Peltier Effect Applied to the Design and Realization of a New Mass Flow Sensor

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The present paper deals with design and realization of a new mass flow sensor using the Peltier effect. The sensor, shaped as a bimetallic circuit includes two continuous parallel strips coated with a great deal of metal plated spots. In such a device, one track performs as a classical thermoelectrical circuitry whose both plated and uncoated parts provide the thermopile junctions. The other strip is subjected to electrical current so as to generate numerous small thermal gradients owing to the Peltier effect. Then, the resulting differences in temperature induce a Seebeck e.m.f. detected by the other strip acting as a receiver. The thermal coupling between transmitter and receiver tracks depends on many variation of the surrounding environment heat transfer coefficient. Therefore, such a device allows us to detect any shift in physical properties related to the apparent thermal conductivity. In special case of a steady state fluid, the induced e.m.f. in the receiving track hinges on the thermal conductivity. When the fluid is in relative motion along the sensor, the velocity can be read out as a funotion of voltage as a n application, the sensor is placed into a tube conducting a fluid flow, in order to design a new mass flowmeter.

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