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(54) **Bow coupling device.**

(57) The invention relates to a method for coupling a manoeuvrable vessel to a floating structure, the method comprising;
- providing a pickup system coupled to the floating structure, the pickup system comprising a float,
- providing a vessel coupling system comprising manoeuvrable coupling means on the manoeuvrable vessel,
- aiming the manoeuvrable coupling means towards the pickup system,
- guiding the manoeuvrable coupling means into float coupling means of the pickup system, such that the manoeuvrable coupling means is accommodated in to the float coupling means,
- locking the manoeuvrable coupling means into the float coupling means, such that a coupling connection between the manoeuvrable vessel and the floating structure is established,
- connecting the floating structure to the coupling vessel.

Bow coupling device

Background

5 The present invention relates to a method for coupling a manoeuvrable vessel to a floating structure.

 Such a method is known from EP0670392A1 wherein a device is disclosed having a conduit coupling whose one coupling part extends at the outlet of a pressure conduit of a suction dredger over the bow. The other coupling part of the device is
10 provided as a floating hose conduit formed as the end of a flushing tube conduit. A pickup line is coupled to the floating hose. Upon hauling in of the pickup line, the one and the other coupling part are brought together and coupled for transport of dredge under pressure.

 The known method for coupling is disadvantageous since while manoeuvring the
15 vessel, sight to the floating hose and pickup line is poor. As a result thereof, damage may occur or coupling procedures may take more time, in particular under severe weather and heavy sea conditions. In addition, the known method is cumbersome and unsafe for personnel. This is particularly true in coastal waters in stormy weather and rough seas.

20 Generally, a suction dredger transports dredge or soil from the bottom of a body of water, especially from the ocean floor near the coast to the shore over a greater distance and rinsed there a floating line for the recovery of land for tilling land.

Summary of the invention

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 The invention aims to provide a method to facilitate coupling of a manoeuvrable vessel to a floating structure, wherein the method is more safe for personnel and allows operations at more severe sea conditions.

 Another object of the invention is to solve, at least partly, a problem associated
30 with known methods for coupling of a manoeuvrable vessel to a floating structure.

 Yet another object of the invention is to provide an alternative method for coupling of a manoeuvrable vessel to a floating structure.

According to a first aspect of the invention this is realized with a method for coupling a manoeuvrable vessel to a floating structure, the method comprising;

- providing a pickup system coupled to the floating structure, the pickup system comprising a float,
- 5 – providing a manoeuvrable vessel comprising a coupling device for coupling the vessel to the floating structure, the coupling device comprising manoeuvrable coupling means on the manoeuvrable vessel,
- aiming the manoeuvrable coupling means towards the pickup system,
- guiding the manoeuvrable coupling means towards float coupling means of
10 the pickup system, such that the manoeuvrable coupling means engage the float coupling means in a coupling manner,
- locking the float coupling means with respect to the manoeuvrable coupling means, such that a coupling connection between the manoeuvrable vessel and the floating structure is established,
- 15 – connecting the floating structure to the coupling vessel for transport of fluidized matter, like dredge between the vessel and the floating structure.

The method provides an improved coupling wherein a distance between the floating structure and the vessel may be observed in order to prevent damage while still being able to provide a coupling connection between the manoeuvrable vessel, also
20 referred to as coupling vessel, and the floating structure. In other words, the method provides an improved window of operation with respect to e.g. heavy sea conditions. This enables an improved usability of costly equipment like a dredger hopper at sea.

It will be understood that the manoeuvrable coupling means may be part of the float. Important is that a difference in vertical movement between the float and the
25 vessel can be accommodated by manoeuvrable coupling means such that the float and the vessel do not bump. The manoeuvrable coupling means may be part of the vessel and/or the float.

According to a further aspect of the invention, this is realized with a coupling system for connecting a floating structure a manoeuvrable vessel, in particular the bow
30 of the manoeuvrable vessel, the bow coupling system comprising a pickup system and a coupling vessel, whereby the pickup systems comprises at least a float for buoyancy of the floating structure on a water surface and a float coupling means connected to the at least one float, which float coupling means extends from the float above the water

surface, and whereby the coupling vessel comprises a coupling device having manoeuvrable coupling means for engaging the float coupling means of the pickup system, such that a coupling connection between the manoeuvrable vessel and the floating structure is obtained.

5

In an embodiment of the coupling system, the coupling connection is obtained by accommodation of the manoeuvrable coupling means in the float coupling means. This even more facilitates to establish a coupling connection between the vessel and the floating structure.

10

In an embodiment, the coupling device is articulated and comprises;

a leading coupling device member provided with the coupling means for engaging the float coupling means of the pickup system,

a trailing coupling device member configured to be supported by the vessel in a hingeable manner, and hingeably coupled with the leading coupling device member, and provided with a conduit coupling means,

wherein the leading coupling device member and the trailing coupling device member are mutually hingeable between a retracted position and a extended position of the coupling device wherein the coupling means and the conduit coupling means are arranged with respect to the coupling device such that, in the extended position of the coupling device the coupling means and the conduit coupling means are remote with respect to each other and the coupling means extend toward the water surface, and in the retracted position of the coupling device the coupling means and the conduit coupling means are about vertically aligned.

25

In an embodiment of the coupling system, the trailing coupling device member is hingeably coupled with the leading coupling device member at their respective coupling ends, the coupling means are situated at a free end of the leading coupling device member opposite its respective coupling end, and the conduit coupling means are situated at a free end of the trailing coupling device member opposite its respective coupling end.

30

In an embodiment of the coupling system, the trailing coupling device member is configured to be supported by the vessel in a hingeable manner proximate the conduit coupling means and opposite its respective coupling end.

5 According to an even further aspect of the invention, this is realized with a floating structure comprising a pickup system suitable for raising at least a part of the floating structure above the water surface, wherein the pickup system comprises an erected elongate float which float extends partly above the water surface, and wherein the float comprises a float coupling means for cooperation with a vessel coupling
10 means associated with a manoeuvrable vessel which intends to couple with the floating structure. The pickup system is configured such that it may raise at least a part of the floating structure above the water surface. Whether this actually will happen depends. Important is that at least a part of the float moves in unity with the pickup unit, more specifically the manoeuvrable coupling means thereof. It is conceivable that the float is
15 articulated and therefore in practice no part of the float will be raised above the water.

 In an embodiment of the floating structure, the float coupling means is arranged at an upper end of the float. This facilitates sight of an operator of the vessel on the coupling means itself which even more facilitates to establish a coupling connection
20 between the vessel and the floating structure.

 In an embodiment, the floating structure comprises a slimline portion beneath the coupling means, in use proximate the water surface, for decreasing movement of the float in particular under rough sea conditions. This even more facilitates to establish a
25 coupling connection between the vessel and the floating structure.

 In an embodiment of the floating structure, the float comprises orientation means for an operator of the manoeuvrable vessel to facilitate orientation. This even more facilitates to establish a coupling connection between the vessel and the floating
30 structure.

 In an embodiment of the floating structure, the orientation means are arranged above the float coupling means.

In an embodiment of the floating structure, the pickup system comprises a pair of erected elongate floats, and wherein the float coupling means and/or the orientation means extend between the floats. The pair of floats aid in stabilizing the pickup system and therefore facilitates in establishing a coupling connection between the vessel and the floating structure.

More particular it is preferred that the floating structure comprises a floating conduit having a free end, and wherein the pickup system is coupled with the free end for raising the free end above the water surface.

According to a further aspect of the invention, this is realized with a manoeuvrable vessel, comprising a coupling system for coupling a vessel to an adjacent floating structure according to the invention to the vessel.

In an embodiment of the manoeuvrable vessel, the coupling system comprises manoeuvrable coupling means manoeuvrable with respect to the vessel for compensating movement of the float in particular under rough sea conditions. It is particularly important to compensate for vertical movement of the vessel relative to the float.

In an embodiment of the manoeuvrable vessel, the manoeuvrable coupling means is hingeable between a substantially horizontal position wherein the coupling means is engageable with float coupling means associated with a floating structure the manoeuvrable vessel intends to couple with, and a raised position for coupling the float with the manoeuvrable vessel.

The invention further relates to a device comprising one or more of the characterising features described in the description and/or shown in the attached drawings.

The invention further relates to a method comprising one or more of the characterising features described in the description and/or shown in the attached drawings.

The various aspects discussed in this patent can be combined in order to provide additional advantages.

Description of the drawings

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The invention will be further elucidated referring to an preferred embodiment shown in the drawing wherein shown in:

Fig. 1a-e a schematic view of the bow coupling system according to the invention during subsequent stages of the method for coupling the manoeuvrable vessel to the
10 floating structure;

fig. 2 a schematic view of a detail of the bow coupling system of fig. 1a-e;

fig. 3 a schematic view of another detail of the bow coupling system of fig. 1a-e;

fig 4, a schematic view of a detail of a vessel provided with a further embodiment of a coupling system according to the invention, and

15 fig 5a-5d schematic views of the embodiment of fig. 4 while in use.

Detailed description of embodiments

In the figures 1a-e a schematic view of the bow coupling system 8 according to
20 the invention during subsequent stages of the method for coupling the manoeuvrable vessel 1 to the floating structure 2. Figure 2 depicts a schematic view of a manoeuvrable coupling means 6 of the bow coupling system 8. Figure 3 shows a detail of the manoeuvrable coupling means 6. The invention will be further elucidated in more detail referring to the figures.

25

Fig 1a-e show the method, or better stills during the method, for coupling a manoeuvrable vessel 1 to a floating structure 2. The method comprises the step providing a pickup system 3. The pickup system 3 is coupled to the floating structure 2 such that the floating structure can be, at least in part, lifted out of the water. A typical
30 floating structure is a floating pipeline for transport of dredge under pressure. The pickup system 3 comprises a float 4. The float 4 serves to provide buoyancy to at least the pickup system 3 itself. In addition, the float 4 enables the pickup system 3 to extend from the water surface such that visibility of the pickup system 3 is facilitated.

The method comprises the step providing a manoeuvrable vessel 1 which is typically a hopper dredger type of vessel. The vessel 1 comprises a coupling system 5 for coupling the vessel 1 to the floating structure 2. The coupling system 5 comprising manoeuvrable coupling means 6 on the manoeuvrable vessel 1.

5 The method comprises the step aiming the manoeuvrable coupling means 6 towards the pickup system 3.

 The method comprises the step guiding the manoeuvrable coupling means 6 into float coupling means 7 of the pickup system 3. Where it says “into” this may mean into like in a plug and socket situation however any other suitable engagement will suffice
10 as long as the manoeuvrable coupling means 6 engage the float coupling means 7 in a coupling manner.

 The method comprises the step locking the float coupling means 7 with respect to the manoeuvrable coupling means 6 such that a coupling connection between the manoeuvrable vessel 1 and the floating structure 2 is established.

15 The method comprises the step connecting the floating structure 2 to the coupling vessel 1 for transport of dredge between the vessel 1 and the floating structure 2.

 A bow coupling system 8 is shown for connecting a floating structure 2 to the bow 9 of at least one manoeuvrable vessel 1. The bow coupling system 8 comprising a
20 pickup system 3 and a coupling vessel 1. The pickup system 3 comprises a pair of floats 4 for buoyancy of the floating structure 2 or at least the pickup system 3 on a water surface 10. The pickup system 3 comprises a float coupling means 7 connected to the pair of floats 4. The float coupling means 7 extend from the float 4 above the water surface 10. The coupling vessel 1 comprises a manoeuvrable coupling means 6 for
25 engaging the float coupling means 7 of the pickup system 3, such that a coupling connection between the manoeuvrable vessel 1 and the floating structure 2 is obtained. Here, the coupling connection between the vessel 1 and the floating structure is obtained by accommodation of the manoeuvrable coupling means 6 in the float coupling means 7, fig. 1b and further.

30 The floating structure 2 comprises a pickup system 3. The pickup system 3 is suitable for raising at least a part of the floating structure 2 above the water surface 10. Here, the floating structure 2 comprises a floating conduit 13 having a free end 14, and wherein the pickup system is coupled with the free end 14 for raising the free end

above the water surface 10. The pickup system is coupled via a pickup line 15 to the floating conduit 13. The pickup line 15 is coupled with the floating pipeline 13 at the free end 14 of the floating pipeline 13. The pickup system 3 comprises an erected elongate float 4 which float 4 extends partly above the water surface 10. The float 4, or
 5 here a pair of floats, comprises a float coupling means 7 for cooperation with a vessel coupling means 6 associated with a manoeuvrable vessel 1 which intends to couple with the floating structure 2. Here, the float coupling means 7 is arranged at an upper end of the float 4.

10 The float 4 comprises a slimline portion 11 beneath the float coupling means 7. In use, the slimline portion 11 is proximate the water surface 10, for decreasing movement of the float 4 in particular under rough sea conditions.

The float 4 comprises orientation means 12 for an operator of the manoeuvrable vessel 1 to facilitate orientation. Here, the orientation means 12 are arranged above the float coupling means 7.

15 Here, the pickup system 3 comprises a pair of erected elongate floats 4, and the float coupling means 7 and the orientation means 12 extend between the floats 4.

A manoeuvrable vessel 1 is shown, which vessel 1 comprises a coupling system 5 for coupling a vessel 1 to an adjacent floating structure 2 to the vessel 1. The coupling system 5 comprises manoeuvrable coupling means 6 manoeuvrable with respect to the
 20 vessel 1 for compensating movement of the float 4 in particular under rough sea conditions. The manoeuvrable coupling means 6 is hingeable between a substantially horizontal position shown in fig. 2 at reference number 6a, and 6b, and a raised position shown in fig. 2 at reference number 6c. In its horizontal position the coupling means 6 is engageable with float coupling means 7 associated with a floating structure 2 the
 25 manoeuvrable vessel 1 intends to couple with. Its raised position is for coupling the float 4 with the manoeuvrable vessel 1. Fig. 3 shows the hinging axis 16 the coupling means 6 hinges around between its substantially horizontal position and its raised position. In the raised position of the manoeuvrable coupling means 6, the float 4 is locked in the locking accommodation 18, specifically the float coupling means 7 is
 30 locked in the locking accommodation 18. An actuator, like a hydraulic cylinder is coupled with the fixing hole 17 of the manoeuvrable coupling means 6 for hinging the manoeuvrable coupling means 6 between the substantially horizontal position and the raised position.

Fig 4 shows a detail of a vessel 1 provided with a further embodiment of a coupling system according to the invention. Fig 5a-5d show the coupling system of fig. 4 while in use.

5 The coupling device 5 is articulated. The coupling device 5 has a leading coupling device member 6a and a trailing coupling device member 6b.

The leading coupling device member 6a is provided with the coupling means 24 for engaging the float coupling means of the pickup system 3.

10 The trailing coupling device member 6b is configured to be supported by the vessel 1 in a hingeable manner. The trailing coupling device member 6b is hingeable with respect to the vessel 1 around hinging axis 16a by a hydraulic cylinder 23. The trailing coupling device member 6b is configured to be supported by the vessel 1 in a hingeable manner proximate the conduit coupling means 20, opposite its respective coupling end.

15 The trailing coupling device member 6b is hingeably coupled with the leading coupling device member 6a. The trailing coupling device member 6b is hingeably coupled with the leading coupling device member 6a at their respective coupling ends. The trailing coupling device member 6b is hingeably coupled with the leading coupling device member 6a and the members are mutually hingeable around hinging axis 19. The trailing coupling device member 6b is hingeably with respect to the leading coupling device member 6a by a hydraulic cylinder 22.

25 The leading coupling device member 6a is provided with a coupling means 24. The coupling means 24 are situated at a free end of the leading coupling device member 6a opposite its respective coupling end.

30 The trailing coupling device member 6b is provided with a conduit coupling means 20. The conduit coupling means 20 are situated at a free end of the trailing coupling device member 6b opposite its respective coupling end. The conduit coupling means 20 is configured to engage the conduit at its upper head 27, as can be seen in fig. 5c.

The leading coupling device member 6a and the trailing coupling device member 6b are mutually hingeable between a retracted position, as shown in fig. 5a, and an extended position, as shown in fig. 5b, of the coupling device 5. The coupling means 24 and the conduit coupling means 20 are arranged with respect to the coupling device 5 such that, in the extended position of the coupling device the coupling means 24 and the conduit coupling means 20 are remote with respect to each other and the coupling means 24 extend toward the water surface 21. The coupling means 24 and the conduit coupling means 20 are arranged with respect to the coupling device 5 such that in the retracted position of the coupling device 5 the coupling means 24 and the conduit coupling means 20 are about vertically aligned.

In use, initially the coupling device 5 is in its retracted position, fig 5a. Then, the coupling means 24 reach toward the pick up system 3 at the waterline 21, fig. 5b, and engages a collar 26 of the pick up system 3. Subsequently, the coupling device 5 lifts the pick-up system 3 in unity with the conduit, thereafter the conduit coupling means 20 engages the conduit proximate its head 27, fig. 5b, 5c. Next, a slurry intake 25 contacts the head 27 for transport of fluid under pressure.

It will also be obvious after the above description and drawings are included to illustrate some embodiments of the invention, and not to limit the scope of protection. Starting from this disclosure, many more embodiments will be evident to a skilled person which are within the scope of protection as defined in the claims and which are obvious combinations of prior art techniques and the disclosure of this patent.

Conclusies

1. Werkwijze voor het koppelen van een manoeuvreerbaar vaartuig (1) aan een
 5 drijvende constructie (2), waarbij de werkwijze omvat;
 - verschaffen van een opneemsysteem (3) gekoppeld met de drijvende constructie, waarbij het opneemsysteem een drijver (4) omvat,
 - verschaffen van een manoeuvreerbaar vaartuig omvattende een koppelinrichting (5) voor het koppelen van het vaartuig aan de drijvende constructie, waarbij de
 10 koppelinrichting manoeuvreerbare koppelingsmiddelen (6, 24) omvat op het manoeuvreerbaar vaartuig,
 - richten van de manoeuvreerbare koppelingsmiddelen richting het opneemsysteem,
 - geleiden van de manoeuvreerbare koppelingsmiddelen naar
 15 drijverkoppelingsmiddelen (7) van het opneemsysteem, zodanig dat de manoeuvreerbare koppelingsmiddelen de drijverkoppelingsmiddelen aangrijpen op een koppelende wijze,
 - insluiten van de drijverkoppelingsmiddelen ten opzichte van de manoeuvreerbare koppelingsmiddelen, zodanig dat een koppelende verbinding tot stand wordt
 20 gebracht tussen het manoeuvreerbare vaartuig en de drijvende constructie,
 - aansluiten van de drijvende constructie op het aankoppelende vaartuig voor het transport van vloeibare materie, zoals bagger tussen het vaartuig en de drijvende constructie.

- 25 2. Koppelingssysteem (8) voor het aansluiten van een drijvende constructie (2) op een manoeuvreerbaar vaartuig (1), in het bijzonder de boeg (9) van het manoeuvreerbare vaartuig (1), waarbij het koppelingssysteem een opneemsysteem (3) en een koppelingsvaartuig (1) omvat, waarbij het opneemsysteem ten minste een drijver (4) omvat voor drijfvermogen van de drijvende constructie op een wateroppervlak (10) en
 30 drijverkoppelingsmiddelen (7) verbonden met de ten minste ene drijver, welke drijverkoppelingsmiddelen zich uitstrekken vanaf de drijver naar boven het wateroppervlak, en waarbij het koppelingsvaartuig een koppelinrichting (5) omvat welke manoeuvreerbare koppelingsmiddelen (6, 24) heeft voor het aangrijpen van de

drijverkoppelingsmiddelen van het opneemsysteem, zodanig dat een koppelende verbinding tussen het manoeuvreerbare schip en de drijvende constructie wordt verkregen.

5 3. Koppelingssysteem volgens conclusie 2, waarbij de koppelende verbinding wordt verkregen door opnemen van de manoeuvreerbare koppelingsmiddelen (6, 24) in de drijverkoppelingsmiddelen.

4. Koppelingssysteem volgens conclusie 2 of 3, waarbij de koppelinrichting (5) geled
10 is en omvat;

- een voorlopend koppelinrichtingorgaan (6a) voorzien van de koppelingsmiddelen (6, 24) voor het aangrijpen van de drijverkoppelingsmiddelen van het opneemsysteem,
- een achterlopend koppelinrichtingorgaan (6b) geconfigureerd om te worden
15 ondersteund door het vaartuig (1) op een scharnierbare wijze, en scharnierbaar verbonden met het voorlopend koppelinrichtingorgaan (6a) en voorzien van leidingkoppelmiddelen (20),

waarbij het voorlopend koppelinrichtingorgaan (6a) en het achterlopend koppelinrichtingorgaan (6b) onderling scharnierbaar zijn tussen een ingetrokken stand
20 en een uitgestrekte stand van de koppelinrichting, waarbij de koppelingsmiddelen (24) en de leidingkoppelmiddelen (20) zodanig zijn aangebracht ten opzichte van de koppelinrichting dat in de uitgestrekte stand van de koppelinrichting de koppelingsmiddelen (24) en de leidingkoppelmiddelen (20) op afstand zijn ten opzichte van elkaar en de koppelingsmiddelen (24) zich naar het wateroppervlak uitstrekken, en
25 in de ingetrokken stand van de koppelinrichting de koppelmiddelen (24) en de leidingkoppelmiddelen (20) ongeveer verticaal uitgelijnd zijn.

5. Koppelingssysteem volgens conclusie 4, waarbij het achterlopend koppelinrichtingorgaan (6b) scharnierbaar is gekoppeld met het voorlopend
30 koppelinrichtingorgaan (6a) bij hun respectieve koppelingseinden, de koppelmiddelen (24) geplaatst zijn bij een vrij einde van het voorlopend koppelinrichtingorgaan (6a) tegenover zijn respectieve koppelingseind, en de leidingkoppelmiddelen (20) geplaatst

zijn bij een vrij einde van het achterlopend koppelinrichtingorgaan (6b) tegenover zijn respectieve koppelingseind.

6. Koppelingssysteem volgens conclusie 5, waarbij het achterlopend
5 koppelinrichtingorgaan (6b) is geconfigureerd om te worden ondersteund door het
vaartuig (1) op een scharnierbare wijze nabij de leidingkoppelmiddelen (20) en
tegenover zijn respectieve koppelingseind.
7. Drijvende constructie (2) omvattende een opneemsysteem (3) geschikt om tenminste
10 een deel van de drijvende structuur boven het wateroppervlak (10) te verheffen, waarbij
het opneemsysteem omvat;
 - een opgerichte langwerpige drijver (4), welke zich gedeeltelijk boven het
wateroppervlak uitstrekt,
 - waarbij de drijver drijverkoppelmiddelen (7) omvat voor samenwerking met
15 vaartuigkoppelmiddelen (6, 24) in verband met een manoeuvreerbaar
vaartuig (1), dat van plan is te koppelen met de drijvende constructie.
8. Drijvende constructie volgens conclusie 7, waarbij de drijverkoppelmiddelen
aangebracht zijn bij een bovenende van de drijver.
20
9. Drijvende constructie volgens een der voorgaande conclusies 7-8, omvattend een
slank deel (11) beneden de koppelmiddelen, tijdens gebruik nabij het
wateroppervlak, voor het verminderen van beweging van de drijver in het bijzonder
onder ruwe zee condities.
25
10. Drijvende constructie volgens een der voorgaande conclusies 7-9, waarbij de drijver
richtmiddelen (12) omvat teneinde oriëntatie voor een operator van het
manoeuvreerbare vaartuig te vergemakkelijken.
- 30 11. Drijvende constructie volgens conclusie 10, waarbij de richtmiddelen boven de
drijverkoppelmiddelen zijn aangebracht.

12. Drijvende constructie volgens een der voorgaande conclusies 7-11, waarbij het opneemsysteem een paar langwerpige opgerichte drijvers omvat, en waarbij de drijverkoppelingsmiddelen en/of richtmiddelen zich uitstrekken tussen de drijvers.
- 5 13. Drijvende constructie volgens een der voorgaande conclusies 7-12, omvattende een drijvende leiding (13) met een vrij uiteinde (14), en waarbij het opneemsysteem is gekoppeld met het vrije uiteinde voor het verheffen van het vrije einde boven het wateroppervlak.
- 10 14. Manoeuvreerbaar vaartuig (1), omvattend een koppelingssysteem (5) voor het koppelen van een vaartuig aan een aangrenzende drijvende constructie (2) volgens een der voorgaande conclusies 4-10 aan het vaartuig.
- 15 15. Manoeuvreerbaar vaartuig volgens conclusie 14, waarbij het koppelingssysteem manoeuvreerbare koppelingsmiddelen (6, 24) omvat manoeuvreerbaar ten opzichte van het vaartuig voor het compenseren van beweging van de drijver (4) in het bijzonder onder ruwe zee condities.
- 20 16. Manoeuvreerbaar vaartuig volgens conclusie 15, waarbij de manoeuvreerbare koppelingsmiddelen scharnierbaar zijn tussen een in hoofdzaak horizontale stand waarin de koppelingsmiddelen koppelbaar zijn met drijverkoppelingsmiddelen in verbinding met een drijvende constructie waarmee het manoeuvrerbaar vaartuig wil koppelen, en een verhoogde stand voor het koppelen van de drijver met het manoeuvrerbaar vaartuig.

Fig. 1a

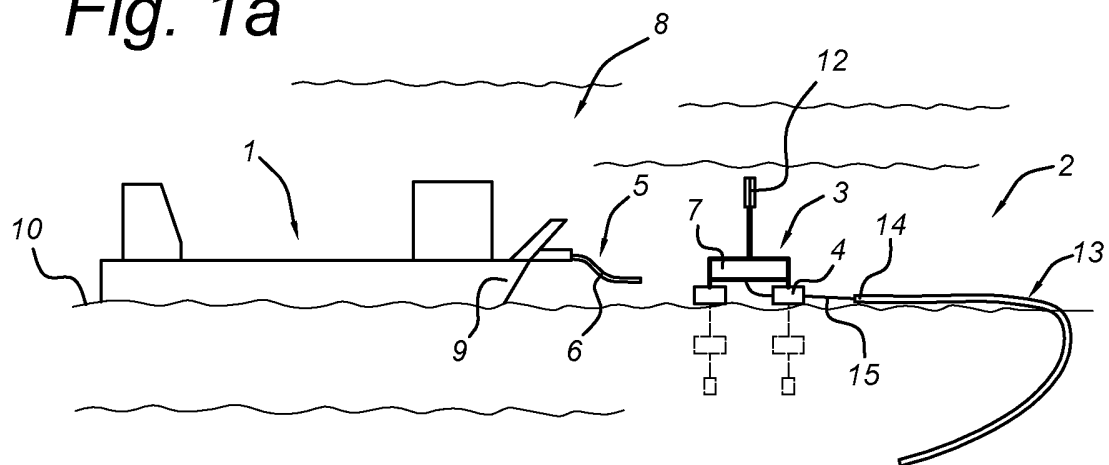


Fig. 1b

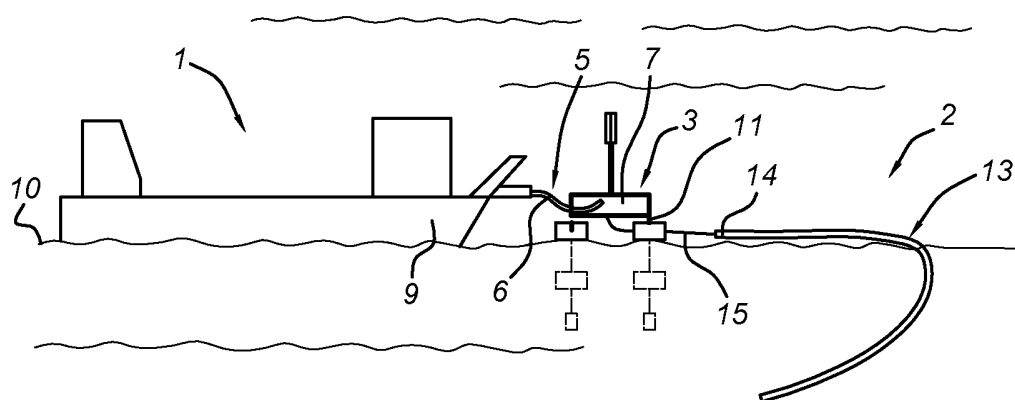


Fig. 1c

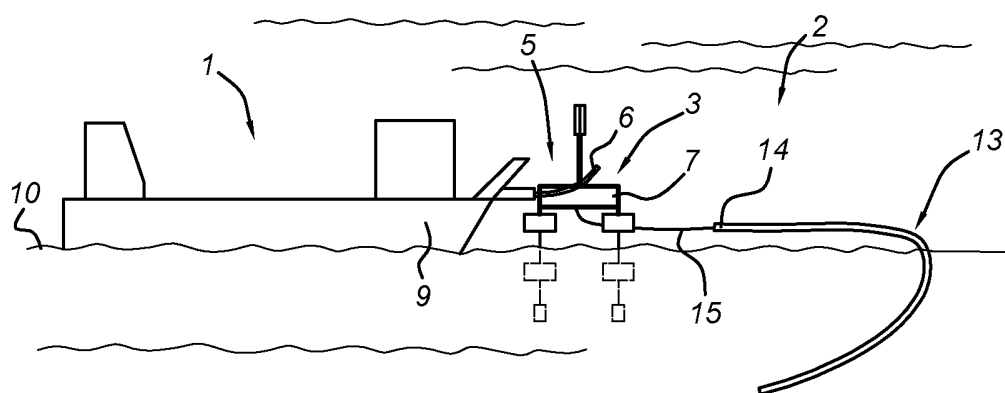


Fig. 1d

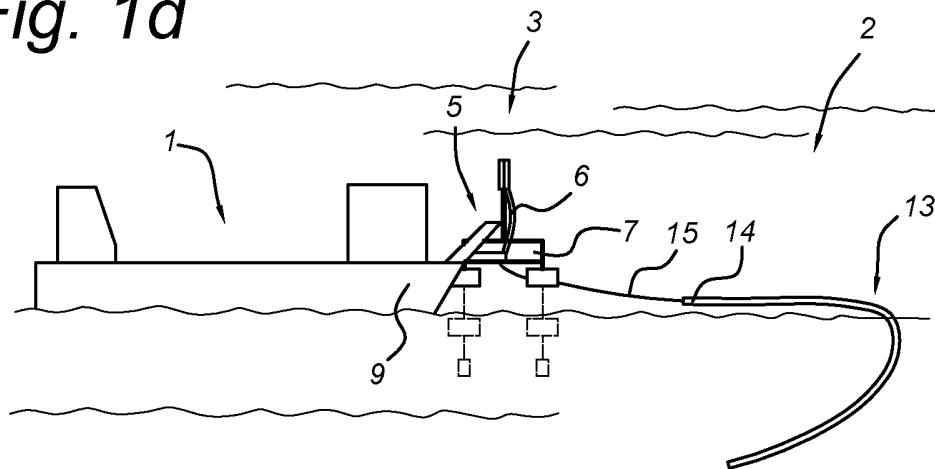


Fig. 1e

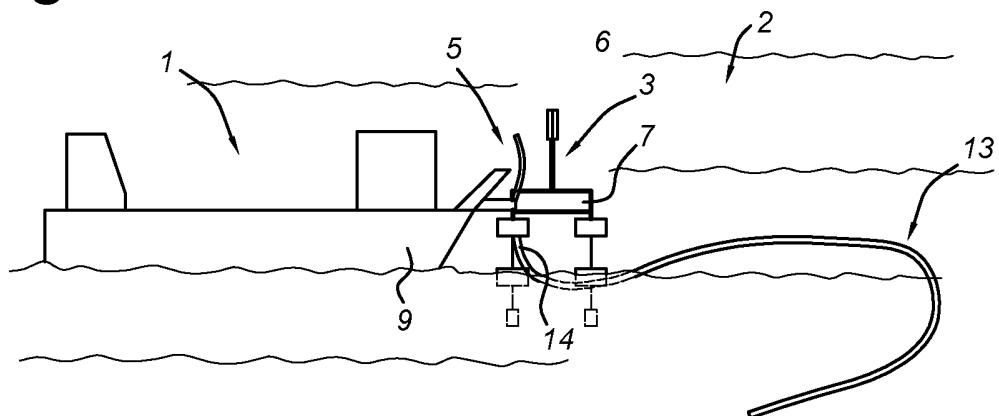


Fig. 2

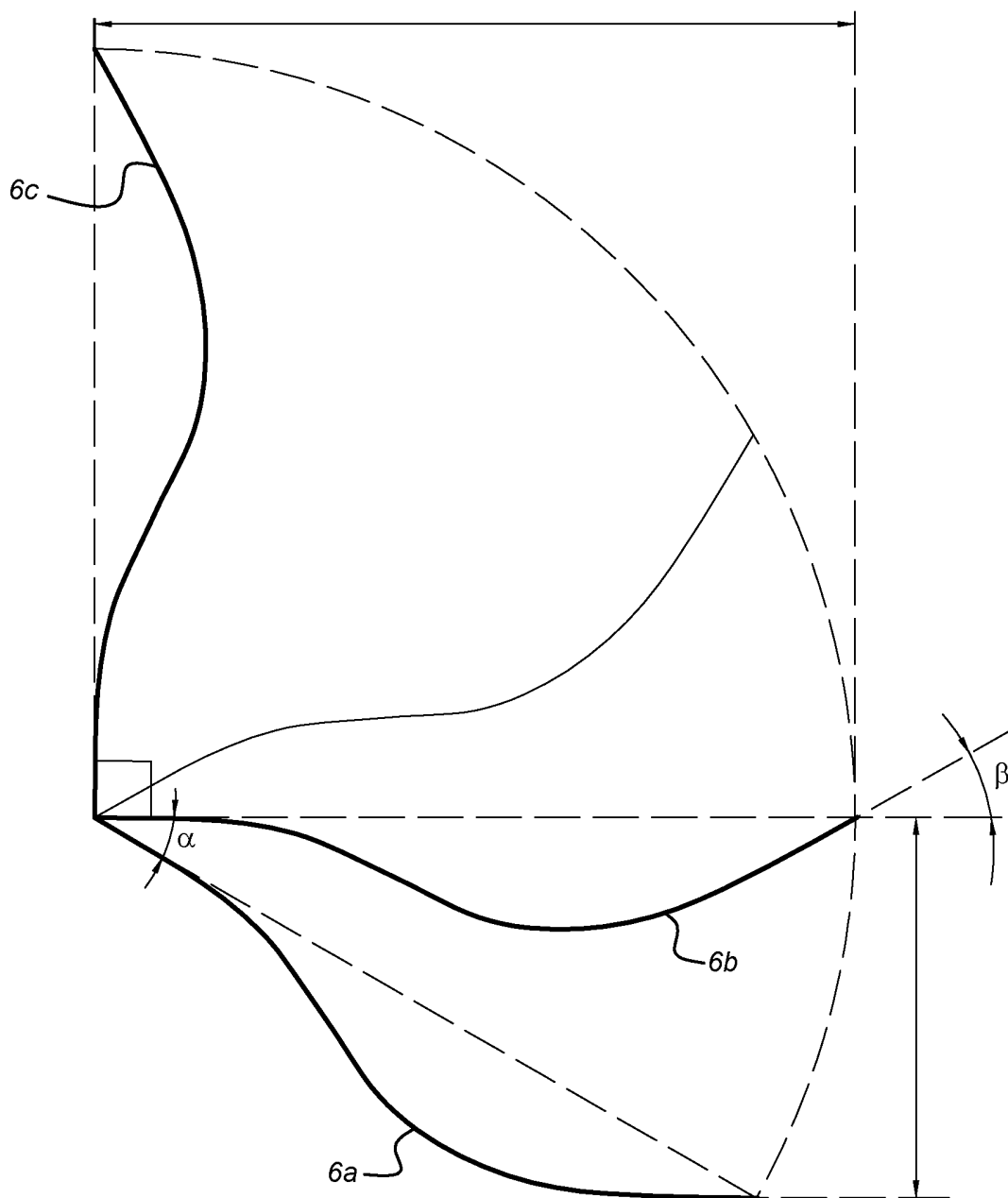


Fig. 3

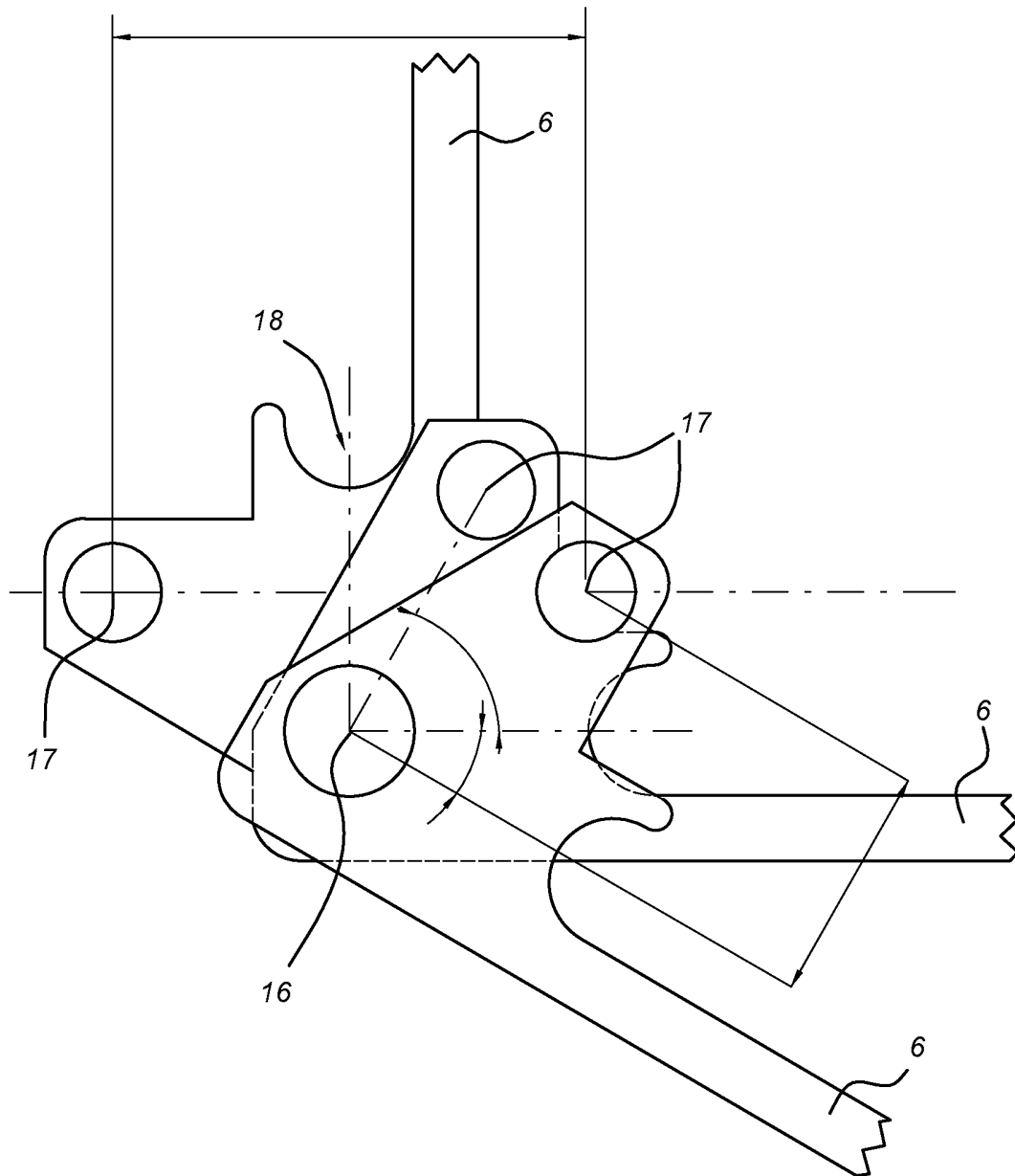


Fig. 4

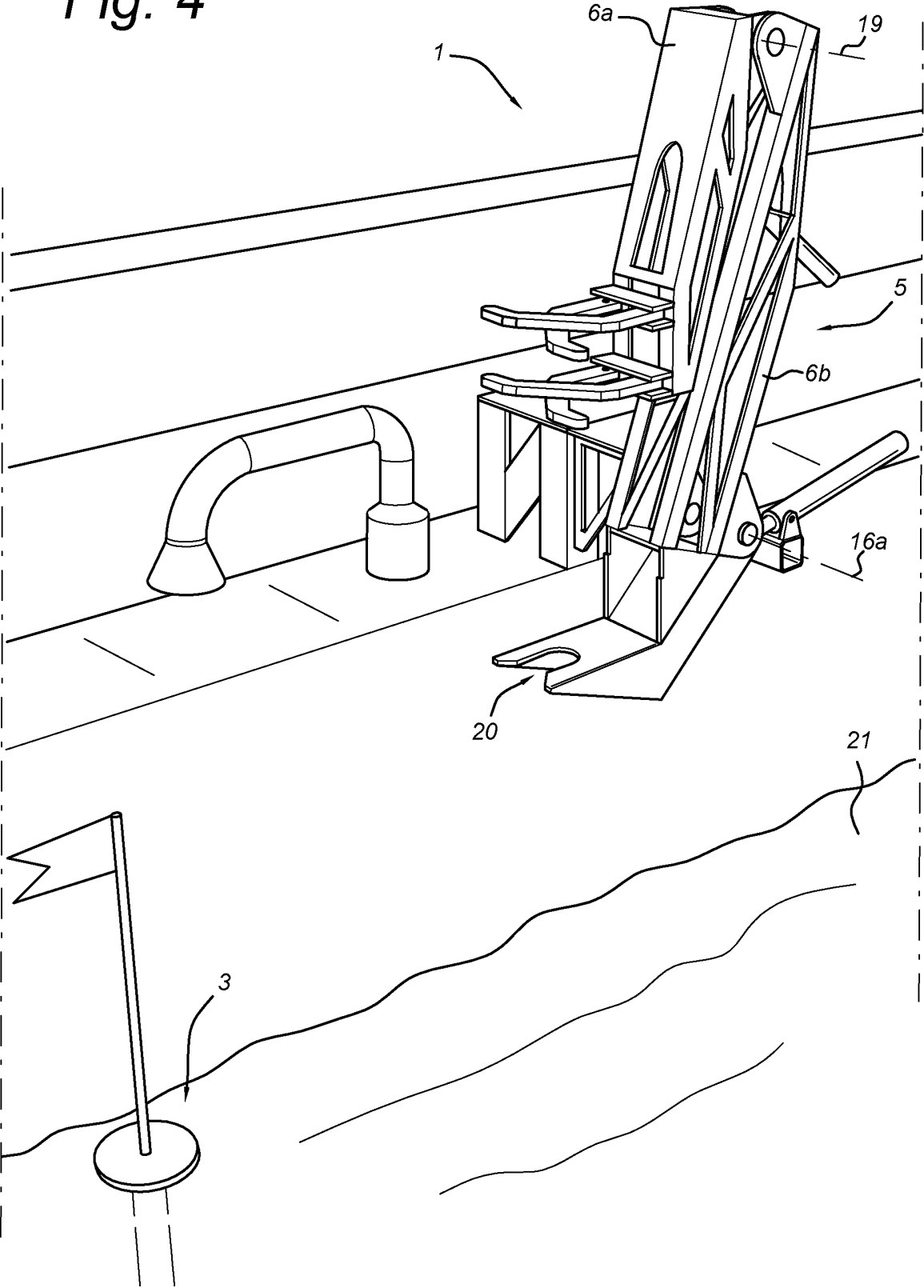


Fig. 5a

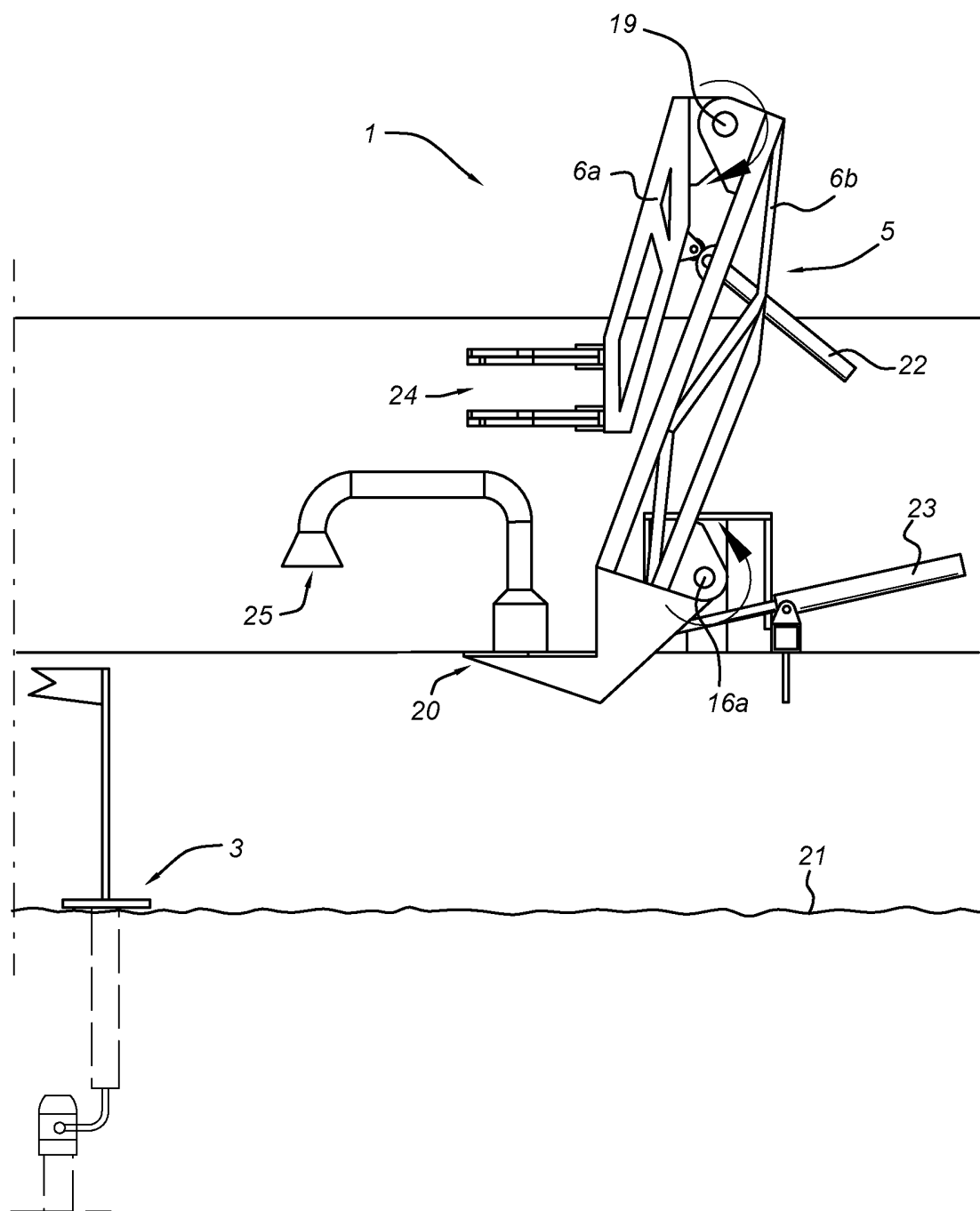


Fig. 5b

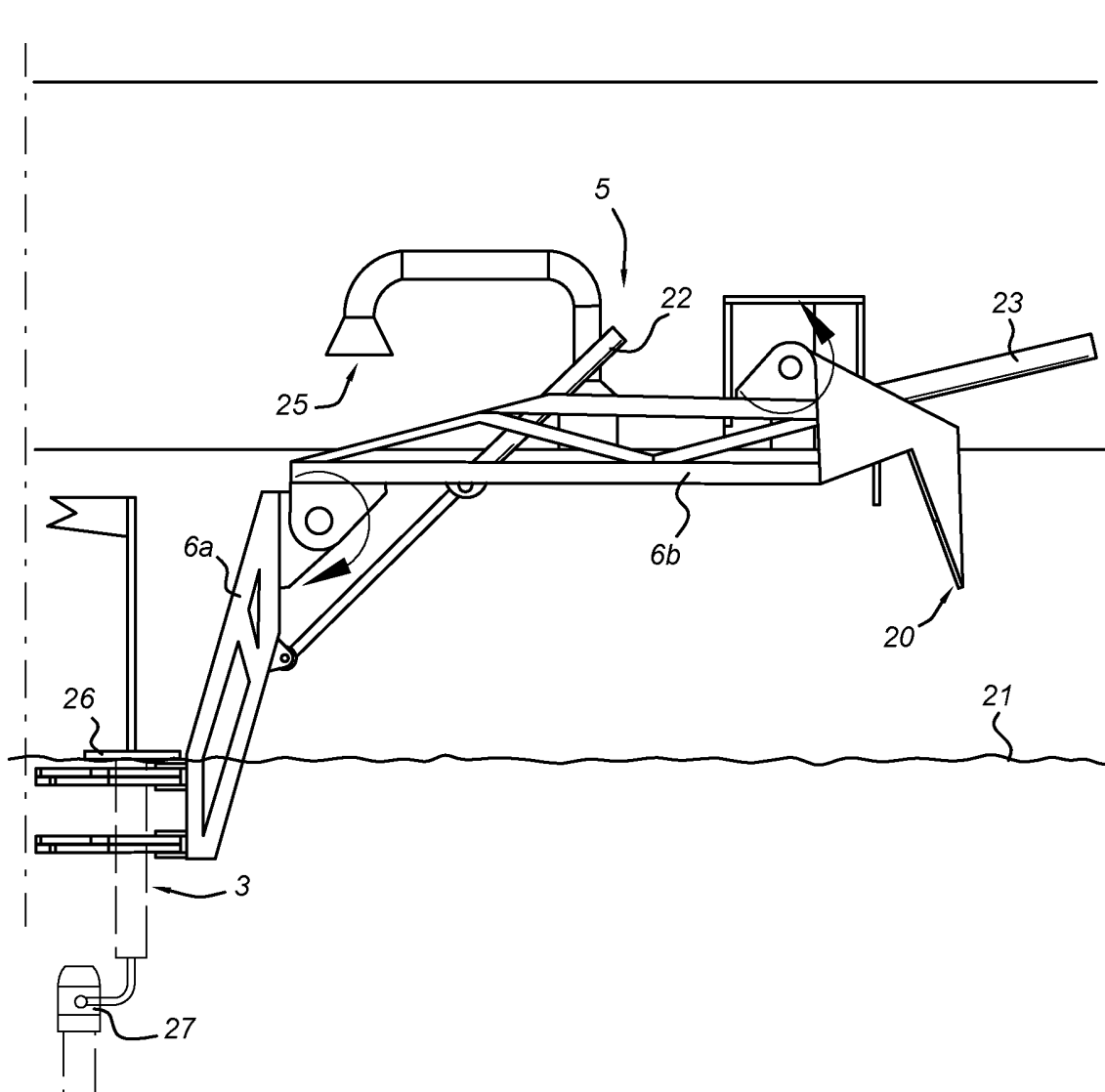


Fig. 5c

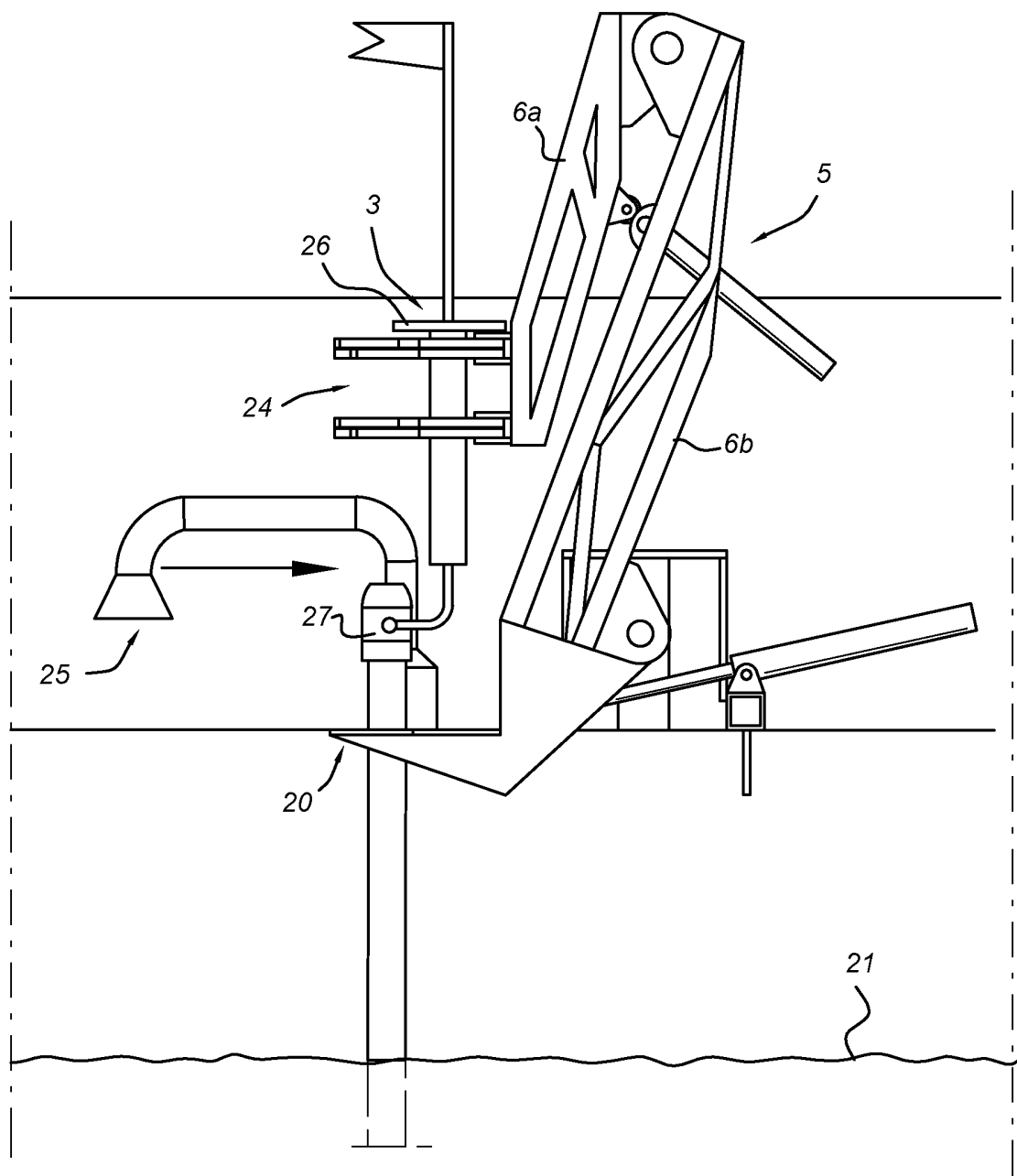
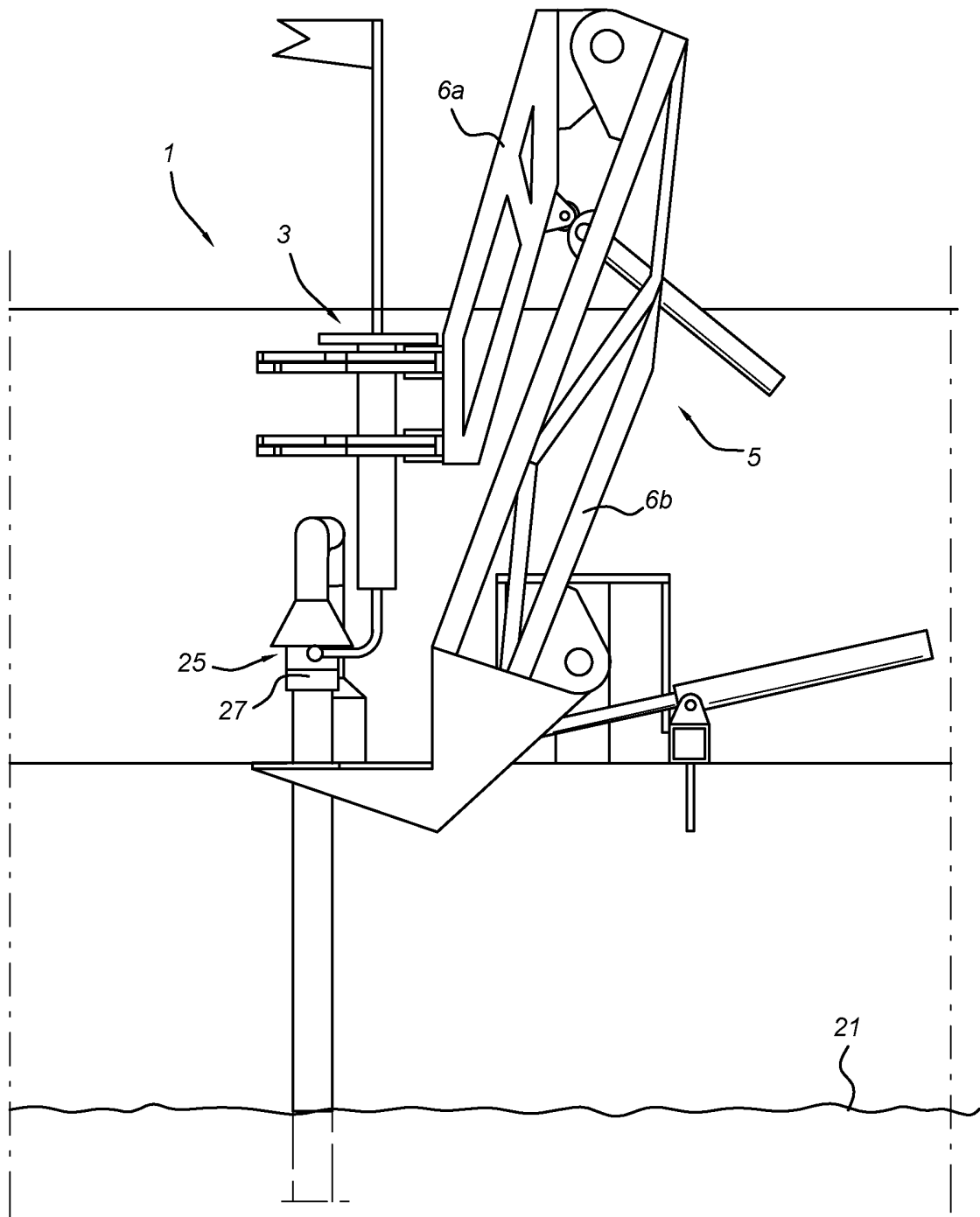


Fig. 5d



SAMENWERKINGSVERDRAG (PCT)

RAPPORT BETREFFENDE NIEUWHEIDSONDERZOEK VAN INTERNATIONAAL TYPE

IDENTIFICATIE VAN DE NATIONALE AANVRAGE		KENMERK VAN DE AANVRAGER OF VAN DE GEMACHTIGDE	
		P6044316NL	
Nederlands aanvraag nr.		Indieningsdatum	
2012002		20-12-2013	
		Ingeroepen voorrangsdatum	
Aanvrager (Naam)			
IHC Holland IE B.V.			
Datum van het verzoek voor een onderzoek van internationaal type		Door de Instantie voor Internationaal Onderzoek aan het verzoek voor een onderzoek van internationaal type toegekend nr.	
19-04-2014		SN 61825	
I. CLASSIFICATIE VAN HET ONDERWERP (bij toepassing van verschillende classificaties, alle classificatiesymbolen opgeven)			
Volgens de internationale classificatie (IPC)			
B63B27/24		B63B27/36	
II. ONDERZOCHETE GEBIEDEN VAN DE TECHNIEK			
Onderzochte minimumdocumentatie			
Classificatiesysteem		Classificatiesymbolen	
IPC	B63B	E02F	
Onderzochte andere documentatie dan de minimum documentatie, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen			
III.	☐	GEEN ONDERZOEK MOGELIJK VOOR BEPAALDE CONCLUSIES (opmerkingen op aanvullingsblad)	
IV.	☐	GEBREK AAN EENHEID VAN UITVINDING (opmerkingen op aanvullingsblad)	

**ONDERZOEKSRAPPORT BETREFFENDE HET
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Nummer van het verzoek om een onderzoek naar
de stand van de techniek
NL 2012002

A. CLASSIFICATIE VAN HET ONDERWERP
INV. B63B27/24 B63B27/36
ADD.

Volgens de Internationale Classificatie van octrooien (IPC) of zowel volgens de nationale classificatie als volgens de IPC.

B. ONDERZOCHE GEBIEDEN VAN DE TECHNIEK

Onderzochte minimum documentatie (classificatie gevolgd door classificatiesymbolen)
B63B E02F

Onderzochte andere documentatie dan de minimum documentatie, voor dergelijke documenten, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen

Tijdens het onderzoek geraadpleegde elektronische gegevensbestanden (naam van de gegevensbestanden en, waar uitvoerbaar, gebruikte trefwoorden)

EP0-Internal, WPI Data

C. VAN BELANG GEACHTE DOCUMENTEN

Categorie °	Geciteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
X	EP 0 396 391 A1 (FOSTER WHEELER ENERGY LTD [GB]) 7 november 1990 (1990-11-07) * kolom 4, regels 46-54; figuren *	1,2,14, 15
X	US 2013/109258 A1 (COOMBS DAVID [US] ET AL) 2 mei 2013 (2013-05-02) * alinea's [0021], [0027]; figuur 1 *	1,2,14, 15
X	WO 03/062043 A1 (SINGLE BUOY MOORINGS [CH]; BAUDUIN CHRISTIAN [FR]; ISNARD JEAN-LOUP [F]) 31 juli 2003 (2003-07-31) * bladzijde 5, regels 22-32; figuren *	1-3, 7-11,14, 15
X	EP 0 503 137 A1 (MUESING ANTON GMBH CO KG [DE]) 16 september 1992 (1992-09-16) * kolom 7, regels 2-56; figuur 1 *	1-3,7, 12-16
	----- -/-	

☒ Verdere documenten worden vermeld in het vervolg van vak C.

☒ Leden van dezelfde octrooifamilie zijn vermeld in een bijlage

° Speciale categorieën van aangehaalde documenten

A niet tot de categorie X of Y behorende literatuur die de stand van de techniek beschrijft

D in de octrooiaanvraag vermeld

E eerdere octrooi(aanvraag), gepubliceerd op of na de indieningsdatum, waarin dezelfde uitvinding wordt beschreven

L om andere redenen vermelde literatuur

O niet-schriftelijke stand van de techniek

P tussen de voorrangsdatum en de indieningsdatum gepubliceerde literatuur

T na de indieningsdatum of de voorrangsdatum gepubliceerde literatuur die niet bezwarend is voor de octrooiaanvraag, maar wordt vermeld ter verheldering van de theorie of het principe dat ten grondslag ligt aan de uitvinding

X de conclusie wordt als niet nieuw of niet inventief beschouwd ten opzichte van deze literatuur

Y de conclusie wordt als niet inventief beschouwd ten opzichte van de combinatie van deze literatuur met andere geciteerde literatuur van dezelfde categorie, waarbij de combinatie voor de vakman voor de hand liggend wordt geacht

Z lid van dezelfde octrooifamilie of overeenkomstige octrooipublicatie

Datum waarop het onderzoek naar de stand van de techniek van internationaal type werd voltooid

29 september 2014

Verzenddatum van het rapport van het onderzoek naar de stand van de techniek van internationaal type

Naam en adres van de instantie

European Patent Office, P.B. 5818 Patentlaan 2
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De bevoegde ambtenaar

Vermeulen, Tom

**ONDERZOEKSRAPPORT BETREFFENDE HET
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Nummer van het verzoek om een onderzoek naar
de stand van de techniek

NL 2012002

C.(Vervolg). VAN BELANG GEACHTE DOCUMENTEN

Categorie °	Geoteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
X	FR 2 109 096 A5 (LIAUTAUD JEAN) 26 mei 1972 (1972-05-26) * bladzijde 3, regels 4-6; figuren 3,8 * -----	2,14-16

**ONDERZOEKSRAPPORT BETREFFENDE HET
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Informatie over leden van dezelfde octrooifamilie

Nummer van het verzoek om een onderzoek naar
de stand van de techniek

NL 2012002

In het rapport genoemd octrooigeschrift	Datum van publicatie	Overeenkomend(e) geschrift(en)	Datum van publicatie
EP 0396391	A1	07-11-1990	CA 2015975 A1
			EP 0396391 A1
			NO 901847 A
			US 5145429 A
			02-11-1990
			07-11-1990
			05-11-1990
			08-09-1992
US 2013109258	A1	02-05-2013	GEEN
WO 03062043	A1	31-07-2003	EP 1467906 A1
			NO 330652 B1
			US 2005042953 A1
			WO 03062043 A1
			20-10-2004
			30-05-2011
			24-02-2005
			31-07-2003
EP 0503137	A1	16-09-1992	DE 4108161 A1
			DE 59108455 D1
			DK 0503137 T3
			EP 0503137 A1
			17-09-1992
			13-02-1997
			16-06-1997
			16-09-1992
FR 2109096	A5	26-05-1972	GEEN

WRITTEN OPINION

File No. SN61825	Filing date (<i>day/month/year</i>) 20.12.2013	Priority date (<i>day/month/year</i>)	Application No. NL2012002
International Patent Classification (IPC) INV. B63B27/24 B63B27/36			
Applicant IHC Holland IE B.V.			

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 with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the application
- ☒ Box No. VIII Certain observations on the application

	Examiner Vermeulen, Tom
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WRITTEN OPINION

Application number
NL2012002

Box No. I Basis of this opinion

1. This opinion has been established on the basis of the latest set of claims filed before the start of the search.
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ on paper
 - ☐ in electronic form
 - c. time of filing/furnishing:
 - ☐ contained in the application as filed.
 - ☐ filed together with the application in electronic form.
 - ☐ furnished subsequently for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty	Yes: Claims	4-6
	No: Claims	1-3, 7-16
Inventive step	Yes: Claims	4-6
	No: Claims	1-3, 7-16
Industrial applicability	Yes: Claims	1-16
	No: Claims	

2. Citations and explanations

see separate sheet

WRITTEN OPINION

Application number
NL2012002

Box No. VIII Certain observations on the application

see separate sheet

Re Item V

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

- 1 The present application does not meet the criteria of patentability, because the subject-matter of claims 1 is not new.
- 2 **EP0396391** (D1) discloses a method for coupling a manoeuvrable vessel (2) to a floating structure (16), the method comprising providing a pickup system coupled to the floating structure, the pickup system comprising a float (14; column 2, lines 30-33), providing a manoeuvrable vessel comprising a coupling device for coupling the vessel to the floating structure, the coupling device comprising manoeuvrable coupling means (8) on the manoeuvrable vessel, aiming the manoeuvrable coupling means towards the pickup system (figure 6), guiding the manoeuvrable coupling means towards float coupling means (26) of the pickup system (column 5, lines 25-36), such that the manoeuvrable coupling means engage the float coupling means in a coupling manner (figure 7), locking the float coupling means with respect to the manoeuvrable coupling means (figures 7-8), such that a coupling connection between the manoeuvrable vessel and the floating structure is established, connecting the floating structure to the coupling vessel for transport of fluidized matter (column 4, lines 49-54).

Also **US2013/0109258** (D2) discloses such a method: manoeuvrable coupling means (vessel rigging in par. [0027]) of a manoeuvrable vessel is aimed towards the pickup system (136) coupled to the floating structure (118), the manoeuvrable coupling means is guided towards float coupling means (142, 144) of the pickup system such that the manoeuvrable coupling means engage the float coupling means in a coupling manner (e.g. hook in par. [0027]), the float coupling means are hereby locked with respect to the manoeuvrable coupling means (implicit by use of hook), such that a coupling connection between the manoeuvrable vessel and the floating structure is established, and finally the floating structure is coupled to the coupling vessel for transport of fluidized matter (through connector 116).

WO03/062043 (D3) also discloses such a method: pickup system (6) is floating partially above the water surface and is coupled to a manoeuvrable vessel (7) through manoeuvrable coupling means (8) which must be aimed towards the pickup system, guided towards float coupling means (9) thereof and engaged with the float coupling means by locking so that a coupling

connection with the floating structure (15) is established and so that the floating structure (15) can be connected to the vessel for transport of fluidized matter (via swivel 23 and transfer hose 25; see figure 1).

Finally, **EP0503137** (D4) discloses a method using a manoeuvrable coupling means (16) aimed at and guided towards a float coupling means (8) for locking therewith, after which a fluid coupling is established connecting the floating structure (3) to the coupling vessel (1), see figure 1.

Hence, independent claim 1 lacks novelty.

- 3 According to D1, a coupling system comprising a pickup system and a coupling vessel (2), whereby the pickup system comprises at least a float (14; column 2, lines 30-33) for buoyancy of the floating structure on a water surface and a float coupling means (26) connected to the at least one float, which float coupling means extends from the float above the water surface (figures 1-2), and whereby the coupling vessel comprises a coupling device having manoeuvrable coupling means (8) for engaging the float coupling means of the pickup system, such that a coupling connection between the manoeuvrable vessel and the floating structure is obtained.

Also D2, D3 and D4 disclose such a coupling system. **FR2109096** (D5) discloses such a coupling system : manoeuvrable coupling means (13, 17) on a vessel (9) engages a float coupling means (11; 28) to make a coupling connection with a floating structure (4), see figures 3 and 8.

Hence, independent claim 2 lacks novelty.

- 4 According to D3 and D4, the manoeuvrable coupling means can be considered to be in the float coupling means (D3: figure 2, line 8 in hook 9; D4: hose 16 in funnel 8).

Therefore, claim 3 does not add anything novel.

- 5 The prior art is without example of an articulated coupling device with a leading coupling device member provided with the coupling means for engaging the float coupling means of the pickup system, and a trailing coupling device member configured to be supported by the vessel in a hingeable manner, and hingeably coupled with the leading coupling device member, and provided with a conduit coupling means, in such a way that the coupling means and the conduit coupling means are *remote* with respect to each other in the extended state of the coupling device, and the coupling means and the conduit coupling means are about *vertically aligned* in the retracted position of the coupling device.

It would not be obvious for the skilled person to adapt the articulated coupling device of D4 or of FR2109096 (see figures 3 and 8) in such a way in order to facilitate the coupling of the floating structure to the coupling vessel.

Hence, claim 4 and claims 5-6, which depend thereon, appear to define a novel an inventive subject-matter.

- 6 D3 discloses a floating structure (6) having a pickup system suitable for raising at least a part of the floating structure above the water surface, wherein the pickup system comprises an erected elongate float (12, 13) which float extends partly above the water surface (figure 1), and wherein the float comprises a float coupling means (9) for cooperation with a vessel coupling means associated with a manoeuvrable vessel which intends to couple with the floating structure.

D4 also discloses such a floating structure.

Hence, independent claim 7 lacks novelty.

- 7 In D3, the float coupling means (9) can arranged at an upper end of the float (figure 3). The floating structure comprises a slimline portion (12) beneath the coupling means, in use proximate the water surface. The float comprises orientation means (11, 23) arranged above the float coupling means, suitable for an operator of the manoeuvrable vessel to facilitate orientation.

In D4, the pickup system comprises a pair of erected elongate floats (10), and wherein the float coupling means (8) extends between the floats. Further, in D4, the floating structure comprises a floating conduit (4) having a free end (on top), wherein the pickup system is coupled with the free end suitable for raising the free end above the water surface.

Hence, claims 8-13 do not add anything novel.

- 8 Each of D1-D5 discloses a manoeuvrable vessel, comprising a coupling system for coupling a vessel to an adjacent floating structure.

Therefore, independent claim 14 lacks novelty (see also in Item VIII).

- 9 Each of D1-D5 have manoeuvrable coupling means manoeuvrable with respect to the vessel.

According to D4, the manoeuvrable coupling means (17) is hingeable between a substantially horizontal position and a raised position. Also D5 discloses such a vessel.

Therefore, claims 15-16 do not add anything novel.

Re Item VIII

Certain observations on the application

- 10 Although claims 4, 7 and 14 have been drafted as separate independent claims, they appear to relate effectively to the same subject-matter and to differ from each other only with regard to the definition of the subject-matter for which protection is sought and in respect of the terminology used for the features of that subject-matter. The aforementioned claims therefore lack conciseness.
- In particular, it is not clear in how far claim 14 (and the claims dependent thereon) refer back to the previous claims 4-10, claims 4-6 defining a coupling system and claims 7-10 defining a floating structure.
- 11 According to method claim 1, the manoeuvrable coupling means is comprised by the manoeuvrable vessel (second method step). However, on page 2, lines 23-27 of the description, an alternative solution is mentioned, according to which the manoeuvrable coupling means is part of the float. This contradiction renders the subject-matter of the claims unclear. Hence, the requirements of clarity are not met.