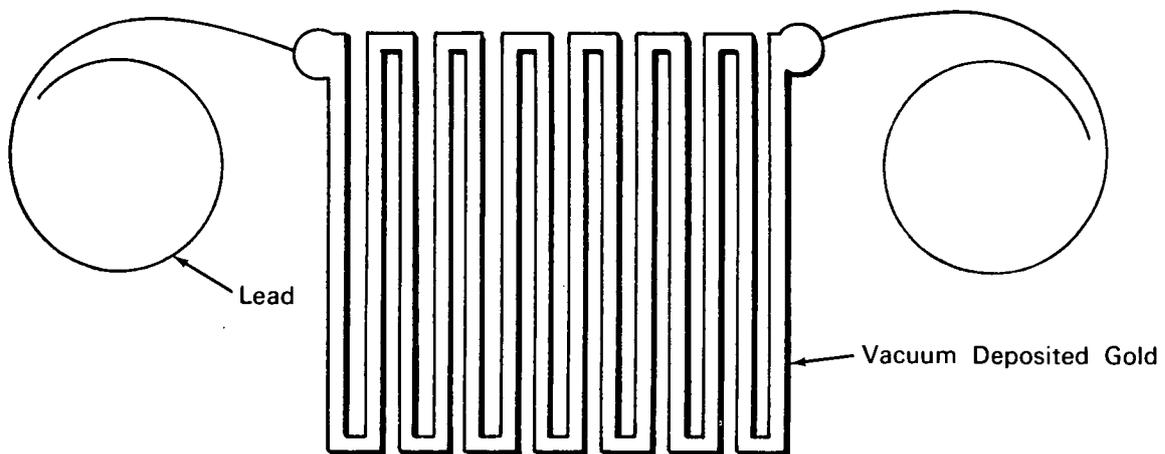


NASA TECH BRIEF



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Efficient Thin Film Heating Element Takes Minimum Space



The problem: Conventional elements for supplying small amounts of heat are somewhat bulky and have poor conductivity, requiring appreciable power inputs.

The solution: A light duty, thin-film heating element which is formed by vacuum deposition of metal onto a nonconductive surface to be heated.

How it's done: The evaporated metal heating element can be applied to thin plastic films such as polyethylene, glass, or metals having a polished surface. The shape of the heater depends on the resistance desired and the configuration required. A mask is prepared for depositing the metal to obtain the desired resistance and pattern. Terminals can be connected in various ways. If polyethylene is used, wires can be embedded in it and the film heating element can be evaporated over them, establishing contact.

Notes:

1. When the film heating element is applied on metals, anodizing or vapor coating is necessary to provide an insulating separator.
2. Materials such as paint or evaporated coatings, may be applied over the heater unit.
3. Vacuum deposited gold and nickel have both been used successfully as resistive elements.
4. Compared to conventional heating elements, this innovation has a much thinner structure and a much faster response time. It can be formed easier into a desired shape, can be used in very small areas, and can withstand limited flexure.
5. This idea may be of interest to manufacturers of heating elements, crystals, ovens, and packaged oscillators.

(continued overleaf)

6. Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
Goddard Space Flight Center
Greenbelt, Maryland, 20771
Reference: B65-10123

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

Source: Albert H. Busch
(GSFC-289)