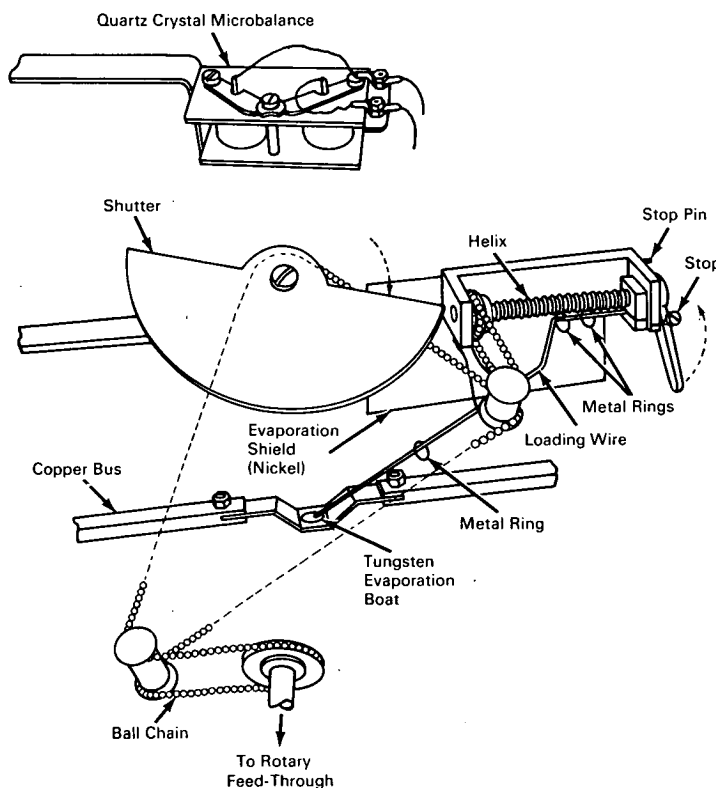


# NASA TECH BRIEF



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## Evaporant Feed Device Facilitates Flash Vapor Deposition Process in Vacuum



### The problem:

To devise a mechanism that will sequentially feed prescribed amounts of metal charges (evaporants) into an evaporation boat used for flash vapor deposition of the evaporants onto a substrate in a vacuum chamber. Sequential feeding and flashing of the evaporants, which may consist of several types of metals, must be accomplished without opening the vacuum chamber or moving the substrate during the deposition process.

### The solution:

A mechanism employing a helix that is advanced by external manual controls, extending through sealed feed-through devices into the chamber wall, to feed the desired metal evaporant into the evaporation boat. The evaporants are made in the form of rings of specified dimensions, according to the desired thickness of metal (metals) to be deposited onto the substrate.

(continued overleaf)

**How it's done:**

Before beginning a deposition operation, the evaporant rings are spaced at prescribed intervals on the loading wire. Stop pins are used for repositioning the loading wire in a reproducible manner. The substrate and quartz crystal microbalance (used to weigh the deposited metal) are supported over the evaporation boat.

In carrying out a deposition in the evacuated chamber, electrical power is switched to the bus bar to heat the evaporation boat to operating temperature. The helix is then advanced by means of the ball-chain linkage until the first evaporant ring slips down the loading wire into the evaporation boat. The position of the shutter is set so that the substrate and microbalance are unshielded when the metal ring strikes the hot evaporation boat. At other times, the quartz crystal microbalance is shielded in order to mini-

mize heating effects. After one flash evaporation is completed, additional evaporations are carried out by sequentially feeding the metal rings into the evaporation boat in a similar manner.

**Note:**

Inquiries concerning this innovation may be directed to:

Technology Utilization Officer  
NASA Pasadena Office  
4800 Oak Grove Drive  
Pasadena, California 91103  
Reference: B67-10320

**Patent status:**

No patent action is contemplated by NASA.

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(NPO-10232)