REVIEW ON INSTRUMENTS USED FOR MEASURING THE CIRCULAR/ ROUND JOBS IN INDUSTRY

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ABSTRACT

Measuring tools are most important in any industry as they make the life of society the better and safer by giving them acceptable products. Recently numbers of method are being used to inspect the diameter of components. But still in all types of industry from small unit to big unit for measurement of diameter mostly used instruments are Vernier calliper and Micrometre. This paper emphases on different types of vernier calliper and Micrometre used on machine shop.

1. INTRODUCTION

In daily life we use numerous products. These products are manufactured in industries with standard practices. These products further have to pass through inspection phase. In earlier days the inspection was carried out with limited sources so at customer end that product was having many issues. Accuracy and precision are the prerequisite for all engineering experiments (1). As customer demands quality products there was a need of precise instruments so various precise measuring instruments are widely used in industries for either measuring or gauging purpose. While using instrument for measurement it will revel reading of a component and when it is used for gauging purpose it will give whether component is accepted or rejected (2). Present paper is focused on vernier caliper and micrometer widely used for measurement of external and internal diameters as well as length.

2. VERNIER CALLIPER

2.1 Working Principle: Vernier calliper works on to the principle of difference between two scales, namely main scale and Vernier Scale

2.2 Types of Vernier Calliper

- External Vernier Calliper
- Depth Vernier Calliper
- Vernier Height Gauge

2.2.1 External Vernier Calliper

The vernier callipers give a direct reading of the distance measured with high accuracy and precision. Vernier Calliper is used for the purpose of measuring the external diameter and internal diameter of the jobs. By using external vernier we can also able to measure the depth and height of component but its is not recommended when the accuracy in measuring the height and depth is of prime important.

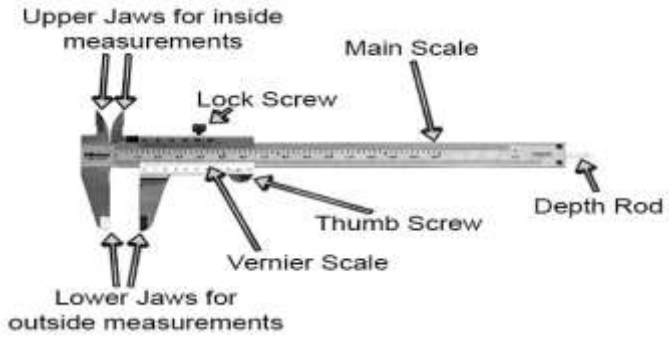

Fig. 1.1 Vernier Calliper

Parts of vernier Callipers

1.Lower jaws: used to measure external diameter or width of an object

2.Upper jaws: used to measure internal diameter of an object

3.Depth rod: used to measure depths of an object or a hole

4. Main scale (Metric): scale marked every mm

5. Main scale (Imperial): scale marked in inches and fractions

6. Vernier scale (Metric) gives interpolated measurements to 0.02 mm or better

7. Vernier scale (Imperial) gives interpolated measurements in fractions of an inch

8. Lock Screw: used to block movable part to allow the easy transferring of a measurement

2.2.2 Depth Vernier Calliper

A depth gauge is used for accurately measuring the depth of cavities, holes or recesses, grooves or other type of openings. The depth gauge consists of a ruler, a base through which the ruler can slide upwards or downwards and a screw used to lock the ruler in place at any point. The base is placed on the reference surface, while the ruler is lowered into the opening, sliding at a right angle to the base until it reaches the bottom of the opening. Measurements can be taken through the markings on the ruler itself or through digital displays.

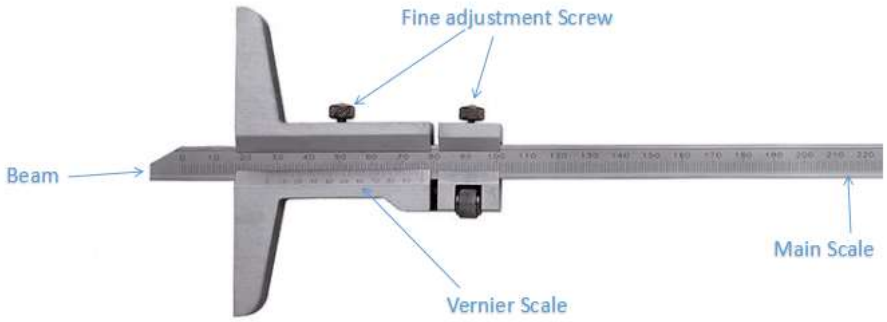

FIG. 1.2Depth Vernier Calliper

2.2.3 Vernier Height Gauge

Vernier height gauge is used to measure heights of different engineering components for high precision and accuracy measurements.

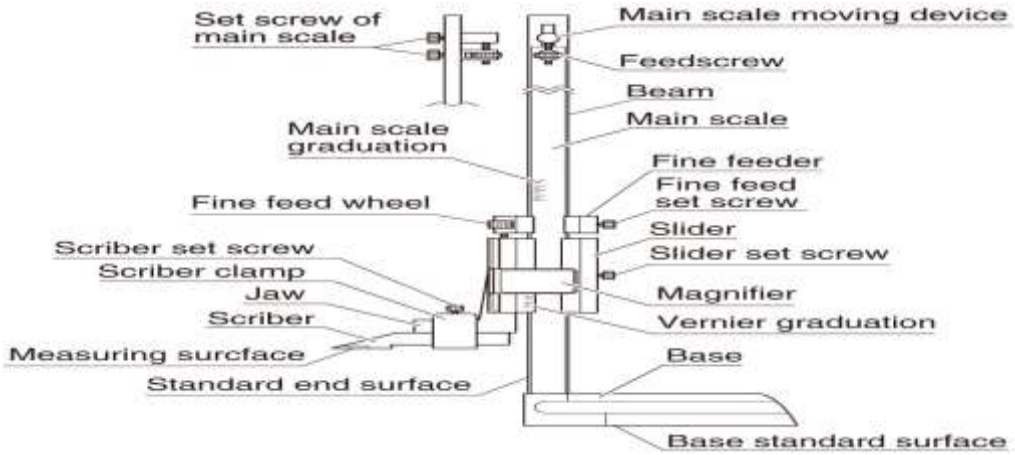

Fig.1.3 Vernier Height Gauge

1. Base- Its rectangular block on which the main scale is mounted.
2. Main Scale- Main scale is mounted perpendicular to base and have markings on in in mm and inches.
3. Vernier Scale- It is able to move over the main scale in upward and downward direction. And it has 50 divisions on it.
4. Scriber- Its measuring jaw. It is kept on component while measuring height of component. Also used for making purpose.
5. Lock Screw- It locks the vernier scale while taking reading.

2.3 Least count of vernier caliper

Least count of aal above mentioned types of vernier is 0.02mm. Its is calculated by the formula, (Smallest division on Main Scale /Number of divisions on vernier scale)

3-MICROMETERE

3.1 Working Principle- Micrometres works on to the principle of Nut and Bolt. When nut is held stationery and bolt is rotated then bolt will make linear movement.

3.2 Types of Micrometer

- **External Micrometer**
- **Internal Micrometer**

3.2.1 External Micrometer

Micrometer is used for the measurement of external diameters. It is accurate measuring device as compared to vernier calliper. The job whose diameter is to be measured is held between two spindles.

3.2.1 External Micrometer

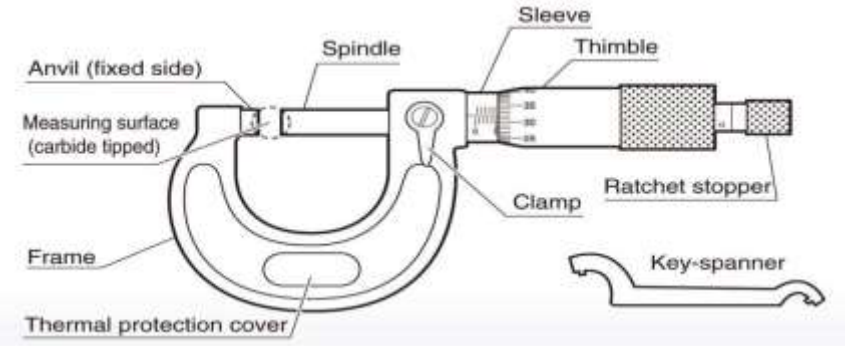

Fig. 1.4 External Micrometer

Parts of Micrometer

1. **Frame -** The C-shaped body that holds the anvil and barrel in constant relation to each other. Frame is made in c shape as its used for measurement of round jobs and job should be aligned purely to centre.
2. **Anvil -**The shiny part that the spindle moves toward, and that the sample rests against. Anvils are also called as spindles. Fixed spindle and moving spindle.
3. **Sleeve/Barrel- It is t**he stationary round component having main scale on it. The smallest division on main scale is 0.5 mm.
4. **Screw-** As mentions in working principle we can say it is the main part of micrometre.
5. **Thimble-** It is the circular part having the circular scale on it and capable of rotating over main scale.
6. **Locking Screw-** It is used to lock thimble on Barrel after job is held between two spindles.

3.2.3 Internal Micrometer

Inside micrometers and sets are used to measure the inside diameters and internal dimensions of holes, bores, and other openings

Fig.1.5 Inside Micrometer

All the parts of inside micrometers are same as that of explained above. Just instead of spindles it has inside jaw like vernier which are used to measure inside diameters.

3.3 Least count of Micrometer

Least count of aal above mentioned types of vernier is 0.01mm. It is calculated by the formula, (Smallest division on Main Scale /Number of divisions on Circular scale).

CONCLUSION

The inspection is more important in any industry for producing the acceptable components. Many different measuring instruments are used to enhance the quality of components. Every Mechanical organization makes use of vernier caliper and micrometer for inspection purpose. Both the instruments are essential for measurement of internal and external diameter along with depth and heights of manufactured product.

REFERENCES

[1] Loo Kang WEE and Hwee Tiang NING (2014) Vernier caliper and micrometer computer models using Easy Java Simulation and its pedagogical design feature-ideas to augment learning with real instruments Physics Education, 49(5), 493

[2] Siddharth Sonkamble1, A. M. Qureshi2 A Review Of Inspection Gauge And Instruments Used In Industries (Irjet) Volume: 07 Issue: 06 | June 2020