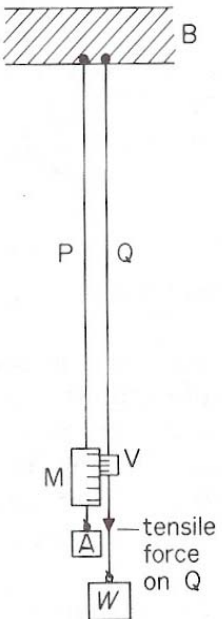
Measurement of Young's Modulus E for a long thin wire.

Method:




Two long thin steel wires, P, Q, are suspended beside each other from a rigid support B, such as a girder at the top of the ceiling. The wire P is kept taut by a weight A attached to its end and carries a scale M graduated in millimetres. The wire Q carries a vernier scale V which is alongside the scale M.

When a load *W* such as 10N is attached to the end of Q, the wire increases in length by an amount which can be read from the change in the reading on the vernier V. If the load is taken off and the reading on V returns to its original value, the wire is said to be *elastic* for loads from zero to 10 N, a term adopted by analogy with an elastic thread. When the load *W* is increased to 20 N the extension (increase in length) is obtained from V again; and if the reading on V returns to origin value when the load is removed the wire is said to be elastic at least for loads from zero to 20 N.
The Experiment is repeated for a number of times with ever increasing loads.

Precautions:

1. The experiment should be carried out using a common support both for the test and control wire, as any sagging will have no effect the measurement of the extension.
2. The wire under test should be uniform and free from kinks.
3. The area is measured by taking repeated readings of the diameter of the wire from different sections.
4. Repeated readings for extensions should be taken as this reduces margin of error.
5. After every instance that a load is added and removed the original length of the wire should always be obtained as this ensures that the elastic limit would not have been exceeded.

Table of Results:

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| W (N) | | | | | | |
| Extension (mm) | | | | | | |

A graph of Stress (F/A)
vs.
Strain (extension/Original Length) is plotted.

From the gradient the Young's Modulus is measured.