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[54] **ULTRASONIC INSPECTION OF SEAL INTEGRITY OF BOND LINES IN SEALED CONTAINERS**

[75] Inventors: **David Jarman**, Oswego, N.Y.; **Bahram Farahbakhsh**, Kingston; **Ralph Herzig**, Ottawa, both of Canada

[73] Assignee: **Alcan International Limited**, Montreal, Canada

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[58] Field of Search 73/588, 599, 600, 582, 73/609, 610, 614, 645, 646

[56] **References Cited**

U.S. PATENT DOCUMENTS

2,971,372	2/1961	Lewis et al.	73/610
3,384,767	5/1968	Arnold et al.	73/600
4,457,174	7/1984	Bar-Cohen et al.	73/582
4,750,368	6/1988	Shearer et al.	73/600

4,821,573	4/1989	Nagata et al.	73/597

FOREIGN PATENT DOCUMENTS

85023	1/1983	Australia .
2757355	7/1979	Germany .
0186753	9/1985	Japan .
2194041	2/1988	United Kingdom .

OTHER PUBLICATIONS

"On–line Detection of Food Container Faults" by J. D. Selman, R&D Review (Feb. 1987).

"Possibilities of Testing Lap–Welded Joints In Thermoplastic Sealing" by S. Langrock, Zis Mitteilungen (vol. 25, iss. 8, 1983) pp. 796–803.

Primary Examiner—Hezron E. Williams
Assistant Examiner—Rose M. Finley
Attorney, Agent, or Firm—Cooper & Dunham

[57] **ABSTRACT**

A method for determining bond integrity of a sealed package has a lid bonded to a container rim by detecting flaws in the bond between the lid and the container. The method comprises: i) positioning the container rim between an ultrasonic transmitter system and an ultrasonic receiver system; ii) ultrasonically coupling the transmitter system and the receiver system to the container rim; iii) transmitting ultrasound waves from the transmitter system through the container rim to the receiver system; iv) generating a signal representative of the ultrasound waves received by the receiver system; and v) analyzing the signal for predetermined signal characteristics representative of a flaw in the bond to identify a flawed package seal.

4 Claims, 8 Drawing Sheets