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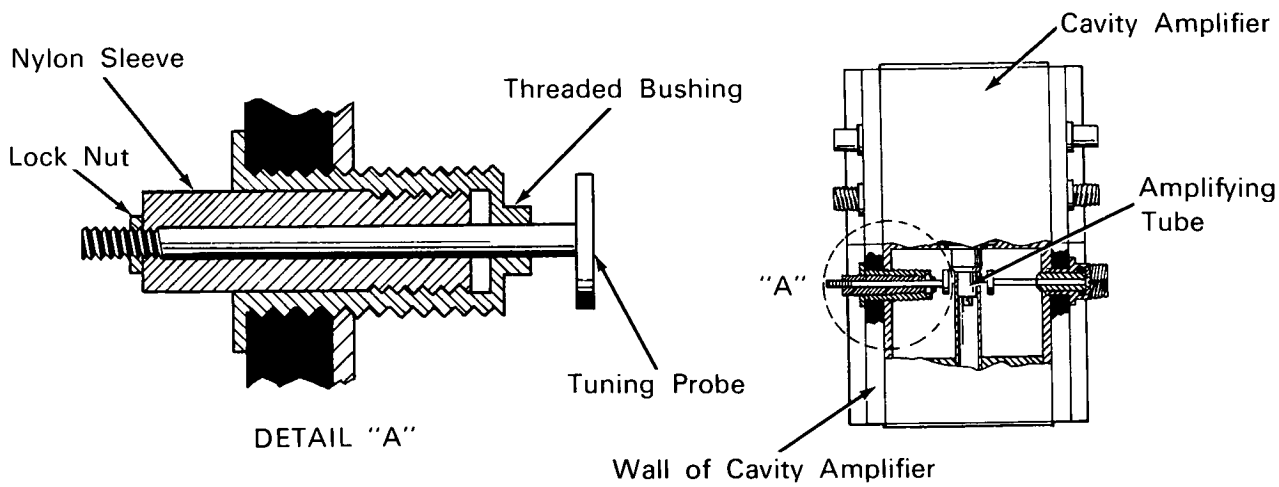
NASA TECH BRIEF

Nylon Sleeve for Cavity Amplifier Holds Tuning Despite Heat



The problem: Detuning of cavity amplifiers with change in temperature. This results in deterioration of the performance of the amplifier at its design frequency. In cavity amplifiers and filters it is desirable that constant performance be maintained regardless of thermal changes. These changes often cause an "off resonance shift" in a cavity filter and a deterioration of performance in a cavity amplifier.

The solution: Mount the tuning probe in a nylon sleeve. Thermal expansion and contraction of the nylon nullifies unwanted capacitive and inductive changes in the resonant elements.

How it's done: A nylon sleeve is fitted between the tuning probe and the threaded bushing in which it is mounted. The sleeve is tapped to permit adjustment of the threaded probe for proper tuning. The nylon has a higher thermal expansion ratio than the surrounding metal of the compensator housing. As the temperature rises, the nylon expands and carries the tuning probe away from the plate line. This action maintains the desired negative characteristic of the capacity of the tuning probe as related to the plate line.

The composite tuning probe with nylon sleeve reacts to temperature changes so that unwanted reactive changes are nullified. It can be adjusted to resonate the cavity either as the main tuning adjustment or as the compensating element. This innovation provides for excellent performance with respect to cost of the parts and construction.

Notes:

1. Application of this invention appears to be limited to cavity amplifiers and filters, but the principle of automatic temperature compensation by means of a nylon member that expands with an increase in temperature could be adapted to other electronic devices that require temperature compensation.

(continued overleaf)

2. For further information about this innovation inquiries may be directed to:

   Technology Utilization Officer
   Jet Propulsion Laboratory
   4800 Oak Grove Drive
   Pasadena, California 91103
   Reference: B63-10179

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(JPL-255)