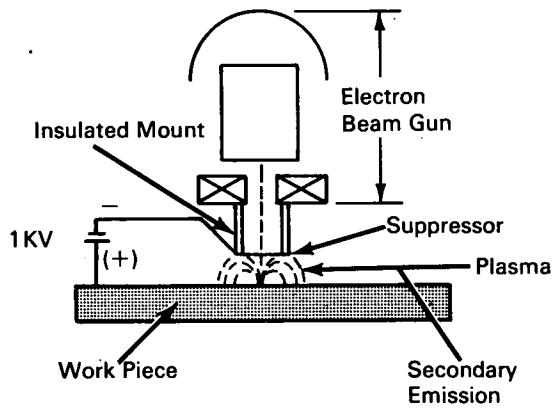
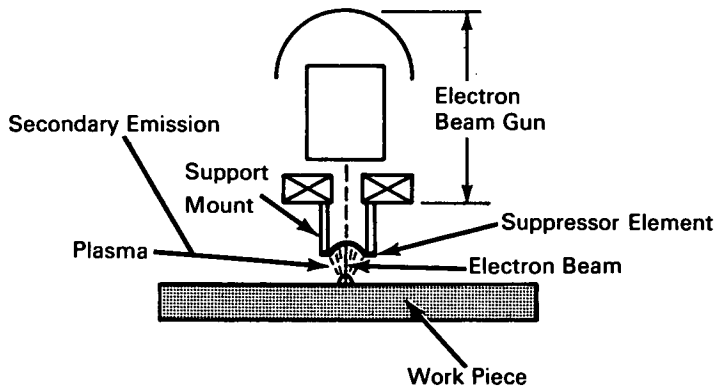
NASA TECH BRIEF

Suppressor Plate Eliminates Undesired Arcing During Electron Beam Welding





The problem:

To weld aluminum alloys with an electron beam welding machine. Since the introduction of the electron beam welding machine arcing has been a major problem, and welding aluminum alloys, such as the 7000 series, could not be readily accomplished with the electron beam machine. Ordinarily, the electron beam passes through the gun and strikes the work at a high velocity causing secondary emission of ions and electrons which create the undesired arcing.

The solution:

To provide a grid at ground potential which will collect secondary emission, or to provide a negatively energized suppressor grid which will repel the plasma.

How it's done:

An arc suppressor element, consisting of a suppressor plate and support tube, is connected to the bottom of the focus coil of the electron beam gun. The secondary emission of ions and electrons is collected on the suppressor plate which is mounted approximately 1/4-inch above the work as shown on the right, or the suppressor plate may be supported by an insulated support tube and negatively energized, thus redirecting the secondary emission back to the work as shown on the left.

Notes:

1. There is a notable increase in beam efficiency and the grounding screens covering the view ports are no longer needed.
2. Inquiries concerning this invention may be directed to:

   Technology Utilization Officer
   Marshall Space Flight Center
   Huntsville, Alabama 35812
   Reference: B66-10357

(continued overleaf)

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

Source: Karl K. Hanchey, NASA,
James C. Mahon, NASA,
and James Kubik,
Hayes International Corp.
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