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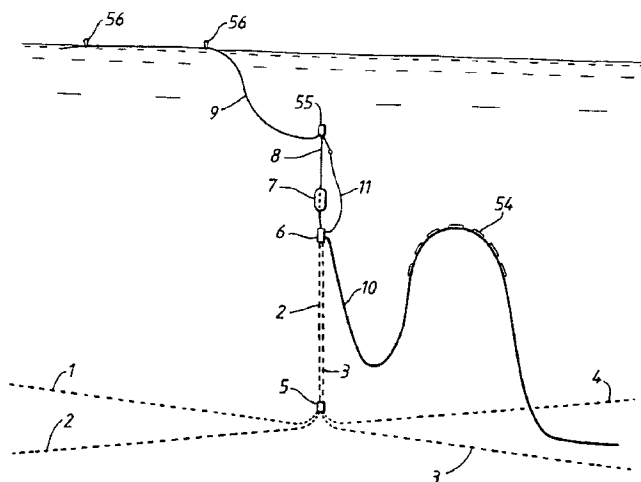
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(54) Mooring systems

(57) A mooring system for the mooring of a tanker or production vessel at an offshore oil production site comprises a plurality of anchor lines, for example four (1,2,3,4), each having a sea-bed anchor at its distal end, an anchor line assembly unit (5) through which passes at least one (2,3) of the anchor lines and to which each of the other anchor lines (1,4) is secured at its proximal end, a swivel unit (6) to which the proximal end of each passing anchor line (2,3) is attached, and a sub-surface buoyancy device (7) also attached to the swivel unit,

each passing anchor line (2,3) having a stop member (12) for limiting the travel of the assembly unit (5) along the line in a direction towards its distal end. A mooring line (8) is also attached to the swivel unit (6), and a messenger line (9) having surface marker buoys (56) for location and pick-up of the mooring is attached to the mooring line. In a loading or production system at least one riser hose (10) is attached to the swivel unit (6) for communication through the swivel unit to a respective continuation hose (11) for connection to the moored vessel.

**Fig.1****EP 0 820 927 A3**



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EUROPEAN SEARCH REPORT

Application Number
EP 97 30 5520

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	US 3 111 926 A (SHATTO) 26 November 1963 * column 2, line 27 - line 71; figures 1-5 *	1,3,7, 21,25, 26,28-30	B63B21/50 B63B22/02 B63B21/04
A	US 3 547 067 A (JONKMAN) 15 December 1970 * column 2, line 17 - line 64; figures 1,2 *	1,11	
A	GB 2 250 006 A (BLUEWATER TERMINAL SYSTEMS N.V.) 27 May 1992 * page 4, line 33 - page 5, line 14; figures 3,4 *	1,10,20	
A	US 4 741 716 A (HASEBE ET AL) 3 May 1988 * column 2, line 61 - column 3, line 12; figures 1-3 *	14,31	
A	WO 95 01904 A (DEN NORSKE STATS OLJESELSKAP A.S.) 19 January 1995 * abstract; figure 3 *	15-17, 19,31-33	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
A	GB 2 257 405 A (BECHTEL LTD) 13 January 1993 * figure 1 *	22	B63B F16L
A	FR 2 646 395 A (INSTITUT FRANCAIS DU PETROLE) 2 November 1990 * page 7, line 23 - page 8, line 6; figures 2-4 *	23,24	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 28 August 1998	Examiner DE SENA, A
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

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