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Travelling microscope: Review

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ABSTRACT
A travelling microscope is an instrument for measuring length with a resolution typically in the order of 0.01mm. It is designed to meet the requirements of research, colleges, schools and industrial laboratories. Travelling microscope is used for accurate measurement of the diameters of different objects. It is also used in Physics Laboratories for more accurate determination of small variation in the liquid levels, Manometers, the refractive index of liquids as well as in surface tension & viscosity experiments.

Keywords: Refractive index, microscope, dentistry, research.

INTRODUCTION

A travelling microscope is a device which measures length with a resolution in order of 0.01mm. The precision is such that better-quality instruments have measuring scales made from Invar (Nickel- iron alloy) to prevent misinterpretation of thermal effects. [1]

Also known as withering microscope after William Withering a medical student, who designed a simple pocket microscope, made of brass, to help him and others in the study of botany when out of the laboratory. [1]

Travelling microscope is defined as a microscope provided with cross hairs and mounted in such a way that it can be moved along a base with a screw for the purpose of making accurate measurements of distance. [2]

Purpose of the instrument is to aim at reference points with higher accuracy than is possible with bare eye. It is widely used in laboratories to calculate the refractive index of liquids using ray optics. [1, 3]

The instrument comprises a microscope mounted on two rails fixed to rigid bed. The coarse and fine adjustment of microscope can be done by sliding along the rails and turning screw. The eyepiece is fitted with fine cross-hairs to fix a precise position, which is then read off the vernier scale. [3]

Travelling microscope consists of a cast iron base with machined-Vee-top surface, fitted with three leveling screws. A metallic carriage is fixed to a spring-loaded bar slides with vernier and reading lens along a positioned metal scale. The scale is divided in half millimeters. Fine adjustments are made by micrometer screw for taking accurate reading. Both vernier reading to 0.01mm or 0.02mm. Microscope tube consists of 10x Eyepiece and 15mm, 50mm or 75mm objectives. The Microscope, with its rack and pinion connection is mounted on a vertical slide,

which too, runs with an attached vernier along the vertical scale. [4]

Applications:

The travelling microscope has a varied role in dentistry. It is suitable for the measuring two-dimensional photographs and radiographs. Also three-dimensional objects such as study casts can be measured using it. Also it can measure the refractive index of glass slabs. Also diameter of capillary tube can be assessed using travelling microscope. [2,4]

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Volume 2, Issue 2; March-April 2019; Page No. 531-532