

NASA TECH BRIEF



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Ultrasonic Recording Scanner Used for Nondestructive Weld Inspection

The problem:

To design a lightweight, portable instrument for nondestructive inspection of welds.

The solution:

An ultrasonic recording scanner.

How it's done:

The scanner employs two point-beam ultrasonic transducers mounted in a V configuration, so that the ultrasonic beams intersect at a common point on the test surface. One transducer transmits the ultrasonic signal and the other receives the ultrasonic signal reflected from the test surface. The chart recorder is a simple independently driven paper roller system.

In operation, the transducers are focused over the weld area. While in this position, the transducer system is oscillated back and forth across the weld area. The ultrasonic signals transmitted and received by the transducers are relayed through a commercial power pack. So long as the weld area presents a uniform field to the transmitted ultrasonic wave, the stylus remains in contact with the chart paper and records a tracing of the ultrasonic signals picked up by the receiving transducer. The moment a change appears in the weld area, the ultrasonic signal relayed through the power pack energizes the solenoid, which causes the stylus to retract from the paper, leaving a blank space on the chart. As soon as a uniform area is again detected, the solenoid releases the stylus to make contact with the recording paper.

In this manner, the entire scanned weld area is represented by a series of tracings and blank spots on the chart. The resultant chart provides a simple, direct-reading record of the weld quality, without requiring further processing or transcription of the data.

Notes:

1. The recording scanner is adaptable to continuous operation in one direction while maintaining oscillatory motion at 90° to this direction. The scanning speed and oscillation frequency are independently adjustable. Each recording can be code-numbered by remote control to identify the weld location.
2. A related innovation is described in NASA Tech Brief B66-10178, May 1966. Inquiries may also be directed to:

Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama, 35812
Reference: B66-10220

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: The Boeing Company
under contract to
Marshall Space Flight Center
(M-FS-284)

Category 01