INSPECTION & QUALITY CONTROL

•Inspection

- □ Introduction, units of measurement, standards for measurement and
- interchangeability.
- □ International, national and company standard, line and wavelength
- standards.
- □ Planning of inspection: what to inspect? When to inspect? Who should
- inspect? Where to inspect?
- □ Types of inspection: remedial, preventive and operative inspection,
- incoming, in-process and final inspection.
- □ Study of factors influencing the quality of manufacture.

MEASUREMENT AND GAUGING

- Basic principles used in measurement and gauging, mechanical, optical,
- electrical and electronic.
- Study of various measuring instruments like: calipers, micrometers, dial
- indicators, surface plate, straight edge, try square, protectors, sine bar,
- clinometer, comparators – mechanical, electrical and pneumatic. Slip
- gauges, tool room microscope, profile projector.
- Limit gauges: plug, ring, snap, taper, thread, height, depth, form, feeler, wire
- and their applications for linear, angular, surface, thread and gear
- measurements, gauge tolerances.
- Geometrical parameters and errors:
- Errors & their effect on quality, concept of errors, measurement of
- geometrical parameter such as straightness, flatness and parallelism.
- Study of procedure for alignment tests on lathes, drilling and milling
- machines.

STATISTICAL QUALITY CONTROL

- Basic statistical concepts, empirical distribution and histograms, frequency,
- mean, mode, standard deviation, normal distribution, binomial and Poisson,
- Simple- examples.
- 119
- Introduction to control charts, namely X, R, P and C charts and their
- applications.
- Sampling plans, selection of sample size, method of taking samples,
- frequency of samples.
- Inspection plan format and test reports

MODERN QUALITY CONCEPTS

- Concept of total quality management (TQM)
- National and International Codes.
- ISO-9000, concept and its evolution
- QC tools
- Introduction to Kaizen, 5S

INSTRUMENTATION

- Measurement of mechanical quantities such as displacement, vibration,
- frequency, pressure temperature by electro mechanical transducers of
- resistance, capacitance & inductance type.

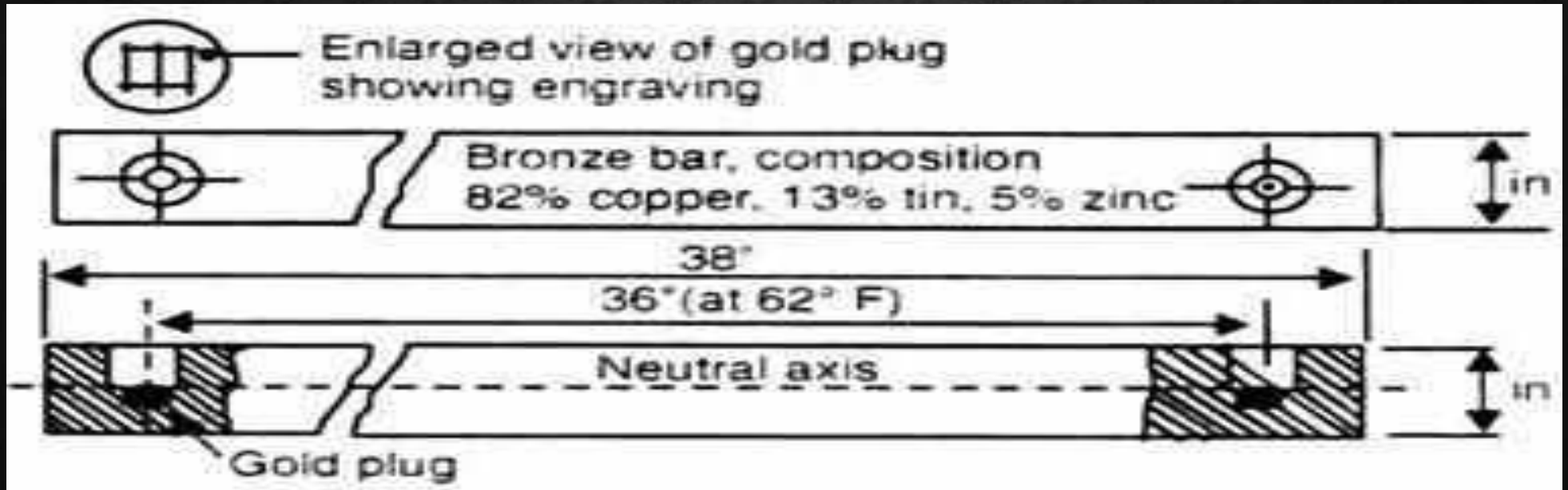
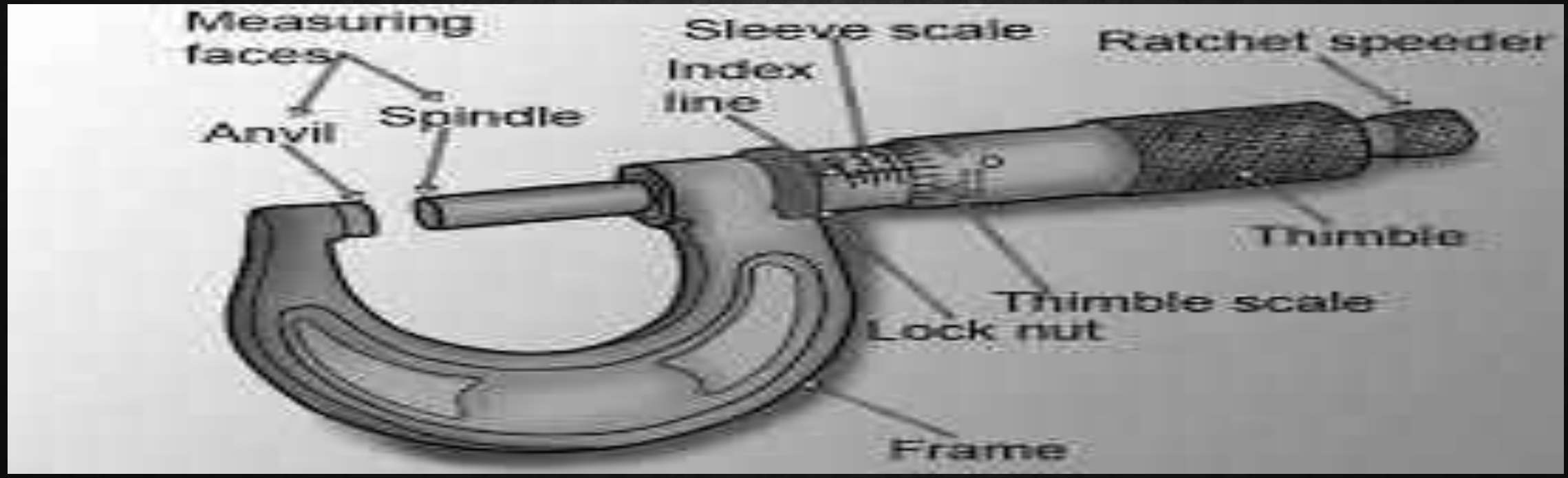
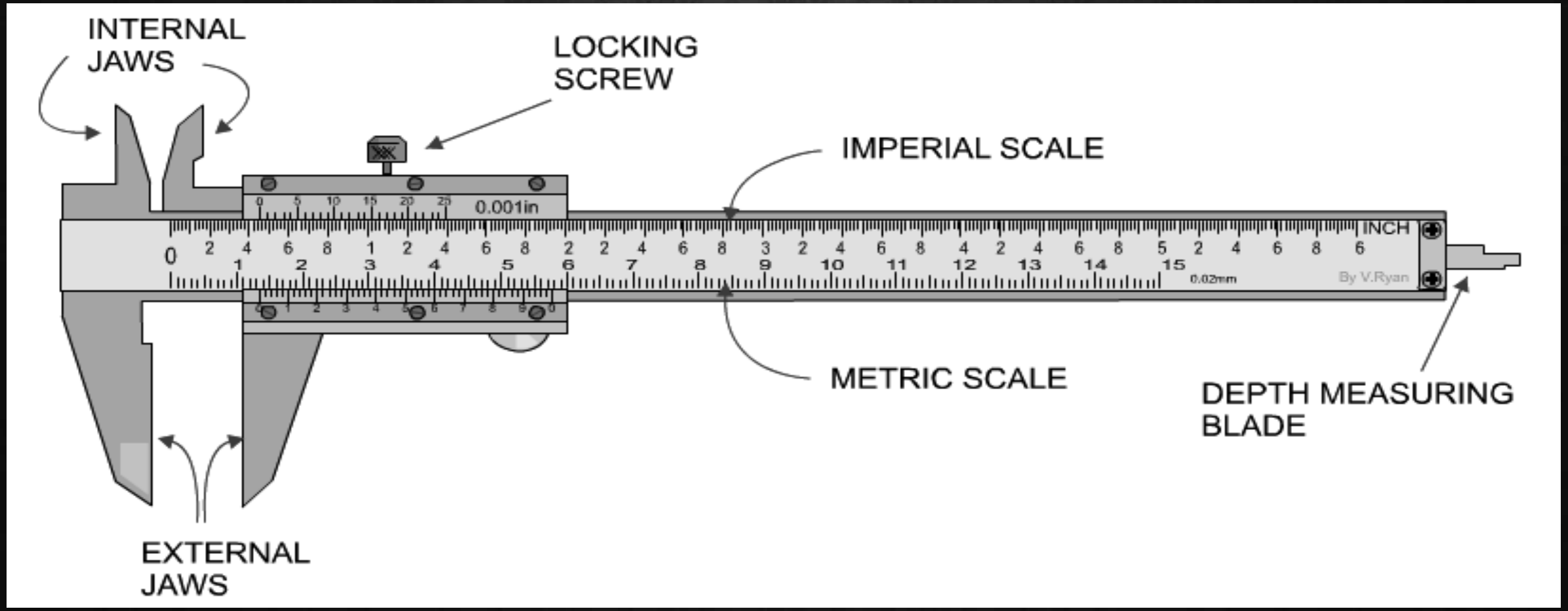


Fig. 1.2. Imperial standard yard.

MICROMETER


Measuring faces
Anvil
Spindle
Sleeve scale
Index line
Ratchet speeder
Thimble
Thimble scale
Lock nut
Frame

VERNIER CALIPER

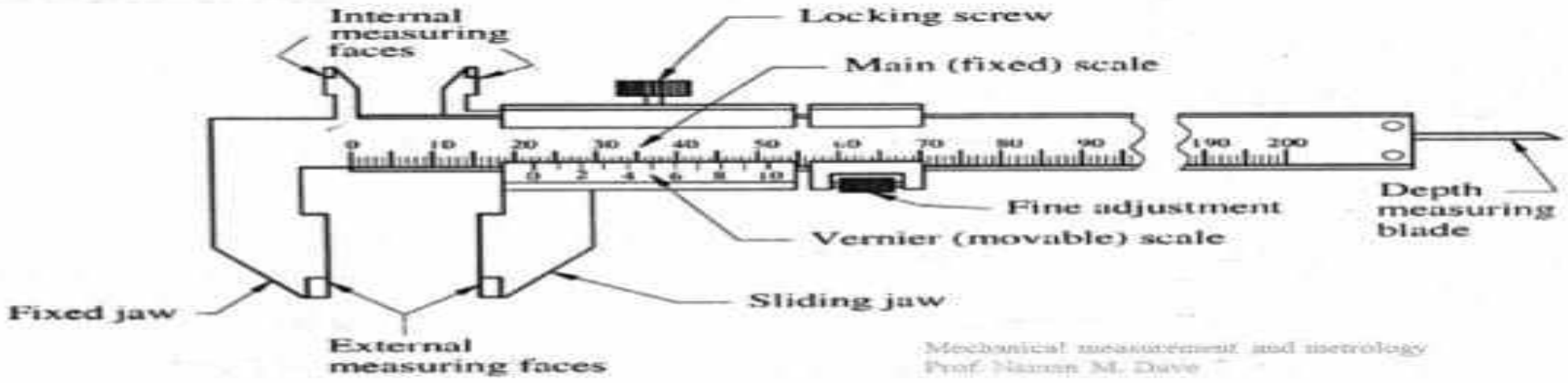


PRINCIPLE OF VERNIER CALLIPER

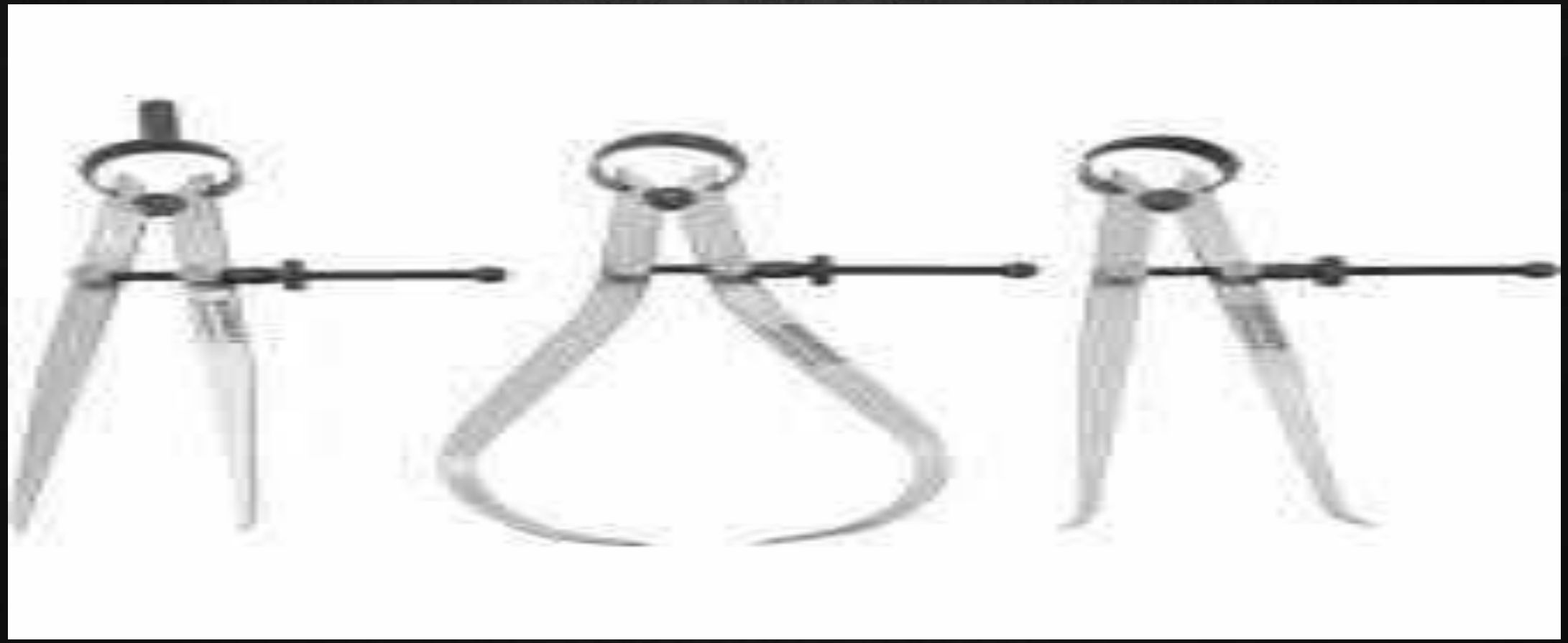
Vernier calliper

Vernier principle : When two scales (main and auxiliary scales) or division slightly different in size are used, the difference between them can be utilized to enhance the accuracy of measurement.

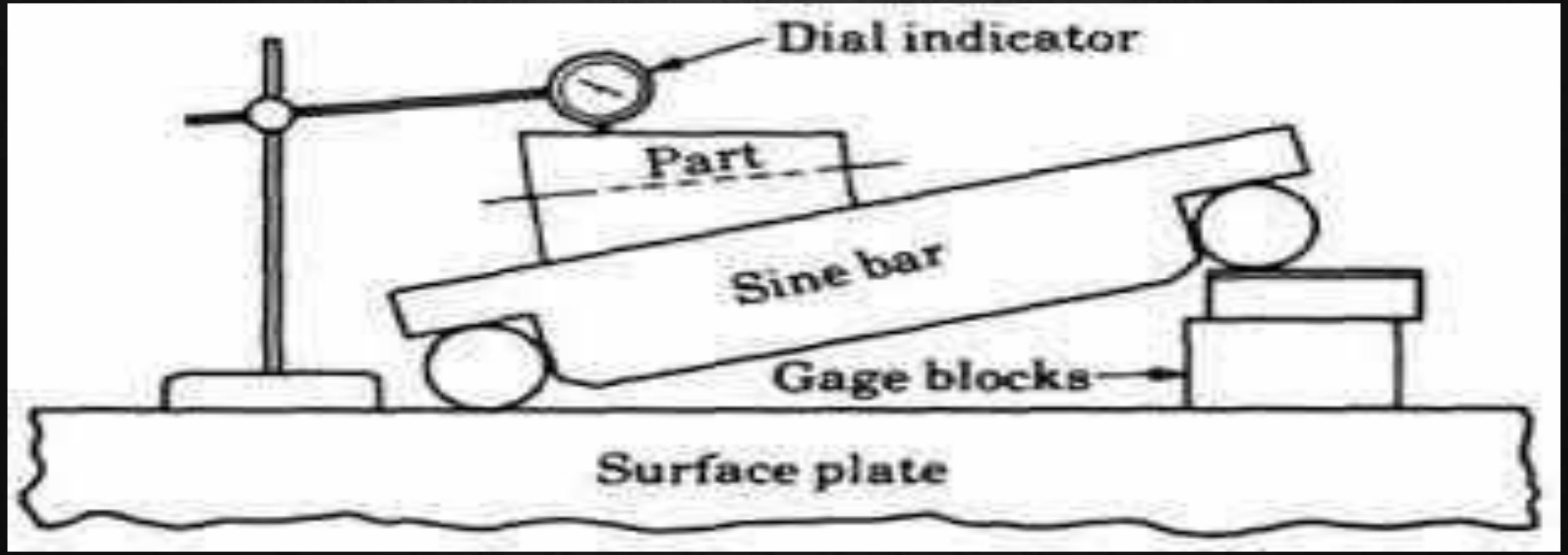
Construction :



CALIPERS



SINE BAR WITH DIAL INDICATOR



FEELER GAUGES

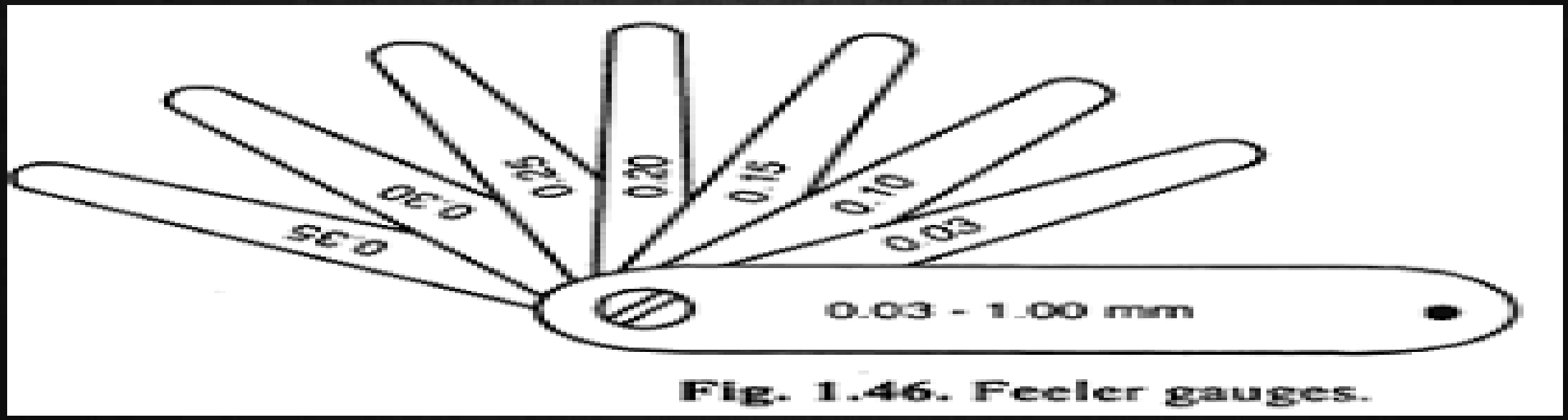
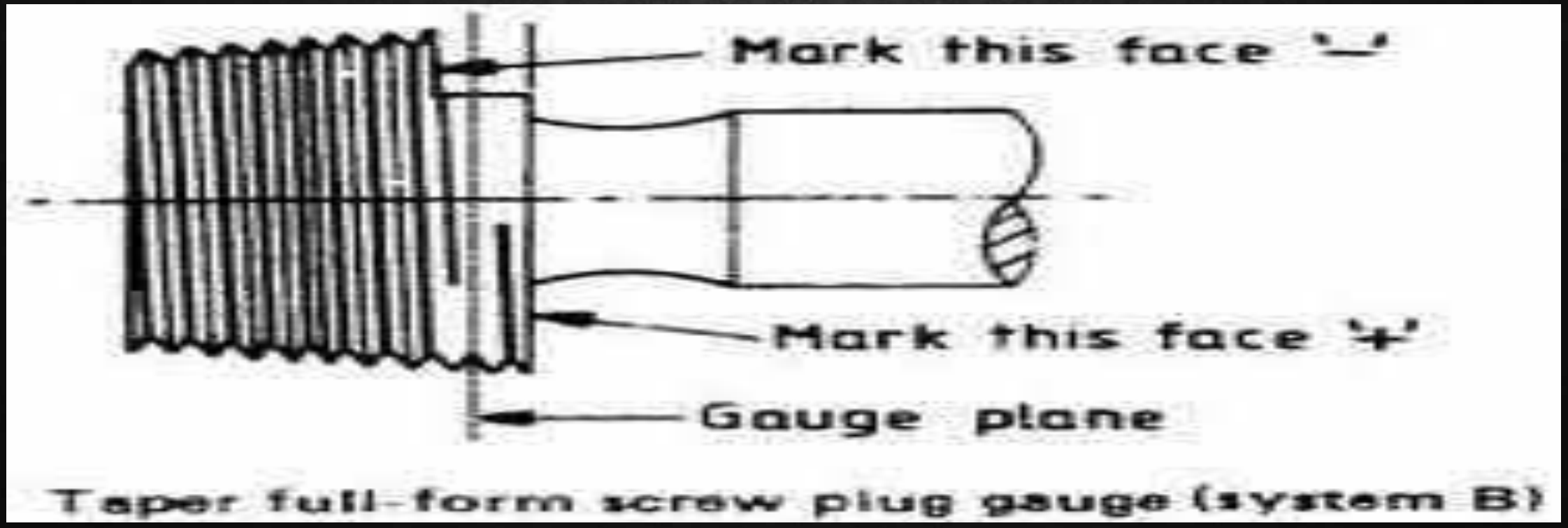


Fig. 1.46. Feeler gauges.

SCREW PLUG GAUGE



Taper full-form screw plug gauge (system B)

ALIGNMENT TEST ON DRILLING MACHINE

Alignment tests on pillar type drilling machine

* **Properly Installed** – In both horizontal transverse directions) and vertical directions.

1. Flatness of clamping surface of base:
   * Straight edge on two gauge blocks
   * Feeler gauges gives error
   * Error should not exceed 0.1/1000 mm clamping surface
   * Surface should be concave only
2. Flatness of clamping surface of table:

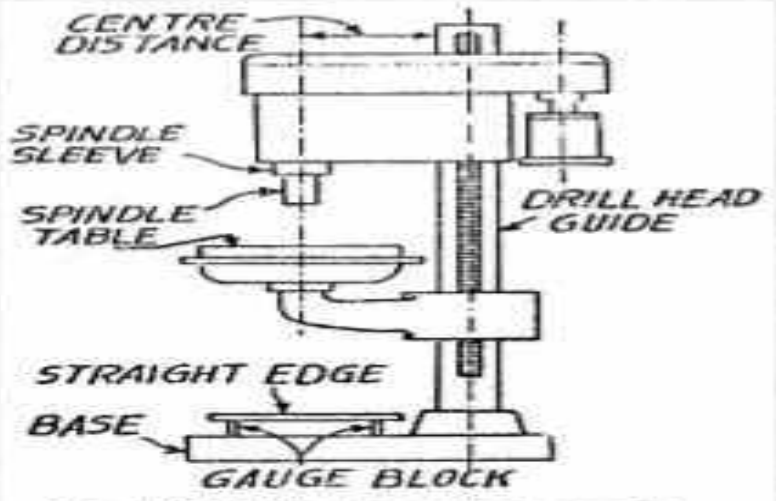
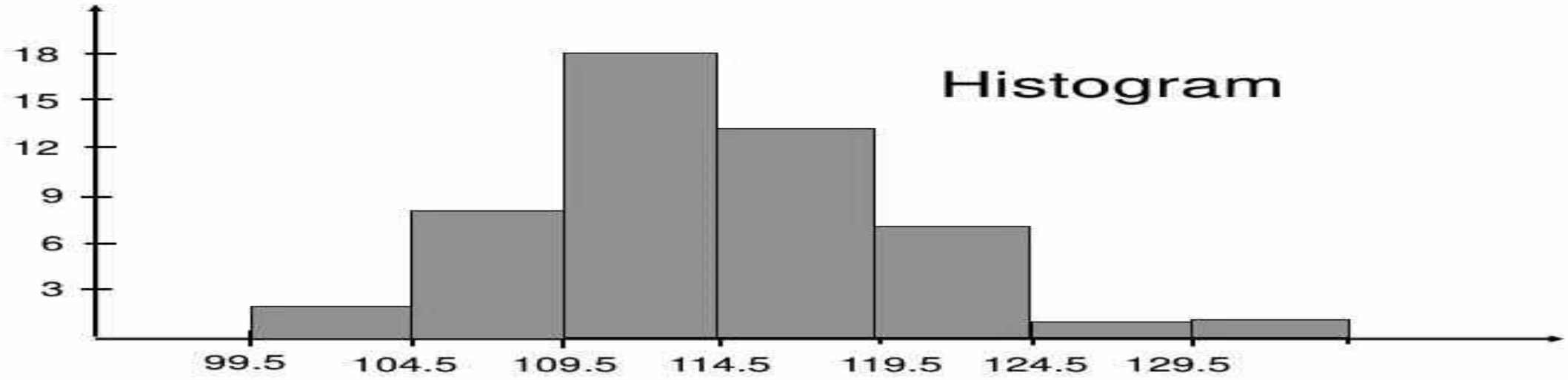


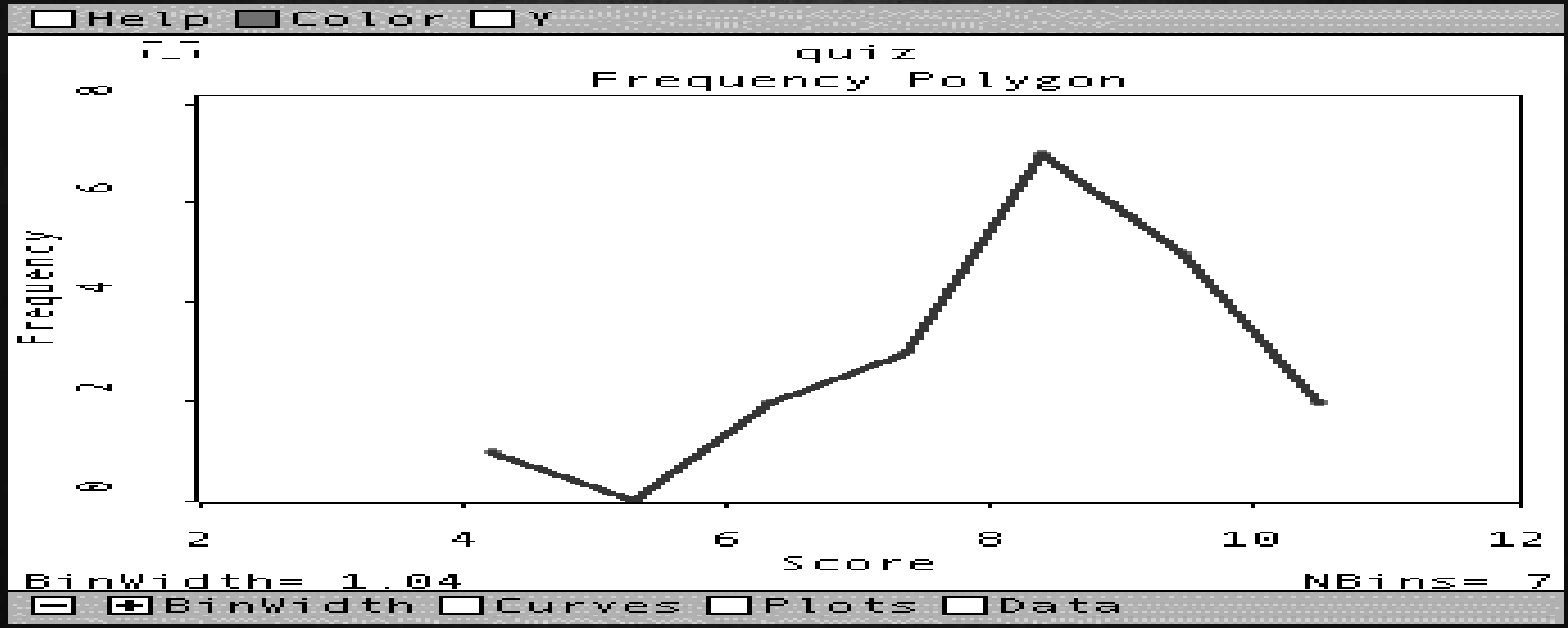
Fig. 16.17. Checking flatness of clamping surface of base.

FREQUENCY DISTRIBUTION GRAPH

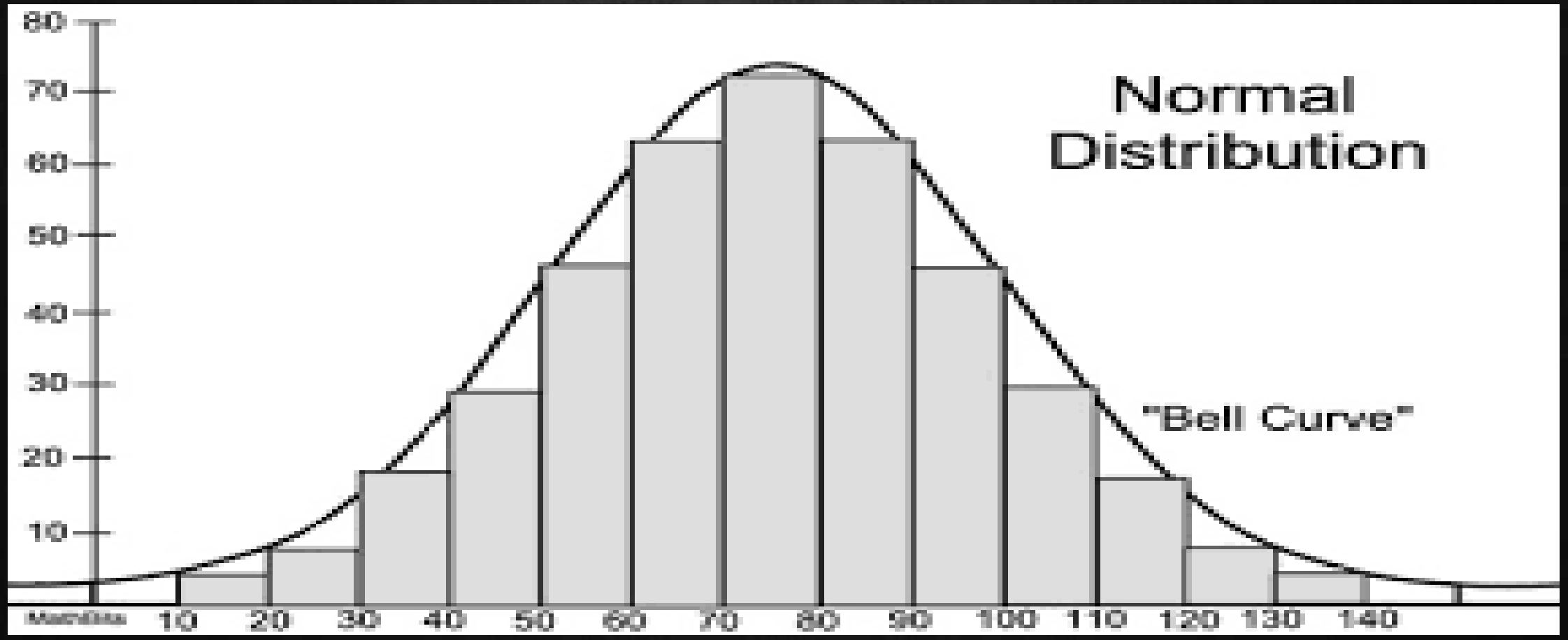


- The largest concentration is in the class 109.5 – 114.5.

FREQUENCY POLYGON



NORMAL DISTRIBUTION



X & R CONTROL CHART