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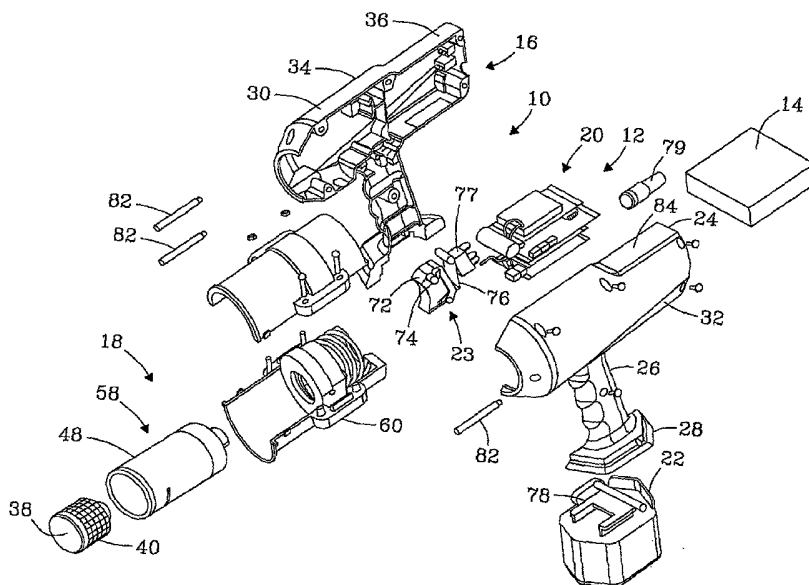
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[Continued on next page]

(54) Title: DEVICE FOR ACOUSTIC INSPECTION OF CONTAINER CONTENT



(57) Abstract: An ultrasound inspection apparatus particularly adapted to examine containers (sealed or unsealed) containing a liquid or solid bulk material. The apparatus has an overall configuration of a hand held pistol with a front transducer contact surface that is positioned against a front wall of the container. An ultrasound pulse is transmitted from the apparatus to be reflected from a back wall of a container being investigated. The received echo pulse is converted to a digital waveform. The waveform is analyzed relative to temperature, travel distance of the pulse(s), and time of travel to ascertain characteristics of the liquid or other materials and to provide identification of the same.

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**INTERNATIONAL SEARCH REPORT**

International Application No  
PCT/US 03/26408

<b>A. CLASSIFICATION OF SUBJECT MATTER</b>		
IPC 7 G01N29/18 G01F23/296 G01N29/10		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b>		
Minimum documentation searched (classification system followed by classification symbols) IPC 7 G01N G01F G01B G01S G01M		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 568 449 A (ROUNTREE STEVEN P ET AL) 22 October 1996 (1996-10-22)	1, 22, 23, 29-32, 34-37, 40-46, 55, 56
Y	abstract; claims 1,9; figures 1,2,5,9A-9D	2, 3, 6, 7, 14-19, 24-28, 33, 38, 39, 47, 48
A	column 5, line 58 - column 16, line 3	4, 5, 8-13
X	US 6 216 623 B1 (WILKINS LARRY C) 17 April 2001 (2001-04-17)	1, 55, 56
Y	claims 1-4; figure 3  column 1, line 34 - column 6, line 13	14-19, 47-54
	-/--	
<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> Patent family members are listed in annex.		
° Special categories of cited documents :		
"A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed		"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family
Date of the actual completion of the international search  3 November 2004		Date of mailing of the international search report  17. 11. 2004
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016		Authorized officer  Uttenthaler, E

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 03/26408

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	US 4 407 293 A (SUAREZ JR JOE R ET AL) 4 October 1983 (1983-10-04) abstract; claims 1,9; figures 1-3 column 2, line 8 - column 6, line 38 -----	2,3,6,7, 14-19,25 20,21
A	US 4 241 430 A (KAYEM DOUGLAS J ET AL) 23 December 1980 (1980-12-23) the whole document -----	1-13,55, 56
Y A	US 4 584 676 A (NEWMAN JOHN W) 22 April 1986 (1986-04-22)  the whole document -----	24, 26-28, 38,39, 47-54 1-13,55, 56
A	US 5 619 423 A (SCRANTZ LEONARD) 8 April 1997 (1997-04-08) abstract; claim 1; figures 2,4 column 2, line 28 - column 11, line 4 -----	1,55,56
Y A	EP 0 635 719 A (GEN ELECTRIC) 25 January 1995 (1995-01-25) abstract; claim 1; figures 1,2 column 2, line 42 - column 6, line 30 -----	14 15-21
Y	WO 01/94934 A (BRIEN EDWIN WILLIAM O ; BAE SYSTEMS PLC (GB); IBBOTSON ANDREW ROBERT ( ) 13 December 2001 (2001-12-13) abstract; claims 1,11; figure 2 page 5, line 9 - page 12, line 2 -----	33,38,39

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US 03/26408

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
  
3.  Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1.  As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2.  As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3.  As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4.  No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

### Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

## 1. claims: 1(part),2-13, 55,56

The housing of the portably operable ultrasound apparatus has a gun-like structure comprising a hand grip with a trigger section and a mounting platform for the computer on the upper housing.

## 2. claims: 1(part), 14-21

The ultrasound transducers comprise a front contact surface positioned adjacent to a surface of a container being inspected, and a front contact layer of a synthetic rubber covering the front contact surface so as to be able to conform to the surface of the container being inspected.

## 3. claims: 1(part),22-39

The signal processing and control section comprises a gate array for effecting the control functions and the circuit section comprises an EPROM information storage component.

## 4. claims: 1(part), 40-54

The computer is arranged to identify waveform peaks above a threshold level and ascertain time intervals in paths of travel between waveform peak portions and initially seeking to identify a time interval between a first backwall echo and a second back wall echo represented in the waveforms and the computer is arranged to correlate the time intervals between waveform peaks and a temperature input to establish a temperature adjusted velocity of ultrasonic pulses.

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 03/26408

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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