

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43bis.1)**

To:

see form PCT/ISA/220

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/NL2018/050567

International filing date (day/month/year)
04.09.2018

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05.09.2017

International Patent Classification (IPC) or both national classification and IPC
INV. E02F5/10 E02F3/88

Applicant
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1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA:



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Date of completion of this opinion

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Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 - the international application in the language in which it was filed.
 - a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).
2. This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:
 - a. forming part of the international application as filed:
 - in the form of an Annex C/ST.25 text file.
 - on paper or in the form of an image file.
 - b. furnished together with the international application under PCT Rule 13ter.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
 - c. furnished subsequent to the international filing date for the purposes of international search only:
 - in the form of an Annex C/ST.25 text file (Rule 13ter.1(a)).
 - on paper or in the form of an image file (Rule 13ter.1(b) and Administrative Instructions, Section 713).
4. In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	<u>4, 8, 9, 14, 15, 17-21, 26, 30-33</u>
	No: Claims	<u>1-3, 5-7, 10-13, 16, 22-25, 27-29</u>
Inventive step (IS)	Yes: Claims	
	No: Claims	<u>1-33</u>
Industrial applicability (IA)	Yes: Claims	<u>1-33</u>
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

1 **Re Item VIII**

Certain observations on the international application

1.1 Independent claims 1 and 27

The application does not meet the requirements of Article 6 PCT, because independent claims 1 and 27 are not clear.

In claim 1, two operation modes are defined "when the subsea support frame is fixed to the cart" and "when the subsea support frame is separate from the cart". No support could be found in the description for those two modes. It is even contradictory to the embodiment of the description on fig. 3A, 3B, 4A, 4B and on page 13, line 15 to page 14, line 3, wherein the carts 5 and 7 are always fixed or connected to the subsea frame through connecting arms 37 and 39. The carts are not separate from the subsea frame as they are always connected to it. This connection can be fixed (fig. 3A, 3B) when the connecting arms are coupled to the subsea frame (page 13, lines 15-26) and this connection can be pivotal (fig. 4A, 4B) when the connecting arms are uncoupled to the subsea frame (page 13, line 27 - page 14, line 3).

It results therefore in a lack of clarity for claim 1 (Art. 6 PCT).

Independent claim 27 defines the method implemented by the machine described in independent claim 1. The objection to the subject-matter of claim 1 applies therefore, mutatis mutandis, to the subject-matter of claim 27 and the subject-matter of claim 27 is unclear (Art. 6 PCT).

1.2 Dependent claim 16

The English formulation used in claim 16 is confusing and unclear (Art. 6 PCT).

1.3 Dependent claim 26

The dependency of claim 26 is contradictory with the former claims (Art. 6 PCT).

2 **Re Item V**

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

2.1 Reference is made to the following documents:

- D1 WO 2009/141409 A2 (SAIPEM SPA [IT]; LAZZARIN DIEGO [IT]; FONTOLAN MASSIMO [IT]) 26 November 2009 (2009-11-26)
- D2 US 3 583 170 A (DEVRIES DOUWE) 8 June 1971 (1971-06-08)
- D3 WO 2017/017599 A1 (SAIPEM SPA [IT]) 2 February 2017 (2017-02-02)
- D4 US 6 022 173 A (SAXON SAINT E [US]) 8 February 2000 (2000-02-08)
- D5 US 4 087 981 A (NORMAN ROBERT M) 9 May 1978 (1978-05-09)
- D6 GB 2 014 538 A (LAND & MARINE ENG LTD) 30 August 1979 (1979-08-30)

2.2 Independent claim 1

D1 discloses in fig. 8, 9, 10A to 10D and page 11, line 1 to page 15, line 26:

Subsea trencher (8) for arranging at least partly into the seabed (fig. 10B, 10C, 10D) a subsea pipeline (4) laying on the seabed (fig. 10A), the subsea trencher comprising:

- at least one cart (30) that separately carries at least one trench tool (fluidifier 33) and is configured to run along the subsea pipeline (through thrusters 39), wherein the trench tool is configured to work the seabed underneath the subsea pipeline (fig. 10A-10D) ; wherein
- a subsea support frame (28), that carries, separately from the cart (30), heavy subsea equipment (35, 36) connected to the trench tool (33) for operating the trench tool, and wherein when the subsea support frame is fixed to the cart (*we consider here the position of fig. 10A wherein 30 has not been slid down in the ground*), the subsea trencher is configured to load at least substantially the assembled weight of the cart and the subsea support frame onto the subsea pipeline as the subsea trencher runs on the subsea pipeline (*page 12, lines 2 to 11 wherein it is stated that the thrusters 39 are suitable to transfer weight to the pipeline; moreover due to the position on fig. 10A, the as-*

sembled weight of the trencher 8 is loaded on the pipeline), and when the subsea support frame is separate from the cart (we consider here the positions on fig. 10B, 10C or 10D wherein the cart 30 is slid down in the trench) , the subsea support frame (28) is configured to be arranged beside the subsea pipeline at a distance from the subsea pipeline as the cart runs along the subsea pipeline (through 29 and the straddle like frame 28, frame 28 is arranged beside the pipeline at a distance thereof, fig. 8,9).

The subject-matter of claim 1 is also disclosed, at least implicitly, in D2, in fig. 1 to 10 with the cart (10) and the subsea frame 12 both connecting through pivotal connecting arms 24, the subsea frame 12 being arranged beside the subsea pipeline (fig. 3) (due to the pivotal connecting arms, the two unclearly defined modes of operation are considered to be disclosed depending on the position of the connecting arms relative to 12).

The subject-matter of claim 1 is therefore not new (Article 33(2) PCT).

Furthermore the combination of D1 with D2 (fig. 18) or D1 with D5 wherein the propulsion devices 29 of D1 could be replaced by the obvious alternative disclosed to the person skilled in the art in D2, fig. 18 (with the suspension cable for the straddle frame 116 suspended above the seabed and the towing cable TL) or in D5 (fig 1 to 3, buoyancy tank 14). This would lead to the alternative defined in claim 1 wherein "the subsea support frame is configured to be suspended above the seabed as the cart runs along the subsea pipeline".

The subject-matter of claim 1 does not therefore involve an inventive step either (Art. 33(3) PCT).

2.3 Independent claim 27

Independent claim 27 defines the method implemented by the machine described in independent claim 1. The objection to the subject-matter of claim 1 applies therefore, mutatis mutandis, to the subject-matter of claim 27 and the subject-matter of claim 27 is neither new (Art. 33(2) PCT) and nor does it involve an inventive step (Art. 33(3) PCT).

2.4 Dependent claims - negative opinion

Following dependent claims do not appear to contain any additional features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty (Art. 33(2) PCT).

- Claims 2, 28

D1 (fig. 10A-10D), D2 (fig. 10, 12)

- Claims 3, 29

D1 (pump 35)

- Claim 5

D1 (connecting structure 31, 32), D2 (connecting arms 24)

- Claims 6, 7

D1 (sliding movement of 30 compared to frame 28), D2 (pivoting connection of arms 24)

- Claims 10, 11, 12

D2 (pivoting connection of arms 24, pivot around one degree)

- Claim 13

D1 (fig. 3 with carts 8)

- Claim 16

D1 (wheels 41), D2 (wheels 102, 112-114 and 106-108)

- Claim 22

D2 (wheels 112-114 and 106-108)

- Claims 23, 24

D1 (fluidifier 33, pump 35)

- Claim 25

D2 (cutters 76A-76C)

Following dependent claims do not appear to contain any additional features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step (Art. 33(3) PCT).

- Claims 4, 30 (D1+D2-fig. 18)

see D2, fig. 18 and arguments in point 2.1

- Claim 8 (D1+D2 -fig. 18 or D1+D5)

The vertical sliding movement of 30 relative to frame 28 of D1 is considered to allow heave motion of the subsea support frame. (see point 2.1 too for "suspended")

- Claim 9 (D1+D2 -fig. 18 or D1+D5)

see D3 (fig. 9B) with cantilever beams connections 28, wherein their motion ranges enables to restrict swaying of the subsea support frame (to restrict the surging motion or in other words the heave motion, see claim 8) (see point 2.1 too for "suspended").

- Claims 13, 14, 15 (D2 as closest prior art)

see D3 (fig. 9A to 9D) with one cart and trench tool at the front and one cart and trench tool at the rear of the trencher 10 with connecting arms and hinges as defined in claims 14 and 15.

- Claims 17, 18, 19, 20, 21, 31, 32, 33 (D1 or D2 as closest prior art)

see D4 (fig. 11, 12 with driven wheels 11A and 11B) and/or D6 (fig. 1 to 3) with tracked wheel set with track pads/shoes)

- Claim 26 (D2 as closest prior art)

A pneumatic motor 54 as disclosed in D2 is a well-known alternative to a hydraulic motor to the person skilled in the art and to place the power supply of the trench tool on the frame 12 is an alternative disclosed in D1.

3 **Re Item VII**

Certain defects in the international application

3.1 The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

3.2 Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in D1 and/or D2 is not mentioned in the description, nor are these documents identified therein.