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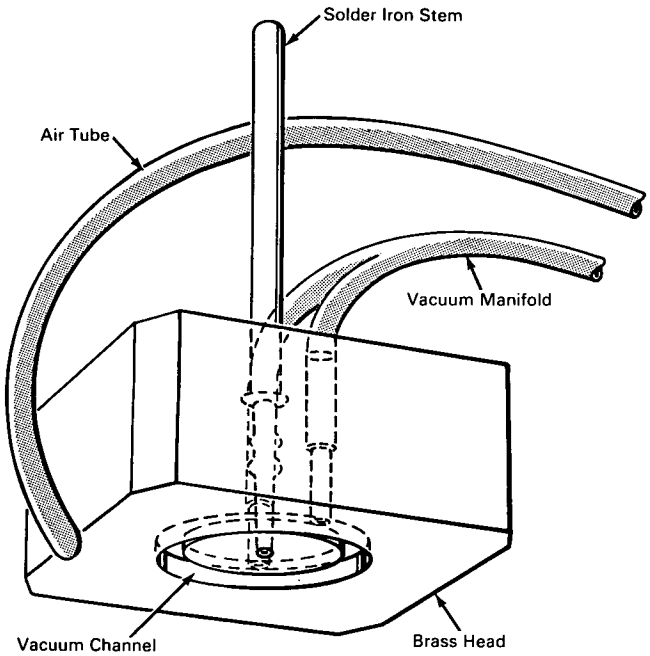
NASA TECH BRIEF

Tool Permits Damage-Free Removal of Solar Cell



The problem:

To design a tool for extracting a wrap-around solar cell that is attached with solder or adhesive to a substrate. This function must be accomplished without destroying the cell being removed or damaging adjacent cells. The present technique is to heat the cell with a soldering iron and simultaneously pry it off with a wedge-shaped instrument. This technique frequently results in damage to substrate, and unnecessary hazard to the surrounding cells.

The solution:

Heat, vacuum, and compressed air, operated from a special head attached to a conventional soldering iron, loosens, extracts, and protects the cell.

How it's done:

The tool consists of a standard 60 to 100 watt soldering iron element that is attached to a specially machined head. The lower portion of the head area is made as large as the cell to be removed. On this surface is a circular groove with two through-holes,

(continued overleaf)

perpendicular to its flat surface. A manifold arrangement connects the holes and permits attachment of a line from a vacuum source. The head thickness of about 5 inches acts as a heat source to assure quick heat saturation of the cell to be removed. There is also a preset air nozzle pointed at the heated area to cool it immediately after cell removal.

The head is heated by the soldering iron element to about 400° F. At this temperature, most plastics lose their bonding strength and solder will melt. The head is placed squarely on the glass slip (the vacuum groove being on the glass slip surface) and grips the slip by vacuum force. The heat of the head breaks the bond strength of the adhesive holding the slip. With a slight upward pull, the slip pulls away from the cell intact. Repeating this step on the cell's surface will remove the cell.

Removal of either glass slip or cell from the head is accomplished by shutting off the vacuum. Immediately after cell removal, an air valve allows compressed air to go out through the preset air nozzle to cool the affected area. This retards heat dissipation to nearby vital areas.

Notes:

1. Slight modification to tool and procedure permits this device to be used with conventional solar cells.
2. Inquiries concerning this innovation may be directed to:

   Technology Utilization Officer
   Goddard Space Flight Center
   Greenbelt, Maryland, 20771
   Reference: B66-10219

Patent status:

No patent action is contemplated by NASA.

Source: James E. Beckley, Jr.
of Comprehensive Designers, Inc.
under contract to
Goddard Space Flight Center
(GSFC-467)