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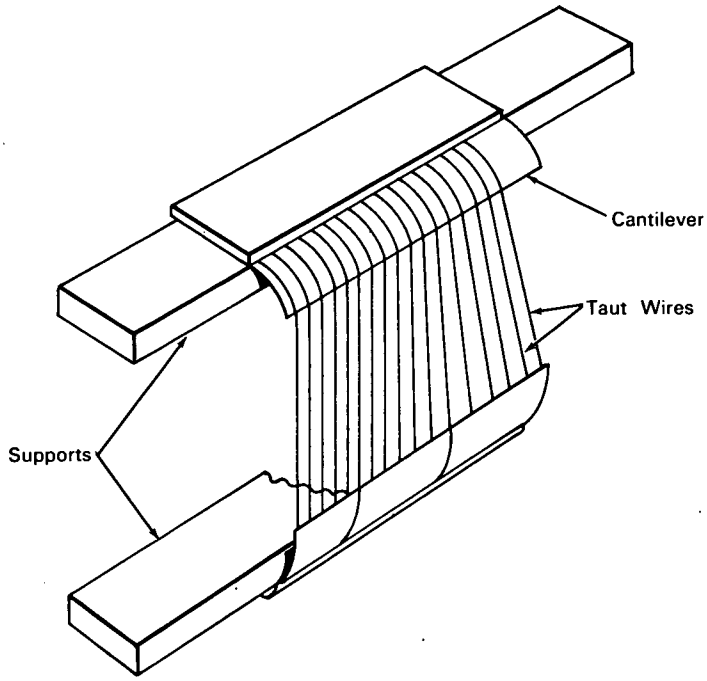
Brief 65-10149

NASA TECH BRIEF

Cantilever Springs Maintain Tension in Thermally Expanded Wires



The problem: To maintain a wire grid in a taut condition over a wide range of temperatures. The method must maintain an axial tension in the wires and absorb any slack produced by thermal expansion. A counterweight system was not satisfactory.

The solution: The wires are strung between two deflected cantilever springs that provide the necessary force displacement compensation to maintain tension in the wires as they undergo thermal expansion.

How it's done: Each end of the wire elements is attached to a thin cantilever spring mounted at one end on a support structure. By separating the two support structures a sufficient amount, a deflection is placed in the cantilever springs and, in turn, an axial tension is imposed on the wires. As the wires are heated, they expand and the cantilever springs give up some of their original deflection. With sufficient original cantilever deflection the wires remain taut at maximum operating temperatures.

(continued overleaf)

Notes:

1. This innovation has been used successfully over a range of room temperature to 2000°F to maintain proper tension in a set of 127 wires 0.005-inch in diameter and 2-1/2 inches long. Wires and cantilevers were of tantalum.
2. A modification could be used for wires with different coefficients of expansion by providing a separate cantilever for each wire.
3. Suggested applications are in large electron tube design, electric space heaters, and residential heat exchangers.
4. Inquiries concerning this innovation may be directed to:

   Technology Utilization Officer
   Lewis Research Center
   21000 Brookpark Road
   Cleveland, Ohio, 44135
   Reference: 65-10149

Patent status: NASA encourages commercial use of this innovation. No patent action is contemplated.

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(Lewis-136)