Resistance Temperature Detectors

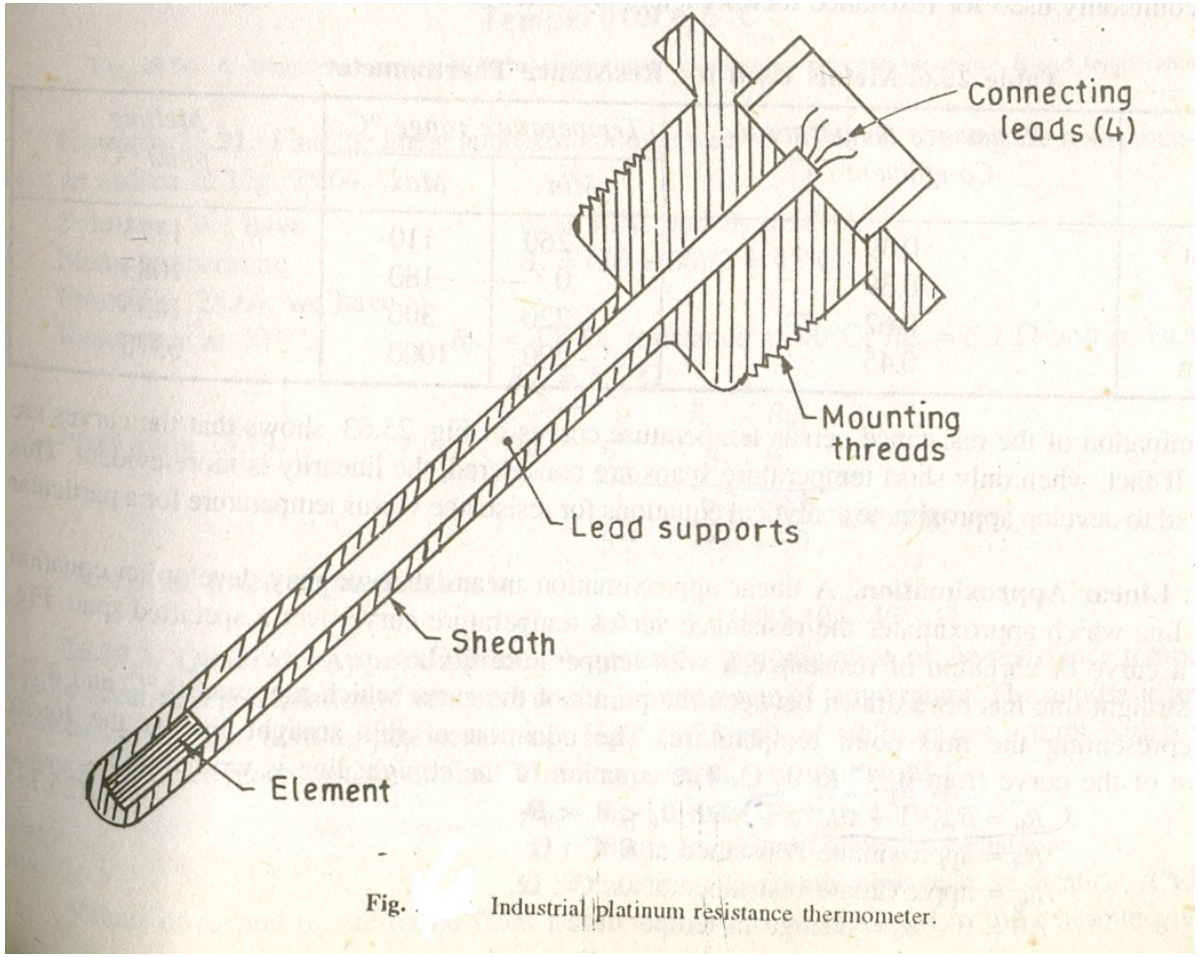

Fig. Industrial platinum resistance thermometer.

Resistance Temperature Detectors

- In RTD,the resistance of a conductor changes when its temperature is changed.
- $R=R_0(1+\alpha_1 T+ \alpha_2 T^2+\ldots\ldots\ldots\ldots \alpha_n T^n+\ldots.)$

Where R_0=resistance at temperature T=0 and $\alpha_1,\alpha_2,\ldots\ldots\ldots\ldots A_n$ are constants.

- Platinum is especially suited for this purpose,it can withstand high temperatures while maintaining excellent stability.

Resistance Temperature Detectors

- All metals produce a positive change in resistance with temperature.
- The requirements of a conductor material to be used in RTDs are:-
- The change in resistance of material per unit change in temperature should be as large as possible.
- The material should have a high value of resistivity so that minimum volume of material is used for the construction of RTD.

Resistance Temperature Detectors

- The resistance of materials should have a continuous and stable relationship with temperature.

Characteristics of Resistance Thermometers

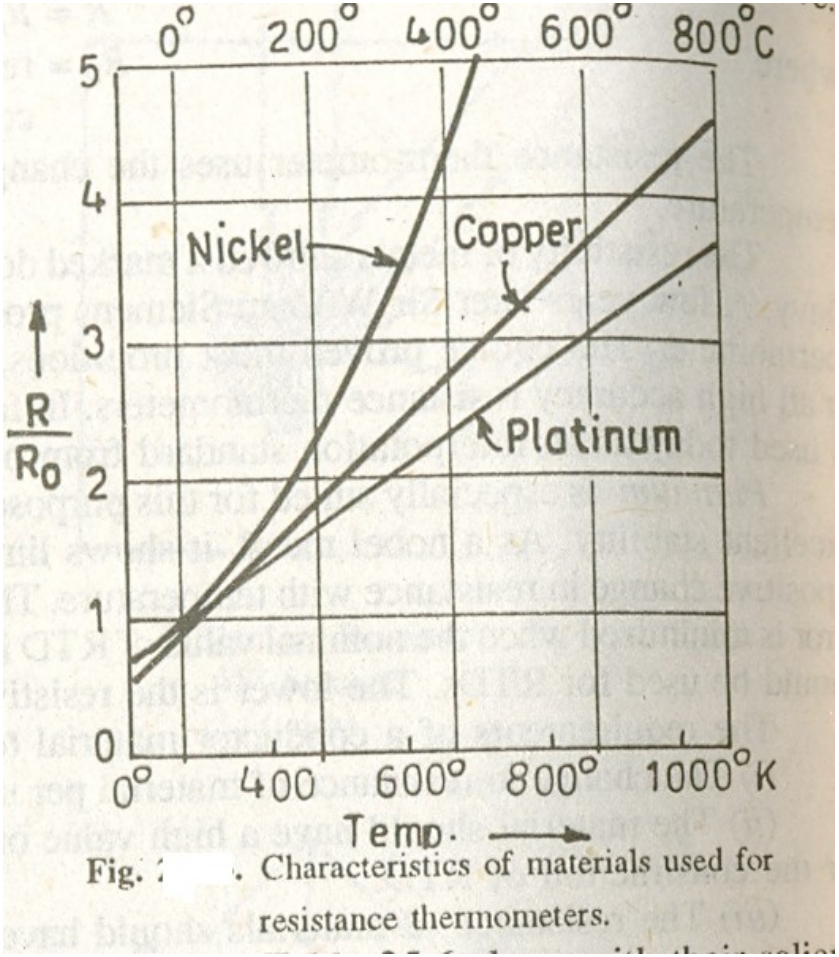

Fig. 1 . Characteristics of materials used for resistance thermometers.

Metals used for RTDs

properties.

Table Metals Used for Resistance Thermometers

Metal	*Resistance temperature Co-efficient /°C*	*Temperature range °C*		*Melting point °C*
		Min	*Max*	
Platinum	0.39	– 260	110	1773
Copper	0.39	0	180	1083
Nickel	0.62	– 220	300	1435
Tungsten	0.45	– 200	1000	3370

Fig. 25.60 shows that the curv

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