

**AIM:** To measure diameter of a given wire using screw gauge.

## APPARATUS

Screw gauge, wire, half-metre scale and magnifying lens.

## THEORY

1. If with the wire between plane faces A and B, the edge of the cap lies ahead of  $N$ th division of linear scale, then, linear scale reading (L.S.R.) =  $N$ .

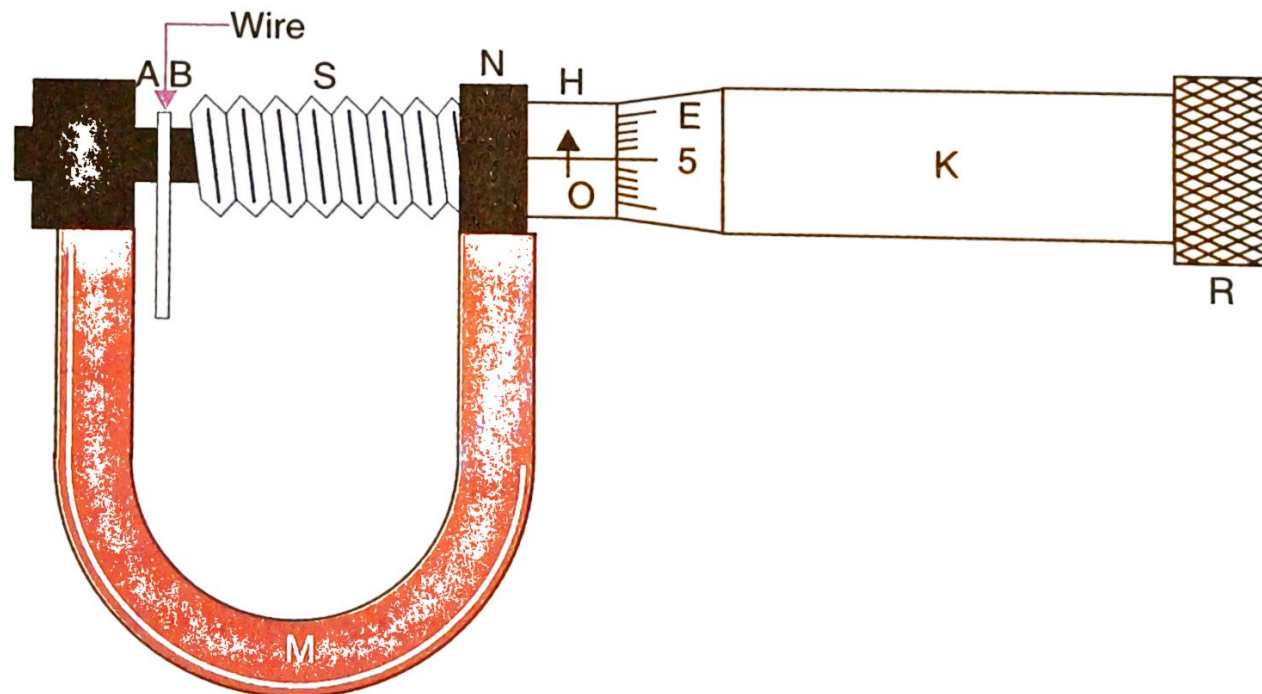
If  $n$ th division of circular scale lies over reference line, then, circular scale reading (C.S.R.) =  $n \times (\text{L.C.})$  (L.C. is least count of screw gauge)

$$\text{Total reading (T.R.)} = \text{L.S.R.} + \text{C.S.R.} = N + n \times (\text{L.C.}).$$

2. If  $D$  be the mean diameter and  $l$  be the mean length of the wire,

$$\text{volume of the wire, } V = \pi \left( \frac{D}{2} \right)^2 l.$$

## DIAGRAM



**Fig.** Screw gauge measuring diameter of the wire.

## PROCEDURE

1. Find the value of one linear scale division (L.S.D.).
2. Determine the pitch and the least count of the screw gauge and record it stepwise.
3. Bring the plane face *B* in contact with plane face *A* and find the zero error. Do it three times and record them. If there is no zero error, then record **zero error as nil**.
4. Move the face *B* away from face *A*. Place the wire lengthwise over face *A* and move the face *B* towards face *A* using the ratchet head *R*. Stop when *R* turns (slips) without moving the screw.
5. Note the number of divisions of the linear scale visible and uncovered by the edge of the cap. The reading (*N*) is called linear scale reading (L.S.R.).
6. Note the number (*n*) of the division of the circular scale lying over reference line.
7. Repeat steps 5 and 6 after rotating the wire by  $90^\circ$  for measuring diameter in a perpendicular direction.
8. Repeat steps 4, 5, 6 and 7 for five different positions separated equally throughout the length of the wire. Record the observations in each set in a tabular form.
9. Find total reading and apply zero correction in each case.
10. Take mean of different values of diameter.
11. Measure the length of the wire by stretching it along a half-metre scale. Keeping one end of wire at a known mark, note the position of other end. Difference in position of the two ends of the wire gives the length of the wire. Do it three times and record them.