide transversely of the second block 8 is the fourth block 23, which block carries a spring 24 thereon, which spring is compressed against the base 9 of the second block and holds the block 23 firmly in place against the block 26 in correct position following the various adjustments of it. The fourth block 23 and the third block 17 have inclined or cam shaped surfaces 35 and 36 that lie side by side so that as the fourth block moves toward the base 9 of the second block it will move the third block along the second block 8 and carry the jaw 3 forward.

The forward movement of the fourth block 23 is secured as follows:

Connecting the arms 10 and 11 is the gage 25 which is calibrated with spaces each of which represents movement of the jaw 3 of .0005 inch. Mounted to slide on the gage 25 is the fifth block 26 which has a zero mark thereon corresponding to the zero mark on the gage 25. This block 26 is also tapered or cam shaped and on the tapered surface 37 thereof rests the block 23 which has a cam shaped surface 38 to correspond so that the movement of the block 26 along the scale 25 will cause the lateral movement of the block 23 toward the base 9 of the second block and this, in turn, will cause the third block to move carrying the jaw 3. The tapered surfaces of the blocks 26, 23 and 17, or the fifth, fourth and third blocks are proportioned so that the movement of the block 26 along the scale on the gage 25 will produce a movement of the jaw 3 of .0005 inch for each half space, or .001 for each full space, or .020 for the forty half spaces.

On the block 26 I provide a vernier 27 which consists of ten spaces which together equal the same as 9 of the half spaces in the scale on the gage 25. By the use of this vernier in the well known manner a measurement of .00005 inch can be secured.

It will thus be seen that four different degrees of measurements may be made with this caliper, first, by the use of the holes in the beam, measurements may be made to the .200 inch. Second, by the use of the holes in the first and second blocks measurements may be made to .020 inch. Third, by the use of the scale on the gage 25 measurements may be made to .00005 inch.

On the sides of the block 8 are provided the plates 28 and 29, which plates are recessed as indicated at 30 (see Figure 9) for the purpose of receiving therein and guiding the third and fourth blocks, 17 and 23, these blocks being completely covered and held in place in the second block 8 by these plates 28 and 29.

For the purpose of clamping the third adjusting block 17 and its jaw in position on the beam so as to preserve the setting thereof, I provide a clamping screw 32 which passes thru the block 17 and engages with the beam. This forces the block 17 against the seat in the second block 8 and holds it firmly in place. The clearance between the second block 8 and the third block 17 and the beam is practically nothing, the parts being fitted very closely together. A

small block 40 is interposed between the end of the screw and the beam to prevent mutilation of the beam by the screw.

The arm with the series of holes A, in combination with the pin 14, may be referred to as the primary means which is adapted to hold the jaws in the adjusted position. The first block 5, with the series of holes C, in combination with the pin 15, may be referred to as the secondary means, whereby the jaws are held in the adjusted position.

I claim:

1. In a measuring instrument, the combination of a beam having an indicator thereon, a block mounted to move on said beam, a second block mounted to move on said first named block, each of said blocks having a series of holes therein the series in one block crossing the series in the other block, the holes in each series being so placed that by moving the second block thru successive steps, the corresponding holes of the two series will be brought successively to register, and a pin for fastening the second block in successive positions on the first block.

2. In a measuring instrument, the combination of a beam having an indicator thereon, a block mounted to slide on said beam, a second block mounted to slide on said first block, each of said blocks, having a series of holes therein, the holes in both series being spaced equally apart vertically, the holes in one series being placed horizontally in alignment with the corresponding holes in the other series, the series of holes in one block crossing the series of holes in the other block, the holes in one series being spaced horizontally by equal increments more than the holes in the other series, means for fastening the blocks together with any pair of holes in line with each other, and an indicator mounted on said second block and moving therewith.

3. In a measuring instrument, the combination of a beam having a stationary indicator thereon, a jaw mounted to slide on said beam, a block mounted to slide in said jaw, said jaw and said block having inclined surfaces between them by which the movement of the block will cause the movement of the jaw, and springs compressed by said block and said jaw for the purpose of holding said block and said jaw firmly in position and preventing lost motion.

4. In a measuring instrument, the combination of a beam having an indicator thereon, a block mounted to slide on said beam, a second block mounted to slide on said first block, and means on each block for locking said block in adjusted position, a jaw provided on said second block and moving therewith.

5. In a measuring instrument, the combination of a beam having a jaw thereon, a block mounted to slide on said beam, a second block mounted to slide on said first block, a third block mounted to slide on said second block, and means on each block for locking said block in adjusted position, each of said blocks being adapted to move in unison with or independently of the other blocks to change the position of said jaw, a predetermined distance.

6. In a measuring instrument, the combination of a beam having a jaw thereon, a block mounted to slide on said beam, a second block mounted to slide on said first block, a third block mounted to slide on said second block, each of said blocks being adapted to move in unison with or independently of the other block on said beam to change the position of said jaw a predetermined distance, and means for holding each successive block in positions that are separated by spaces that are fractions of the unit movements of the preceding block.

7. In a measuring instrument, the combination of a beam having a jaw thereon, a block mounted to slide on said first block, a third block mounted to slide on said second block, each of said blocks being adapted to move in unison with or independently of the other block on said beam to change the position of said jaw a predetermined distance, means for holding each successive block in positions that are separated by spaces that are fractions of the unit movements of the preceding block, and means for locking each of said blocks in adjusted position.

8. In a measuring instrument, the combination of a stationary member having an indicator thereon, a member mounted to move on said stationary member thru unit spaces and means for locking it at the end of each of said spaces, a third member mounted to move on said second member thru spaces that are fractions of the unit movements of the second member and means for locking the third member at the end of each of said spaces on the second member.

9. In a measuring instrument, the combination of a beam having a jaw thereon, a second jaw mounted to move on said beam, means for giving said second jaw an initial setting on the beam thru successive units of measurement, said second jaw being movable on the beam thru successive spaces that are fractions of the first named unit movements and independently of said first named means, and means for holding the said second jaw at the end of each of said fractional spaces.

10. In a measuring instrument, the combination of a beam, a block mounted to move thereon thru unit measurements a

second block mounted to move on the first named block thru unit measurements, the units of which are fractions of the first named units, a third block mounted to move on the second block thru spaces, the units of which are fractions of the second named spaces, and means for locking the first and second named blocks in adjusted positions and a jaw carried by said second block.

11. In a measuring instrument, the combination of a beam, a jaw provided on said beam, a block mounted to move thereon, a second block mounted to move on said beam and engaging with said first named block, a third block mounted to move on the second named block and engaging with the first named block, and the third named block being movable independently of the other two blocks, each of said blocks being adapted to move in unison with or independently of the other block or said beam to change the position of said jaw a predetermined distance.

12. In a measuring instrument, the combination of a beam, a block mounted to move thereon, a second block mounted to move on said beam and engaging with said first named block, a third block mounted to move on the second named block and engaging with the first named block, the third named block being movable independently of the other two blocks, and means for clamping said third named block on the beam.

13. In a measuring instrument, the combination of a beam, a block mounted to move thereon, a second block mounted to move on said beam and engaging with said first named block, a third block mounted to move on the second named block and engaging with the first named block, the third named block being movable independently of the other two blocks, and a jaw carried on the third named block.

In testimony whereof I affix my signature.

JOHN NEUMAIER.