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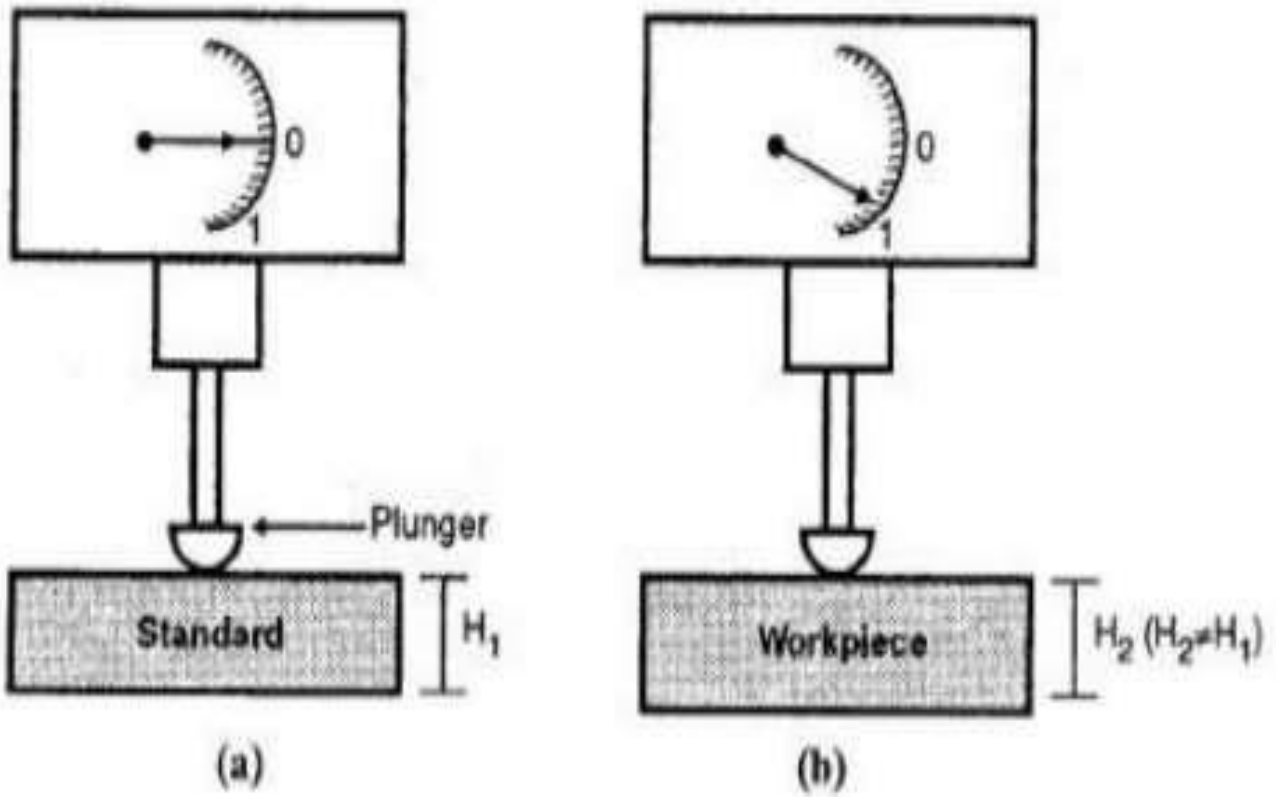
Introduction

- Comparator is a precision instrument
- Employed to compare the dimension of given component with given standard
- Employed to find out, by how much the dimensions of the given component differ from that of a known datum.

Basic Principle



Uses of Comparators

- Comparators can be used as:
  1. Laboratory Standards
  2. Working Gauges
  3. Final Inspection Gauges
  4. Receiving Inspection Gauges
  5. For Checking Newly Purchased Gauges

Characteristics

1. Robust Design and Construction
2. Linear Characteristics of Scale
3. High Magnification
4. Quick in Results
5. Versatility
6. Minimum Wear of Contact Point
7. Free from oscillations and back lash
8. Quick Insertion of Work piece
9. Adjustable table
10. Compensation from Temperature Effects
11. Means to Prevent Damage

Classification

1. Mechanical comparators

- Dial Indicator
- Reed Type comparator
- Sigma Comparator
- Johansson Mikrokator

2. Mechanical-Optical Comparators

- Optical Lever
- Zeiss Optimeter
- Zeiss Ultra Optimeter
- Zeiss Optotest Comparators

3. Electrical and Electronics Comparators

4. Pneumatic Comparators

5) Fluid Displacement Comparators

6) Projection Comparators

7) Multi check Comparators

8) Automatic Gauging

9) Electro Mechanical Comparators

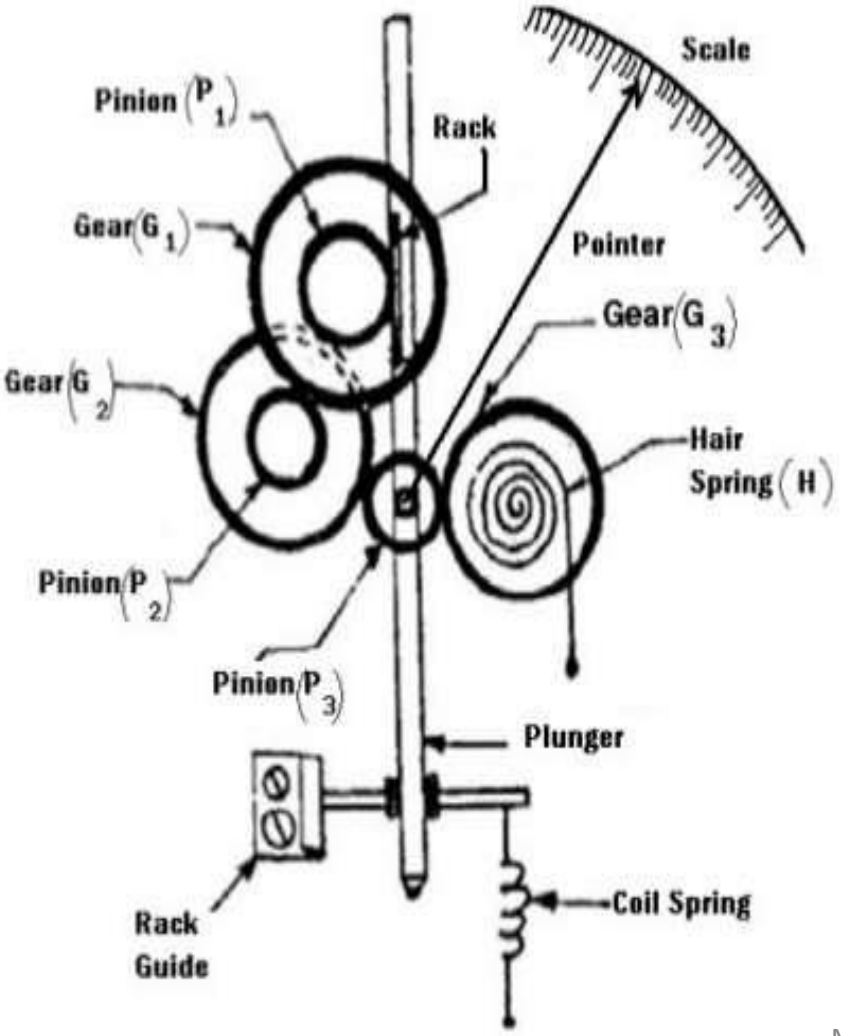
10) High Sensitive Calibration Comparators

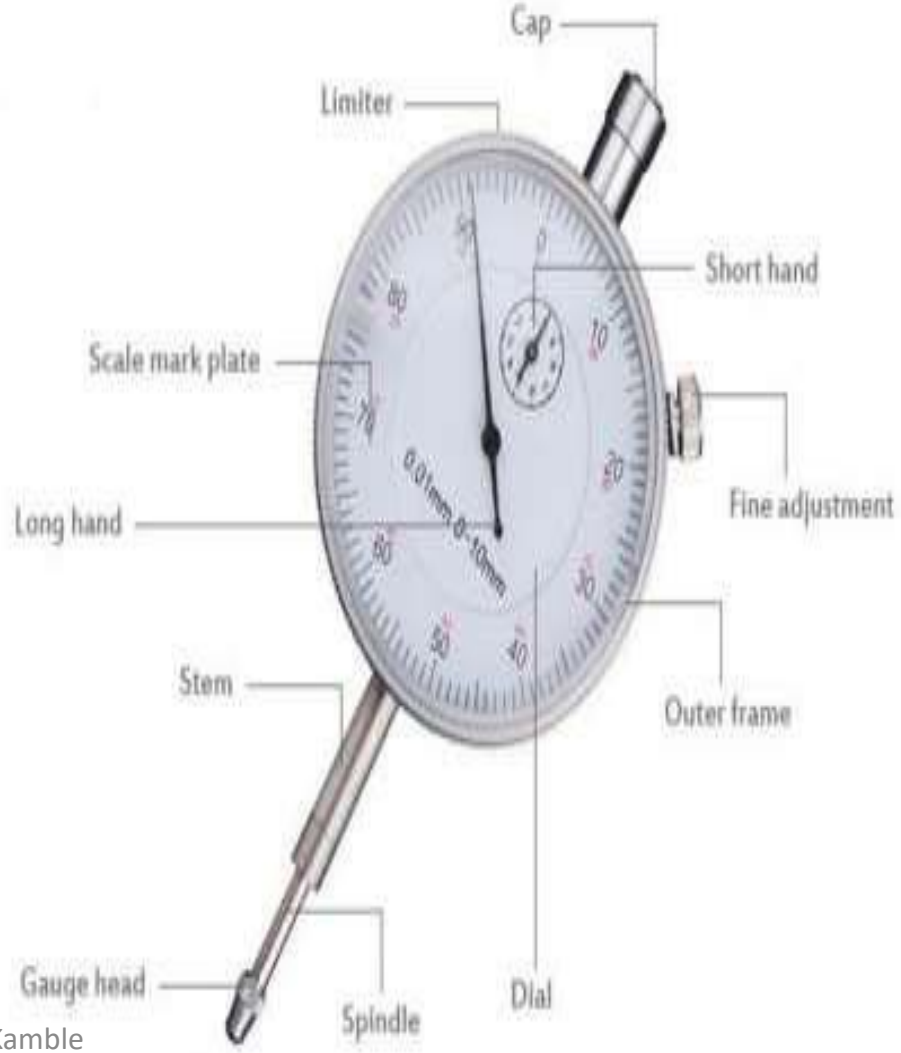
- Brookes Level Comparators
- Eden-Rolt Millionth Comparators

Mechanical Comparators

- Self controlled and no power or any other form of energy is required
- It employs mechanical means for magnifying the small movement of the measuring stylus.
- The movement is due to the difference between the standard and the actual dimension being checked

1. Dial Indicator



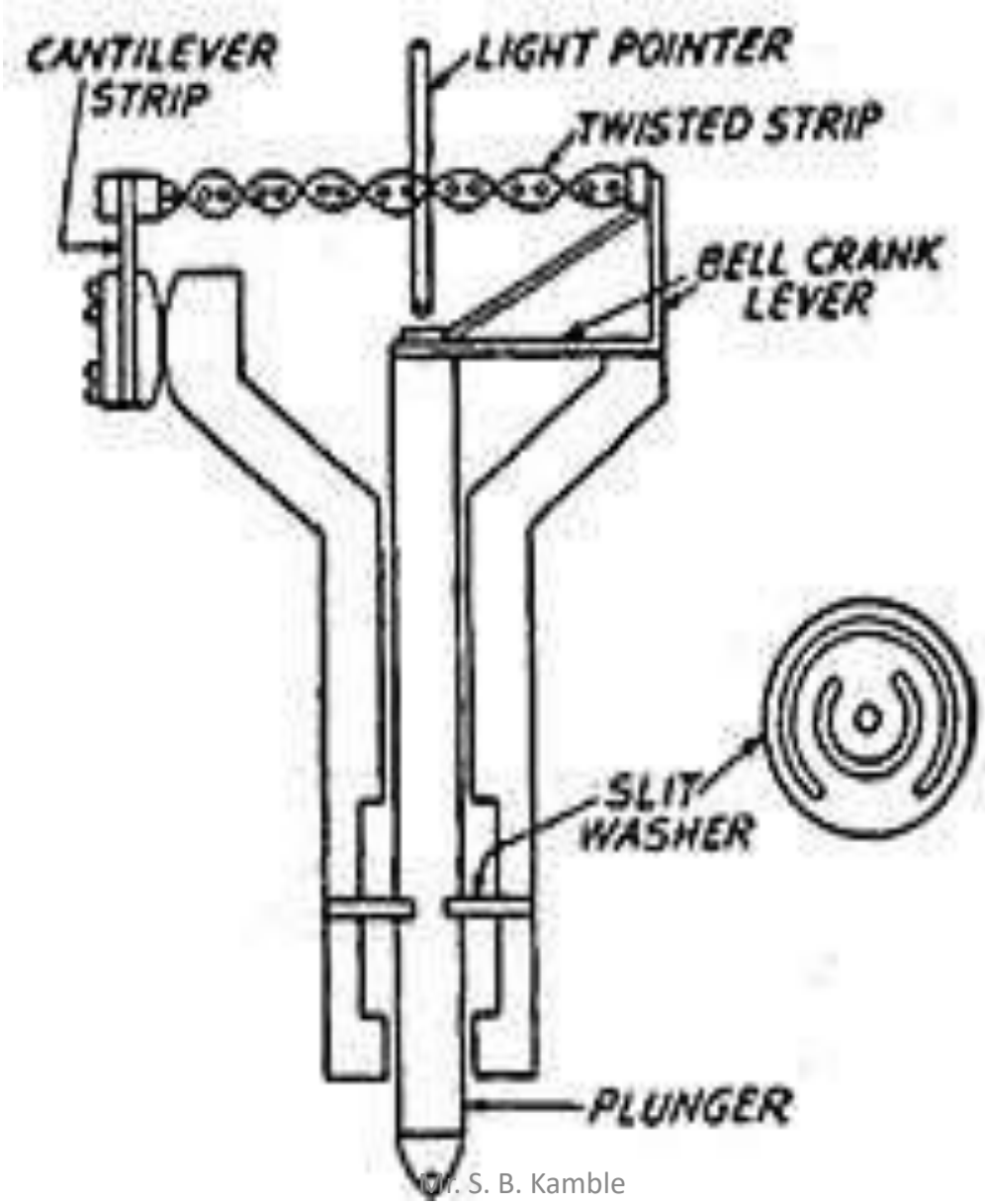


1. Dial Indicator

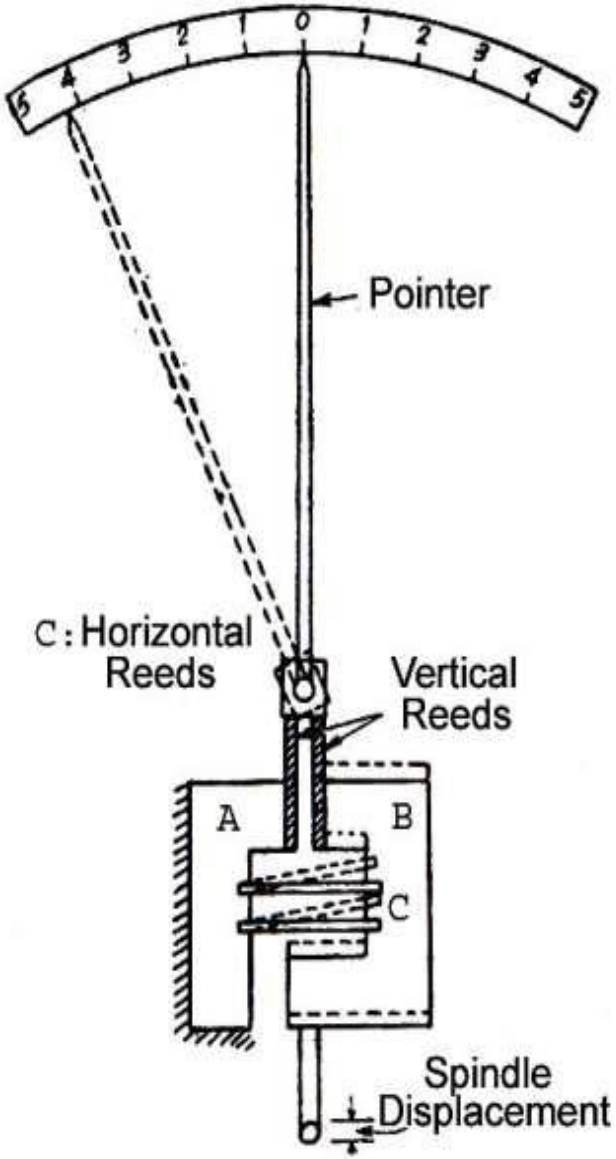
- Amplifies the length or displacement and translate it into rotational motion of pointer over circular scale
- ***Applications:-***

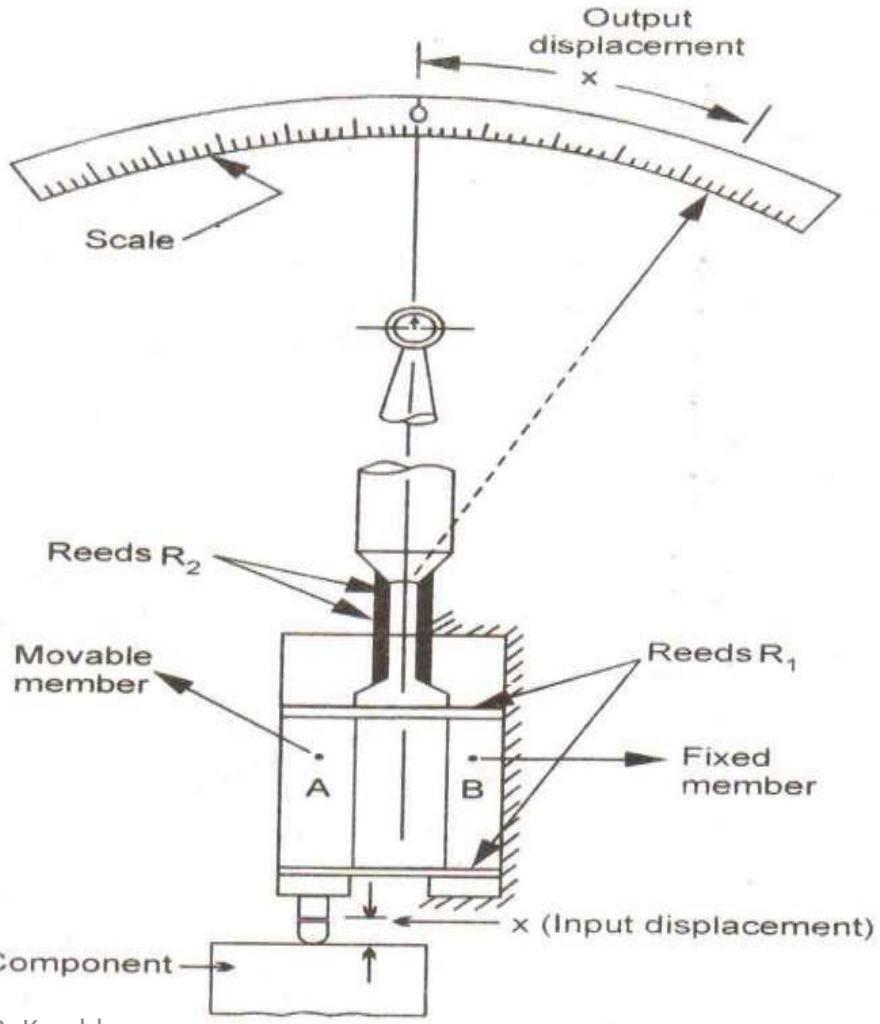
1. To compare two heights or distance between narrow limits
2. For determining errors in geometrical forms
3. For testing alignment, roundness and parallelism of work piece
4. For quality control and inspection work

2.Johannson Mikrokator

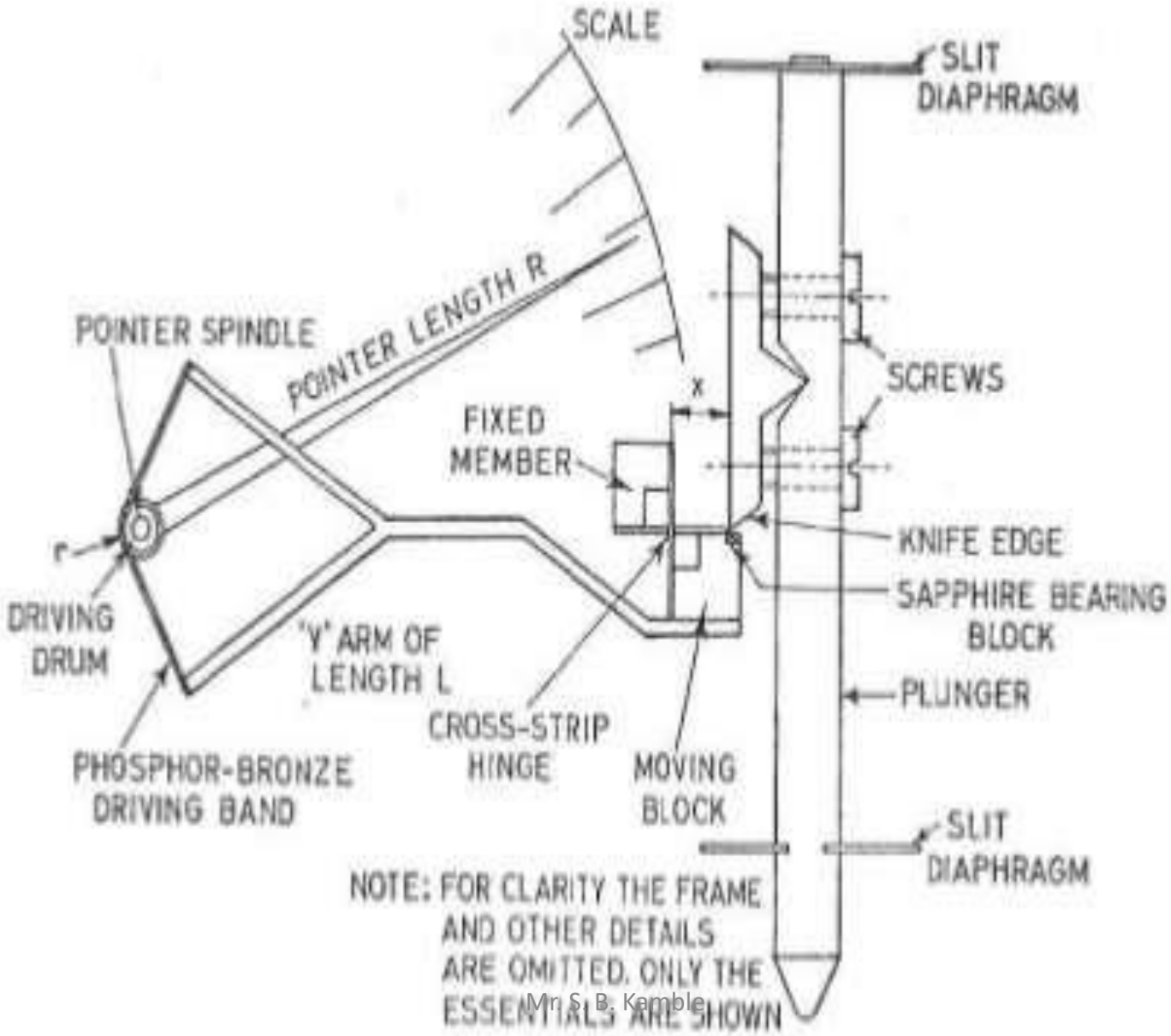


3.Reed Type Mechanical Comparator





4. Sigma Comparator



Mr. S. B. Kamble

Mechanical Comparators

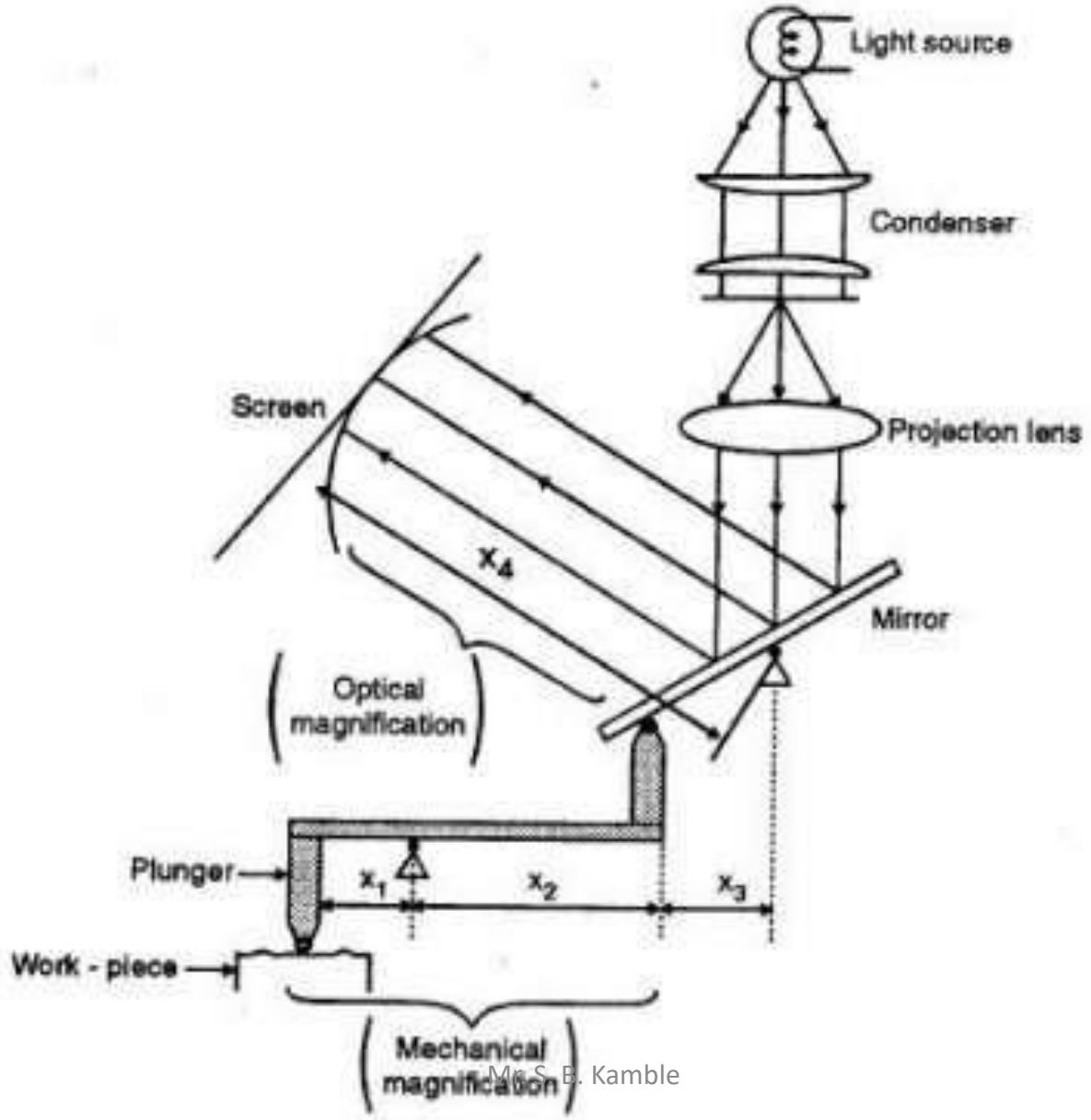
- ***Advantages***

  1. Do not require any external source of energy
  2. Cheaper and portable
  3. Robust construction and compact design
  4. The simple linear scales are easy to read
  5. Unaffected by variations due to external source of energy such air, electricity etc.

- ***Disadvantages:***

  1. Range is limited as the pointer moves over a fixed scale
  2. Pointer scale system used can cause parallax error.
  3. There are number of moving parts which create problems due to friction, and ultimately the accuracy is less
  4. The instrument may become sensitive to vibration due to high inertia

Mechanical-Optical Comparators



Mechanical-Optical Comparators

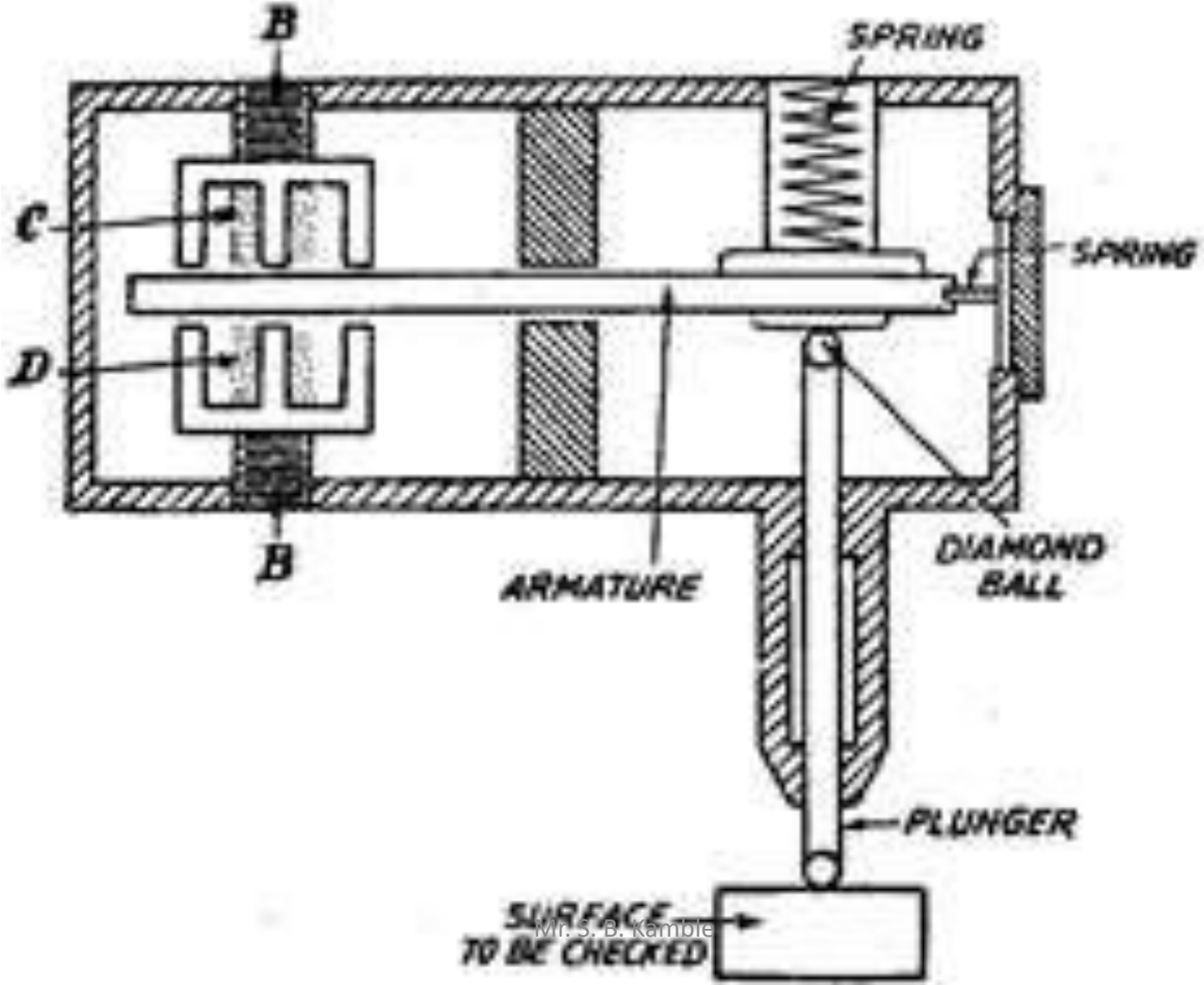
- ***Advantages:-***

  1. Less friction and inertia effect and higher accuracy
  2. High magnification
  3. Enables readings to be taken irrespective of room lighting conditions
  4. High range and no parallax

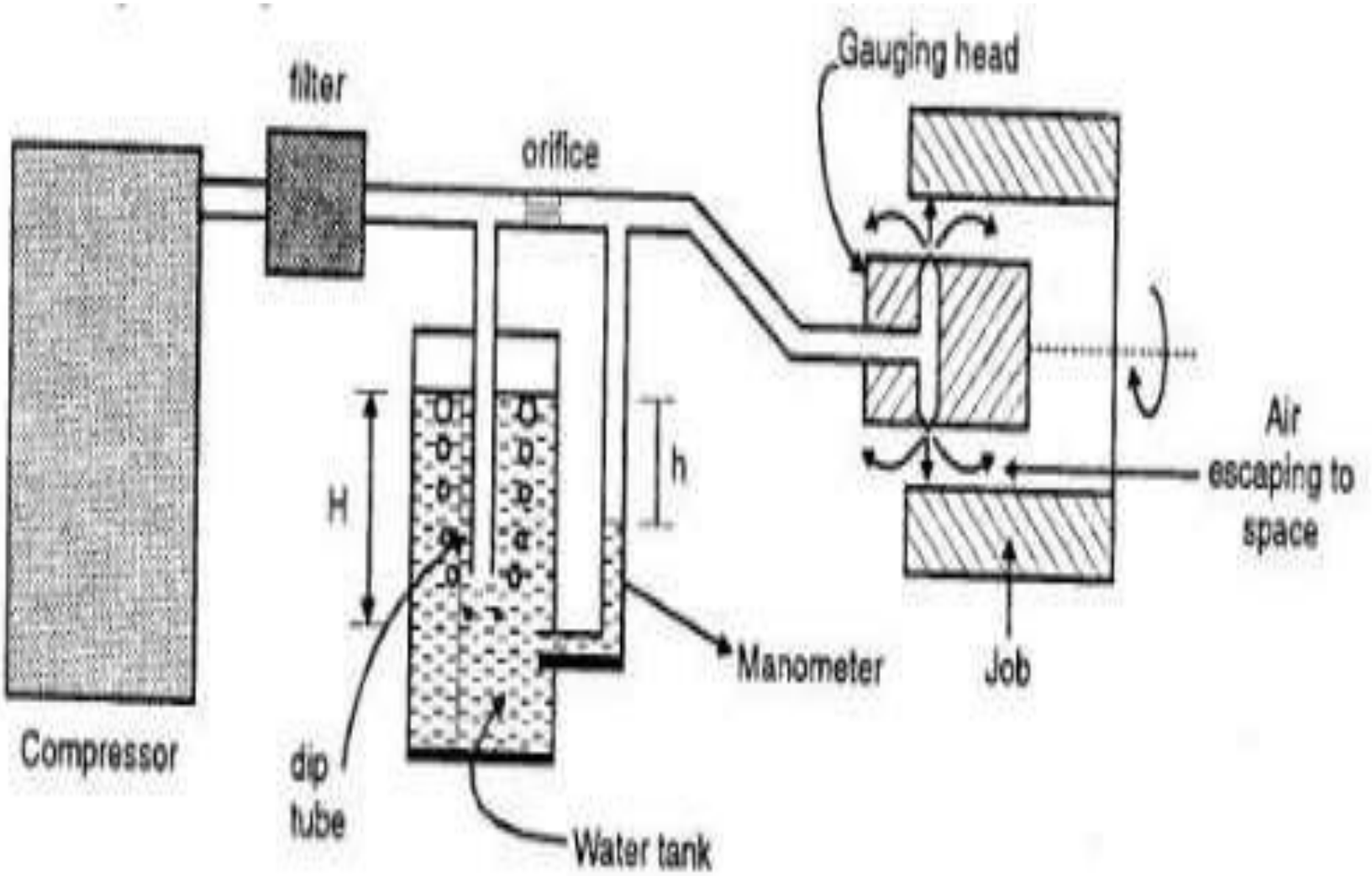
- ***Disadvantages:-***

  1. Requires light source
  2. Large and expensive
  3. Inconvenient for continuous use
  4. Instrument setting may drift

Electrical Comparator



Pneumatic Comparators

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- ***Advantages:-***

  1. Very high magnification
  2. Less friction, wear and inertia
  3. Less measuring pressure
  4. Determines ovality and taperness of circular bores

- ***Disadvantages:-***

  1. Scale is generally not uniform
  2. Requires compressor and accurate pressure regulator
  3. Non portable
  4. Less sensitivity