NASA TECH BRIEF

Langley Research Center

Traveling Digital Counters For Micrometers

The problem:

Micrometers, mounted on low-range manometers, are often used in calibrating pressure instruments. Typical micrometers cover the 0 to 50 mm range and indicate the different heights of two oil columns while measuring pressures with a sensitive U-tube manometer, designed by The National Bureau of Standards. The calibration of pressure instruments with this standard requires numerous micrometer readings, and although much time is taken and much care is exercised in obtaining the readings, they are frequently misread. Stationary and rotary scale indications of the micrometer for a reading such as 34.702 were often read as 33.702, 34.202, or even 34.722. Because of the considerable time used in obtaining correct readings, as well as the extra time required to correct errors, it is necessary to devise a faster and easier method of obtaining the readings.

The solution:

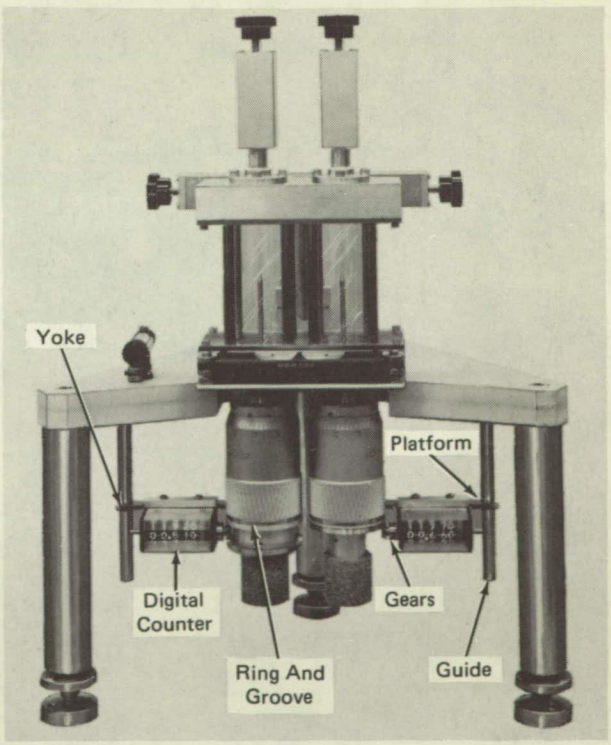
Digital counters have been adapted for use with the micrometers and synchronized to directly indicate the readings.

How it's done:

A two-inch diameter, precision bevel gear is fastened onto the micrometer rotary thimble to drive a smaller gear (5 to 1 ratio) on a digital counter. The counter is also mounted on the rotary thimble to travel vertically with it as shown in the illustration. The counter is mounted on a 1/8-inch thick polished steel platform which is machined at one end into a ring shape. The ring is fitted to the rotary thimble with a close-tolerance rotational fit and held on by the driver gear. The precision groove thus formed carries the counter platform up and down with the rotating thimble. Frictional drag is prevented from carrying the counter and platform around with the thimble by a yoke, machined in the other end of the platform, which engages and slides up and down the smooth stationary vertical guide.

The digital counters indicate the complete five digit micrometer readings directly with no loss of precision; the readings are made quickly, and it is virtually impossible for the operator to misread the micrometer. Micrometers, digitized as described, can also be used for repetitive measurements such as of the thickness of mass produced parts.

A small geared reversible electric motor, properly slip clutched, can be attached to the traveling platform to drive the micrometer thimble, possibly directly through the counter shaft, in instances where large changes in the dimension to be measured are involved. This would further speed up measurements and relieve the tedium of hand operation.



Micrometer with Digital Counters

(continued overleaf)

Notes:

Requests for further information may be directed to:

Technology Utilization Officer
Langley Research Center
Mail Stop 139-A
Hampton, Virginia 23365
Reference: B73-10042

Patent status:

NASA has decided not to apply for a patent.

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