



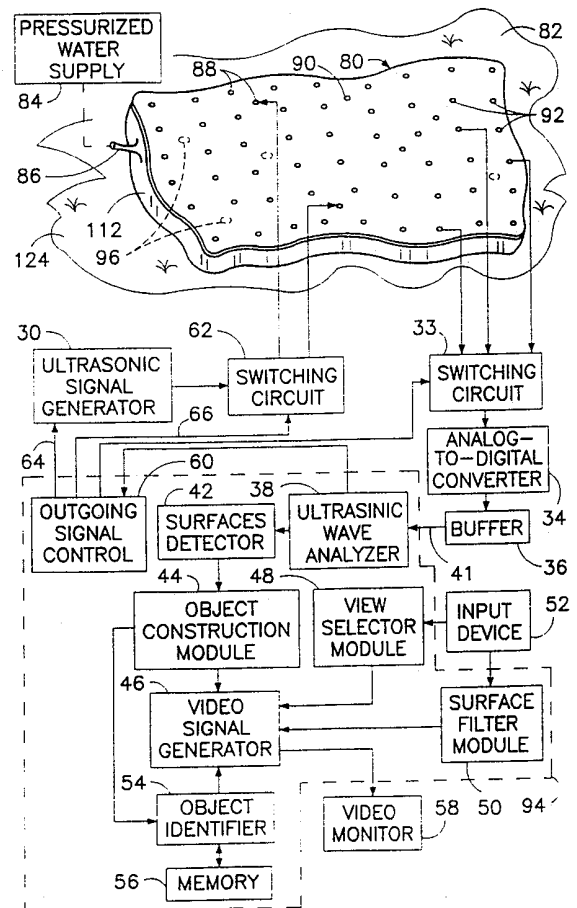
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<p>(21) International Application Number: PCT/US99/05725 (22) International Filing Date: 12 March 1999 (12.03.99)  (30) Priority Data: 09/040,094 17 March 1998 (17.03.98) US 09/063,019 20 April 1998 (20.04.98) US 09/112,487 9 July 1998 (09.07.98) US 09/121,488 23 July 1998 (23.07.98) US  (71) Applicant: WILK PATENT DEVELOPMENT CORPORATION [US/US]; 160 Third Avenue, New York, NY 10003 (US).  (72) Inventor: WILK, Peter, J.; 160 Third Avenue, New York, NY 10003 (US).  (74) Agent: SUDOL, R., Neil; Coleman Sudol, LLP, 14th floor, 708 Third Avenue, New York, NY 10017 (US).</p>	<p>(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</p> <p><b>Published</b> <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p> <p>(88) Date of publication of the international search report: 2 December 1999 (02.12.99)</p>	

(54) Title: IMAGING SYSTEM FOR DETECTING UNDERGROUND AND UNDERWATER OBJECTS AND ASSOCIATED METHOD

(57) Abstract

A method for detecting hidden objects utilizes a plurality of electromechanical transducers including at least one electroacoustic pressure wave generator (88) and at least one acoustoelectric sensor (92) above a selected ground or water surface or a surface of an object located underground or underwater. Accordingly, the method is useful for detecting underground or underwater objects. Pursuant to the method, locations of the transducers relative to one another are determined, the pressure wave generator is energized to produce an outgoing pressure wave, and the outgoing pressure wave is transmitted through the selected surface. Incoming pressure waves are detecting which are reflected by hidden surfaces generally below the selected surface in response to the outgoing pressure wave. The incoming pressure waves are analyzed (38) to determine three-dimensional shapes of hidden objects disposed below the selected surface, whether underground or underwater. Various views of the hidden objects are displayable on a video monitor (58).



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## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US99/05725

<b>A. CLASSIFICATION OF SUBJECT MATTER</b>		
IPC(6) : G01S 15/89; G03B 42/06; G01V 1/30 US CL : 367/1,7,11,13,56,87, 96, 99; 89/1.13; 73/594; 181/108 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) U.S. : 367/1,7,11,13,56,87, 96, 99; 89/1.13; 73/594; 181/108		
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 practicable, search terms used)		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 3,585,577 A (ROLLWITZ et al) 15 JUNE 1971 (15/06/1971), see entire document.	14
A	US 4,197,591 A (HAGEMANN) 08 APRIL 1980, (08/04/1980), see abstract.	51-102
A	US 4,403,311 A (TOURNOIS) 06 SEPTEMBER 1983 (06/09/1983), see abstract.	51-102
Y	US 4,727,329 A (BEHR) 23 FEBRUARY 1988 (23/02/1988), see entire document.	7,8,23,24
Y	US 5,128,904 A (CHAMBERS) 07 JULY 1992 (07/07/1992), see entire document.	4
A	US 5,184,330 A (ADAMS et al) 02 FEBRUARY 1993 (02/02/1993), see abstract.	51-102
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
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Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230		Authorized officer <i>Deane Bortoluzzi</i> D. PIHULIC Telephone No. (703) 306-4168

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US99/05725

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,323,683 A (DILHAN et al) 28 JUNE 1994 (28/06/1994), see entire document.	3,4,18,19
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Y,P	US 5,808,969 A (ARNAUD et al) 15 SEPTEMBER 1998 (15/09/1998), see entire document.	1-26
Y	FR 2,728,354 A (ARNAUD et al) 21 JUNE 1996 (21/06/1996), see entire document.	1-26