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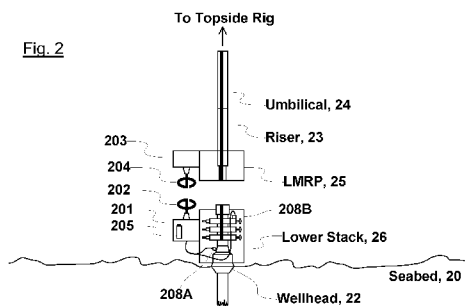
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(54) Title: WIRELESS AUXILIARY MONITORING AND CONTROL SYSTEM FOR AN UNDERWATER INSTALLATION



(57) Abstract: The present invention provides a wireless auxiliary system for monitoring and control of an underwater installation. The auxiliary system of the present invention sends data and control signals between an underwater installation - for example, a lower stack (26) in a hydrocarbon drilling or production facility - and an associated riser assembly (23). Data is collected by sensor network (208A, 208B) and is transmitted from a first transceiver (201) to a second transceiver (203) by electromagnetic signals. First transceiver (201) is powered by a local power supply (205). To conserve power consumption, the first transceiver is designed to become active for a short time and then to switch to an inactive mode. For example, wireless data transfer may occur after the detachment or just prior to the reattachment of riser assembly (23) to the underwater installation. Wireless data transfer may also occur on receipt of a handshaking signal from second transceiver (203). Thus, the system of the present invention is capable of providing soft shut-down mode for the underwater installation on detachment of riser assembly (23) and can also safeguard potential risks of reattaching riser (23) when the underwater installation in an unknown state.



# INTERNATIONAL SEARCH REPORT

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**A. CLASSIFICATION OF SUBJECT MATTER**  
 INV. E21B43/01  
 ADD.  
 According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**  
 Minimum documentation searched (classification system followed by classification symbols)  
 E21B H04Q H04B

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

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3 717 844 A (BARRETT ET AL.) 20 February 1973 (1973-02-20) column 3, line 28 - line 35 -----	1,18
A	GB 2 377 131 A (SCHLUMBERGER) 31 December 2002 (2002-12-31) page 3, line 28 - page 2, line 23 -----	1,18

Further documents are listed in the continuation of Box C.

See patent family annex.

\* Special categories of cited documents :

<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"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</p> <p>"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</p> <p>"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.</p> <p>"&amp;" document member of the same patent family</p>
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer  <b>Rampelmann, Klaus</b>
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**INTERNATIONAL SEARCH REPORT**

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 3717844	A 20-02-1973	BE 747972 A1	31-08-1970
		CA 923216 A1	20-03-1973
		DE 2015773 A1	15-10-1970
		FR 2040580 A5	22-01-1971
		GB 1310411 A	21-03-1973
		NL 7004769 A	06-10-1970
		SE 380957 B	17-11-1975
		US 3717844 A	20-02-1973
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GB 2377131	A 31-12-2002	BR 0202248 A	20-05-2003
		GB 2377131 A	31-12-2002
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