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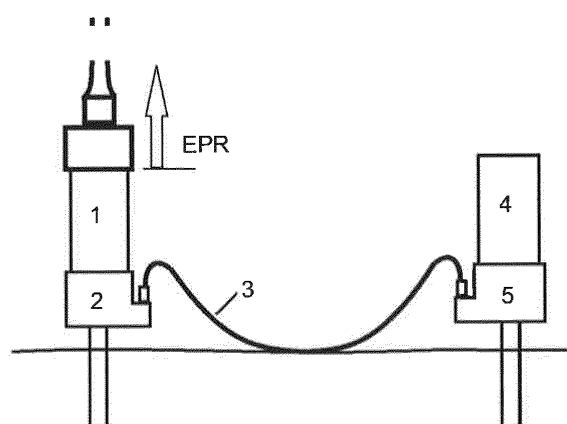
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(54) **GAS-LIQUID SEPARATION AND COMPRESSION/PUMPING UNITS CAPABLE OF BEING MOUNTED IN PRODUCTION WELLS AND INJECTION WELLS**

(57) The present invention refers to individual sub-sea solutions to be applied in production well for gas-liquid separation and injection well for compression or pumping of gas or water current in subsea systems of oil exploration. Said solutions refer to a unit for gas-liquid separation mountable in production well, which comprises a unit of gas-liquid separation (1) directly connected to an adapter base of BAP production or "Tubing Head" (2); and a unit for compression/pumping mountable in injection well comprising a unit of compression or pumping (4) that is directly connected to a BAP or ("Tubing Head") (5), being the flow line having gas or water to be injected connected to the BAP or ("Tubing Head") (5).

FIGURE 1



Description**Claims****Field of the Invention**

[0001] The present invention refers to individual sub-sea solutions to be applied in production well for gas-liquid separation and injection well for compression or pumping of the gas or water current in subsea systems of oil exploration.

Description of the Invention

[0002] As depicted in Figure 1, the present invention refers to a unit of gas-liquid separation (1) that is connected to an adapter base of BAP production or "Tubing Head" (2), or alternatively in a well head with string suspensor previously installed in the production well.

[0003] Said unit of gas-liquid separation (1) comprises also the barriers necessary to safety and control of the well, such that to discard the use of a wet Christmas tree ("X-tree").

[0004] The unit of gas-liquid separation (1) directs the separated gas for a flow line (3) through the BAP mandrel (2). Alternatively, the said unit of gas-liquid separation (1) may also provide the mandrel for connecting the flow line (3) to the gas outlet. Doing so, the separated liquid is sent to a second flow line through a second mandrel in the BAP. Additionally, the unit of gas-liquid separation (1) may also provide the mandrel for connecting the liquid flow line.

[0005] The application of this solution according to the present invention is specially indicated for anticipated production systems (SPA) or long duration tests (TLD). In this case, the mandrel for liquid outlet of the unit of gas-liquid separation (1) may be provided in its top, easing the connection with SPA or TLD for sending the liquid current to the surface facilities.

[0006] In the injection well, the solution according to the present invention comprises a unit of compression or pumping (4) that is directly connected to a BAP or ("Tubing Head") (5) or to a well head with string suspensor. The flow line having gas or water to be injected may be connected to BAP or ("Tubing Head") (5) or, alternatively, directly to the unit of compression/pumping (4). The gas or liquid is then compressed or pumped to the injector well.

[0007] It is important to note that said unit of compression/pumping (4) also has the barriers necessary to safety and to control of the well, which also makes the use of a wet Christmas tree ("X-tree") dispensable.

[0008] As can be appreciated by those skilled in the art, the solution according to the present invention is easily applicable to sceneries with several wells where the gas and liquids produced or to be injected may be distributed through the subsea arrangement having traditional equipment, such as manifolds and PLEMs.

1. Unit of gas-liquid separation mountable in production well, wherein it comprises a unit of gas-liquid separation (1) directly connected to an adapter base of BAP production or "Tubing Head" (2), as well as the barriers necessary to safety and control of the well, such that to discard the use of a wet Christmas tree ("X-tree").
2. Unit of gas-liquid separation mountable in production well, according to claim 1, wherein it is connected to a well head with string suspensor previously installed in the production well.
3. Unit of gas-liquid separation mountable in production well, according to claim 1, wherein said unit of gas-liquid separation (1) directs the separated gas to a flow line (3) through a BAP mandrel (2).
4. Unit of gas-liquid separation mountable in production well, according to claim 1, wherein said unit of gas-liquid separation (1) may also provide the mandrel for connecting the flow line (3) to the gas outlet, such that the separated liquid is sent to a second flow line through a second mandrel in the BAP.
5. Unit of gas-liquid separation mountable in production well, according to claim 1, wherein said unit of gas-liquid separation (1) may also provide the mandrel for connecting the liquid flow line.
6. Unit of gas-liquid separation mountable in production well, according to claim 1, wherein it is applied in anticipated production systems (SPA) or long duration tests (TLD), the liquid outlet mandrel for the gas-liquid separating unit (1) is therefore capable of being provided at its top.
7. Unit of compression/pumping mountable in injection well, comprising a unit of compression or pumping (4) that is directly connected to a BAP or ("Tubing Head") (5), being the flow line having the gas or water to be injected connected to the BAP or ("Tubing Head") (5).
8. Unit of compression/pumping mountable in injection well, according to claim 7, wherein it is directly connected to a well head with string suspensor.
9. Unit of compression/pumping mountable in injection well, according to claim 7, wherein said flow line having gas or water to be injected is directly connected to the unit of compression/pumping (4).
10. Unit of compression/pumping mountable in injection well, according to claim 7, wherein said unit of compression/pumping (4) also has the barriers necessary

sary to safety and control of the well, making the use of a wet Christmas tree ("*X-tree*") dispensable.

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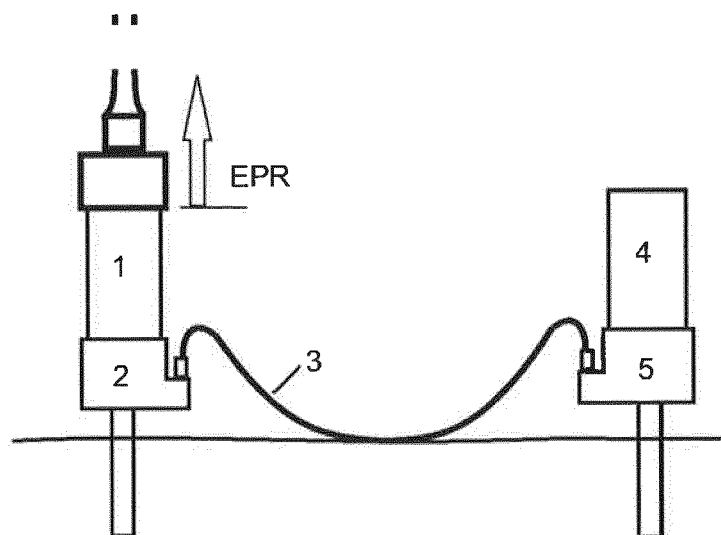
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FIGURE 1



INTERNATIONAL SEARCH REPORT

International application No.

PCT/BR2016/050035

A. CLASSIFICATION OF SUBJECT MATTER

E21B 43/38 (2006.01), E21B 43/12 (2006.01), E21B43/013 (2006.01), E21B 47/00 (2006.01)

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

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SINPI(Banco de patentes INPI-BR), Google Patents

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6068053 A (BAKER HUGHES LTD [GB]) 30 May 2000 (2000-05-30) Description, column 2, line 67 to column 3, line 3 Abstract Figures 1 and 5	1 to 10
A	US 2005173322 AI (INGE OSTERGAARD [NO]) 11 August 2005 (2005-08-11)	
A	CN 201412129 Y (PETROCHINA CO LTD) 24 February 2010 (2010-02-24)	

☒ Further documents are listed in the continuation of Box C.
 ☒ See patent family annex.

* Special categories of cited documents:	"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
"A" document defining the general state of the art which is not considered to be of particular relevance	
"E" earlier application or patent but published on or after the international filing date	"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
"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)	"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
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

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Date of mailing of the international search report

08/04/2016

Name and mailing address of the ISA/BR


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INTERNATIONAL SEARCH REPORT

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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