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ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI,
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[Continued on next page]

(54) Title: SUBSEA COOLER

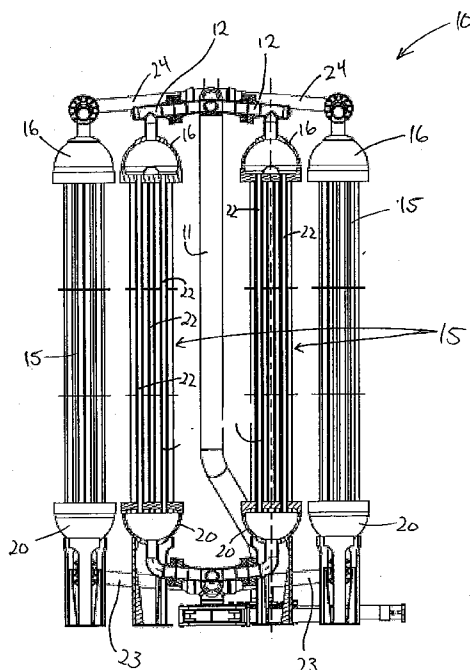


Fig. 9

(57) Abstract: The subsea cooler (10) comprises an inlet manifold (16) and an outlet manifold (20) which are connectable to the subsea flow line and at least two cooling sections arranged in fluid communication with the inlet and the outlet of the subsea cooler. Each cooling section (15) includes a plurality of cooling pipes (22) which are configured such that they exchange heat energy with the surrounding sea water when the subsea cooler is in use. The subsea cooler (10) further comprising at least one distributing pipe (24) for each cooling section (15) extending between a primary distribution point (28) and respective cooling sections (15), the distributing pipes (24) being inclined relative to a horizontal plane when the subsea cooler is installed on the seabed such that the fluid flows downwards from the primary distribution point (28) toward the cooling sections (15).



ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV,
MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM,
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
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INTERNATIONAL SEARCH REPORT

International application No
PCT/N02010/000121

A. CLASSIFICATION OF SUBJECT MATTER

INV. E21B36/00 E21B43/01 E21B43/12 F28F27/02 F28F9/02
F28G9/00

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 F17D F28F F28D F28G

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.
X	US 3 205 939 A (ANDRE HUET) 14 September 1965 (1965-09-14)	1-4, 6-8, 34
Y	the whole document	12
Y	FR 1 495 857 A (ZEITZ HYDRIERWERK) 22 September 1967 (1967-09-22) figures	12
X	US 2 670 933 A (BAY THOMAS J) 2 March 1954 (1954-03-02)	1, 3, 5-8, 15, 16, 20, 23, 32-34
Y	column 5, line 67; figure 4	31
	----- -/-	

☒ Further documents are listed in the continuation of Box C.

☒ See patent family 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

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"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

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Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/N02010/000121

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 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 No. III Observations where unity of invention is lacking (Continuation of Item 3 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 fees, this Authority did not invite payment of additional fees.
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 and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☒ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No
PCT/N02010/000121

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 2008/147219 A2 (FMC KONGSBERG SUBSEA AS [NO]; STEN-HALVORSEN VIDAR [NO]; BAGGERUD ERIK) 4 December 2008 (2008-12-04) cited in the application page 4, line 4 - line 22; claim 1; figure 3 -----	31,35-37
X	US 2 059 255 A (LASSIAT RAYMOND C) 3 November 1936 (1936-11-03) figures -----	1,4,6-8, 16,20, 23,34
X	FR 2 098 411 A1 (BBC SULZER TURBOMASCHINEN) 10 March 1972 (1972-03-10) figure 1 -----	1-3, 6-11,16, 20,23, 30,32,34
Y	US 1 449 753 A (CHRISTIAN HULSMeyer) 27 March 1923 (1923-03-27) page 1, line 28 - line 49; figures -----	35-37
A	DE 885 714 C (HUELMEYER CHRISTIAN) 6 August 1953 (1953-08-06) page 2, line 42 - line 52 -----	35-37

INTERNATIONAL SEARCH REPORT

International application No
PCT/N02010/000121

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 3205939	A	14-09-1965	DE 1257157 B GB 949778 A NL 249238 A	28-12-1967 19-02-1964
FR 1495857	A	22-09-1967	NONE	
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WO 2008147219	A2	04-12-2008	AU 2008257714 A1 EP 2156014 A2 NO 330761 B1 US 2010252227 A1	04-12-2008 24-02-2010 04-07-2011 07-10-2010
US 2059255	A	03-11-1936	NONE	
FR 2098411	A1	10-03-1972	CH 518514 A	31-01-1972
US 1449753	A	27-03-1923	NONE	
DE 885714	C	06-08-1953	NONE	

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-34

Subsea cooler

2. claims: 35-37

Method for removing wax and/or hydrate and/or sand and debris which accumulate in a subsea cooler
