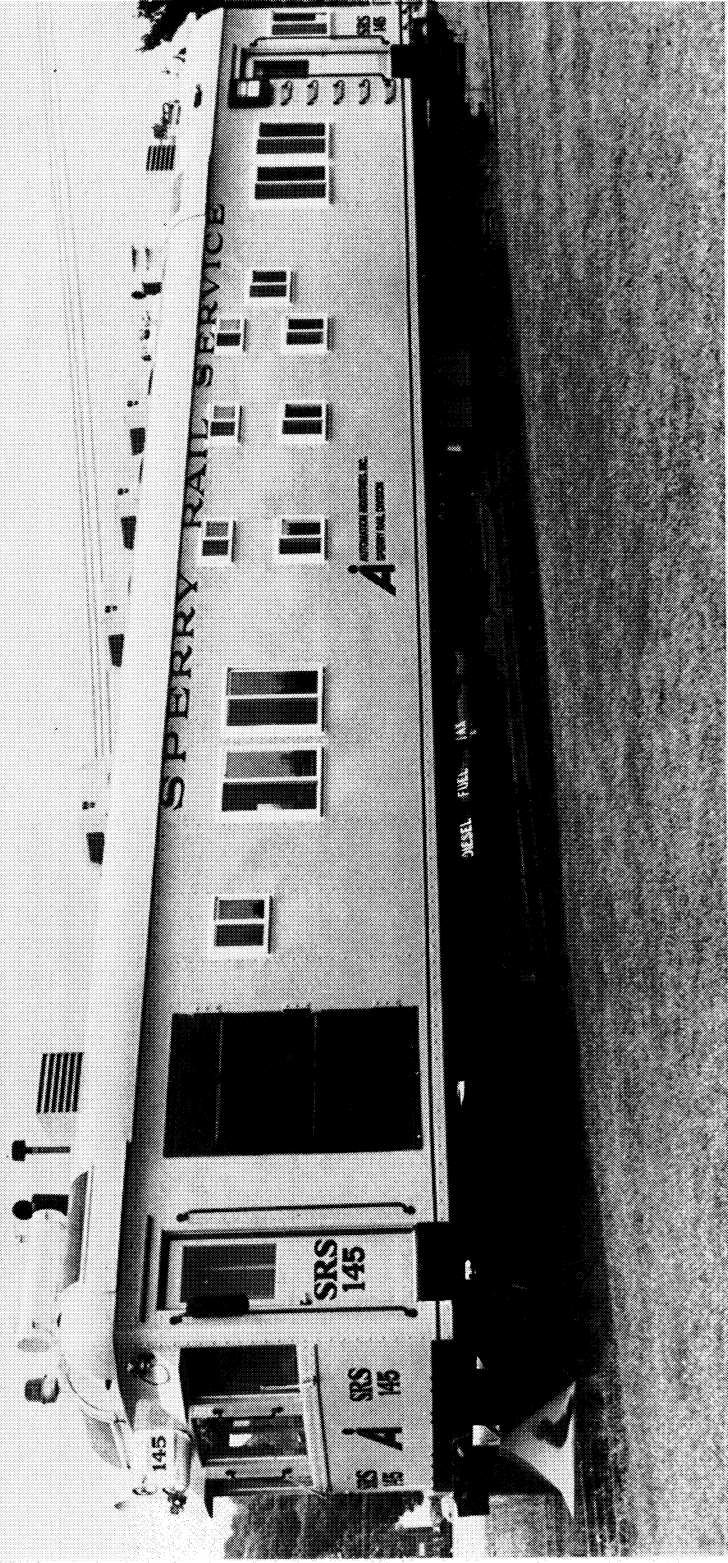
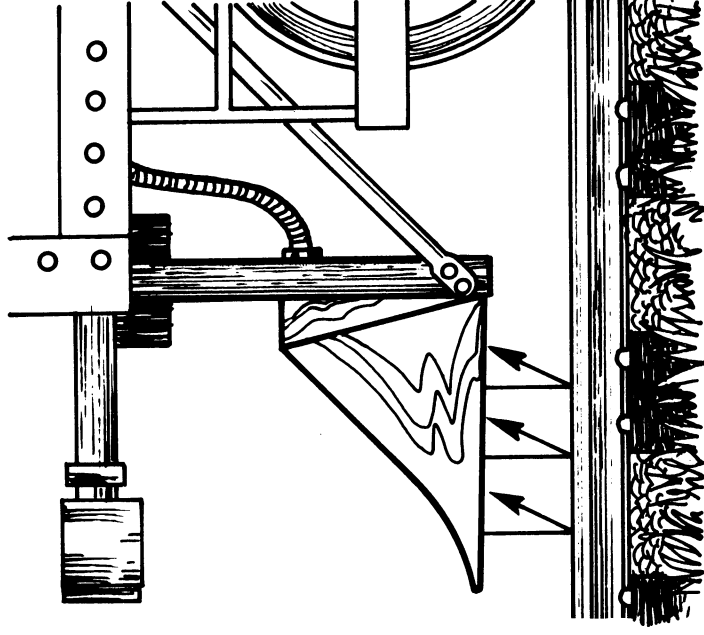




"Delta manipulator" is mounted beneath instrumented railroad car above to inspect track welds. The instrument uses two or more transducers that transmit ultrasonic energy into the track at an angle that produces shear-waves (right). The sound propagates in the track until it strikes an interface which differs in acoustic impedance from the parent material, interrupting the propagation pattern of the sound beam. The interface may be an inclusion, crack, or absence of weld penetration.



Ultrasonic inspection

A Connecticut company, Automation Industries Inc., has had more than \$2-million in contracts to produce innovative equipment for the Apollo program and has successfully spun off many times that amount in sales.

When the Marshall Space Flight Center sought a fast, nondestructive way to inspect butt welds in aluminum alloys for spacecraft, the company developed a reliable ultrasonic device using multiple transducers. Called a "delta manipulator," it can detect lack of weld penetrations not readily seen in radiographs.

That was only the beginning. Automation Industries soon adapted the ultrasonic equipment to a unique rail inspection device that saves countless man hours. The device is contained in self-propelled railroad cars produced and operated by the company to check old track welds for deterioration.

The company operates 28 of the cars on U.S. rails and several in Australia, Europe, and Mexico. The cars move along at about 7 mph, inspecting 160,000 miles of track annually for 100 different railroads.