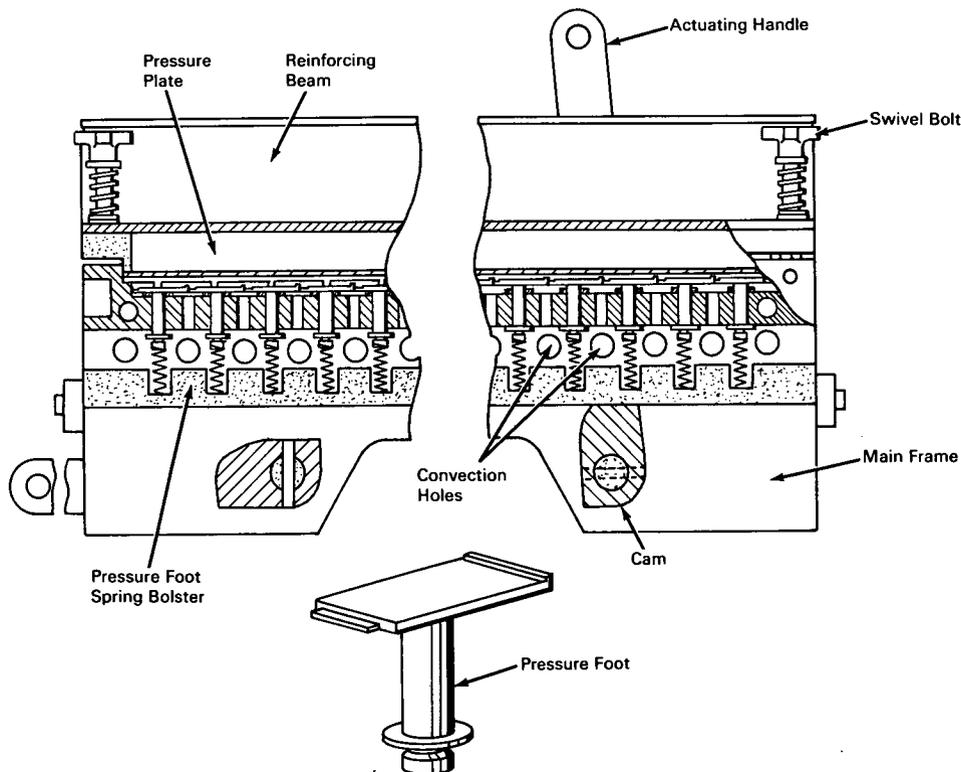


NASA TECH BRIEF



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Assembly Jig Assures Reliable Solar Cell Modules



The problem:

The assembly of solar cell modules by hand-soldering methods has involved uneven thermal conditions that result in cracked lead wires and damage to cell structures by warping and separation of cell material from substrate.

The solution:

An assembly jig, designed to the configuration of the planned module, that holds all components firmly

and precisely in place as the assembly is soldered and bonded by the even heat of an oven.

How it's done:

The assembly jig has a main frame of side and end plates that support the rest of the components. A pressure foot spring bolster is operated upward or downward by the action of handle actuated cams versus spring tension. The bolster is countersunk with a number of recesses that contain springs that engage the pressure feet on which the solar cells are

(continued overleaf)

placed, sensitive face down. When all solar cells are in place, solder strips are placed in the grooves between the cells and a printed circuit board overlaid on these components. A suitable bonding agent is placed on the circuit board and the module substrate is placed on the bonding agent. The cam handles are moved to the up position forcing the pressure foot spring bolster upward causing the assembled solar cell module components to bear against the pressure plate that is placed above them. The pressure plate is secured by four swivel bolts that operate in slots at the ends of the side plates. A reinforcing "I" beam above the pressure plate maintains the flat plane of the module beneath the pressure plate rigidly.

Following these procedures, the jig with its assembled and contained solar cell module components is placed in a suitable oven and heated to the proper

temperature for flow of the solder and bonding agent. The jig and its contents are removed and allowed to cool. Convection holes along both side plates assist in the heating and cooling processes.

Note:

This invention lends itself to almost limitless sizes and configurations of solar cell module design.

Patent status:

Title to this invention has been waived under the provisions of the National Aeronautics and Space Act (42 U.S.C. 2457 (f)), to TRW Space Technology Laboratories, One Space Park, Redondo Beach, California.

Source: Herbert W. O'Farrell of TRW Space Technology Laboratories under contract to Goddard Space Flight Center (GSFC-455)