

(19) DANMARK

(10) DK 2011 00237 L



(12) PATENTANSØGNING

Patent- og
Varemærkestyrelsen

(51) Int.Cl. ⁸: *E 21 B 19/00 (2006.01)* *B 63 B 21/50 (2006.01)* *E 21 B 41/00 (2006.01)*
E 21 B 41/04 (2006.01)

(21) Patentansøgning nr: **PA 2011 00237**

(22) Indleveringsdag: **2011-03-31**

(24) Løbedag: **2009-10-15**

(41) Alm. tilgængelig: **2011-03-31**

(86) International ansøgning nr: **PCT/GB2009/051383**

(86) International indleveringsdag: **2009-10-15**

(30) Prioritet: **2008-10-24 GB 0819489.6**

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(54) Benævnelse: **Method and apparatus for subsea installations**

(57) Sammendrag:

There is provided a method and apparatus for lowering and/or raising a load or structure to or from the bed of a body of water. The apparatus comprises a buoyancy apparatus configured to be coupled to a load, and having positive buoyancy sufficient to lift the load. At least one receptacle is provided on the apparatus for receiving a control weight lowered from a vessel to lower or raise the assembly. The lowering method includes forming an assembly from a buoyancy apparatus and a load and submerging the assembly to a position at a first height above the bed. In a preferred embodiment the assembly is submerged by a clump weight tow system. A control weight is deployed from a vessel to the assembly to overcome the positive buoyancy of the assembly and thereby lower the load from the first height to the bed. The raising method reverses the steps of the lowering method.

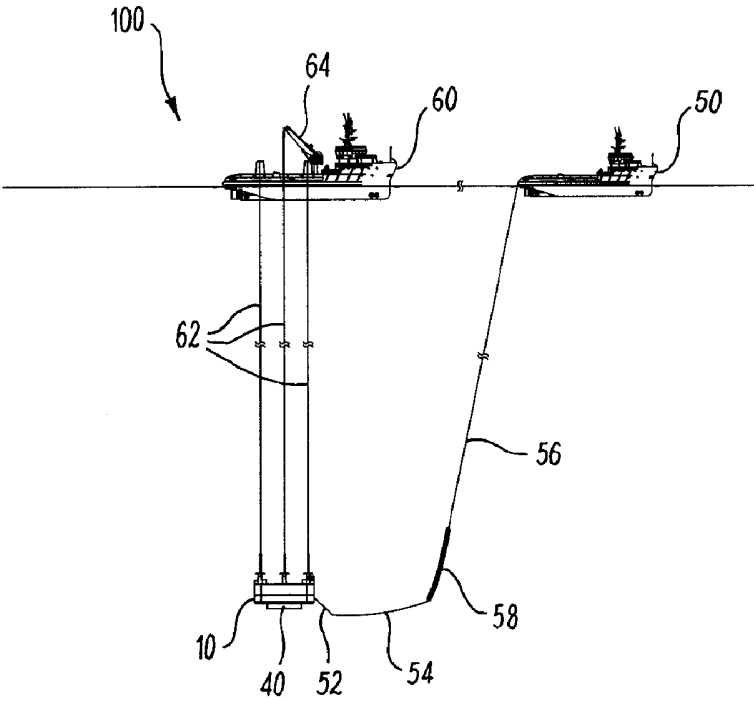


FIG. 2A

Claims:

1. A method of lowering a load to a bed of a body of water, the method comprising:
Providing an assembly formed from a buoyancy apparatus and a payload, wherein
5 the buoyancy apparatus renders the assembly positively buoyant;
Submerging the assembly to a position at a first height above the bed;
Deploying a control weight from a vessel to the assembly to overcome the positive
buoyancy of the assembly and thereby lower the payload from the first height to the
bed.
10
2. The method as claimed in claim 1 comprising submerging the assembly to the first
height above the bed using a clump weight line.
3. The method as claimed in claim 2 comprising parking the assembly at the first height
15 with the assembly anchored by the clump weight line.
4. The method as claimed in any preceding claim comprising coupling the control
weight to the assembly at the first height above the bed.
- 20 5. The method as claimed in claim 4 comprising receiving the control weight in a
receptacle on the buoyancy apparatus.
6. The method as claimed in any preceding claim wherein the control weight is a
control chain, and the method comprises
25 supporting a first portion of the control chain on a lower surface of a receptacle of the
apparatus;
suspending a second portion of the control chain above the first portion within the
receptacle; and
suspending a third portion of the control chain between the control vessel and an
30 opening to the receptacle.
7. The method as claimed in any preceding claim comprising ballasting the assembly
with a ballast weight corresponding to the weight of the payload of the assembly;
and subsequently detaching the payload from the buoyancy apparatus at the bed of
35 the body of water.

8. A method of raising a payload from a bed of a body of water, the method comprising:
Providing an assembly on a bed formed from a buoyancy apparatus and the
payload, wherein the buoyancy apparatus has sufficient buoyancy to lift the payload;
5 Retaining the assembly on the bed using a control weight;
Using a vessel to retrieve the control weight from the assembly to render the
assembly positively buoyant, thereby raising the assembly from the bed.
9. The method as claimed in claim 8 comprising decoupling a ballast weight from the
10 assembly subsequent to forming the assembly the ballast weight corresponding to
the weight of the payload of the assembly.
10. The method as claimed in claim 8 or claim 9 wherein the control weight is a control
chain, and the method comprises
15 supporting a first portion of the control chain on a lower surface of a receptacle of the
apparatus;
suspending a second portion of the control chain above the first portion within the
receptacle; and
suspending a third portion of the control chain between the control vessel and an
20 opening to the receptacle.
11. An apparatus for lowering or raising a load to or from a bed of a body of water, the
apparatus comprising: a buoyancy apparatus configured to be coupled to a payload,
the buoyancy apparatus having positive buoyancy sufficient to lift the load; and at
25 least one receptacle for receiving a control weight lowered from a vessel to lower or
raise the assembly.
12. The apparatus as claimed in claim 13, wherein the control weight is a control chain.
- 30 13. The apparatus as claimed in claim 12, wherein the receptacle comprises a lower
surface for supporting a first portion of the control chain and is configured for
suspension of a second portion of the control chain above the first portion within the
receptacle.

14. The apparatus as claimed in any of claims 11 to 13, wherein the receptacle is an elongate tower oriented substantially vertically on the buoyancy apparatus.
15. The apparatus as claimed in any of claims 11 to 14, comprising a plurality of
5 receptacles for receiving multiple control weights from the vessel.

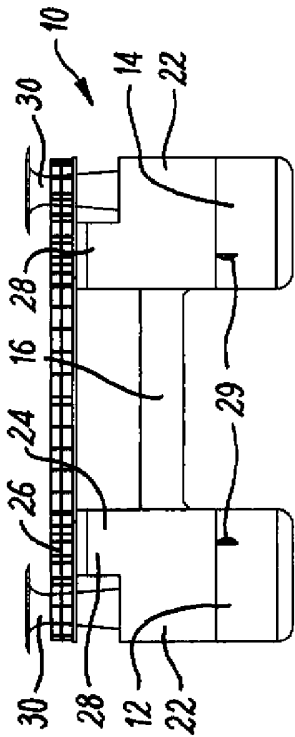


Fig. 1A

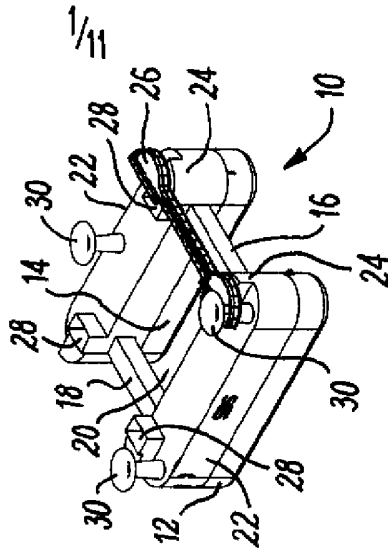


Fig. 1B

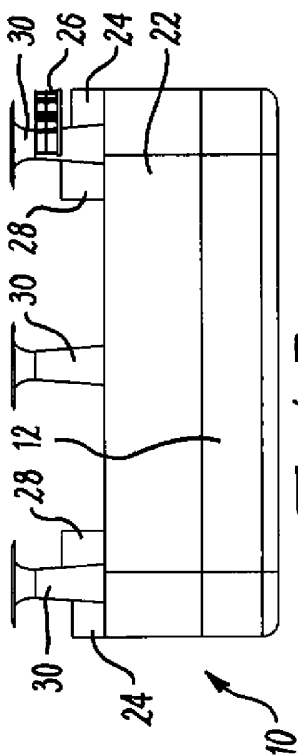


Fig. 1C

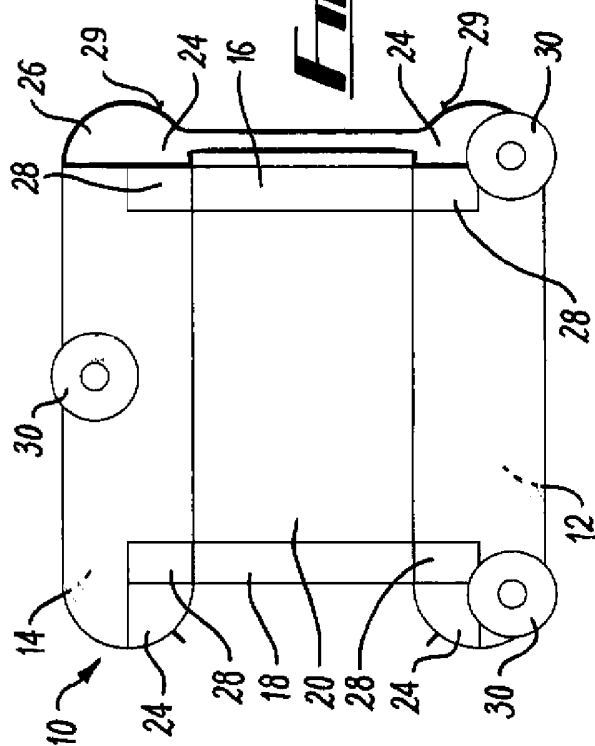


Fig. 1D

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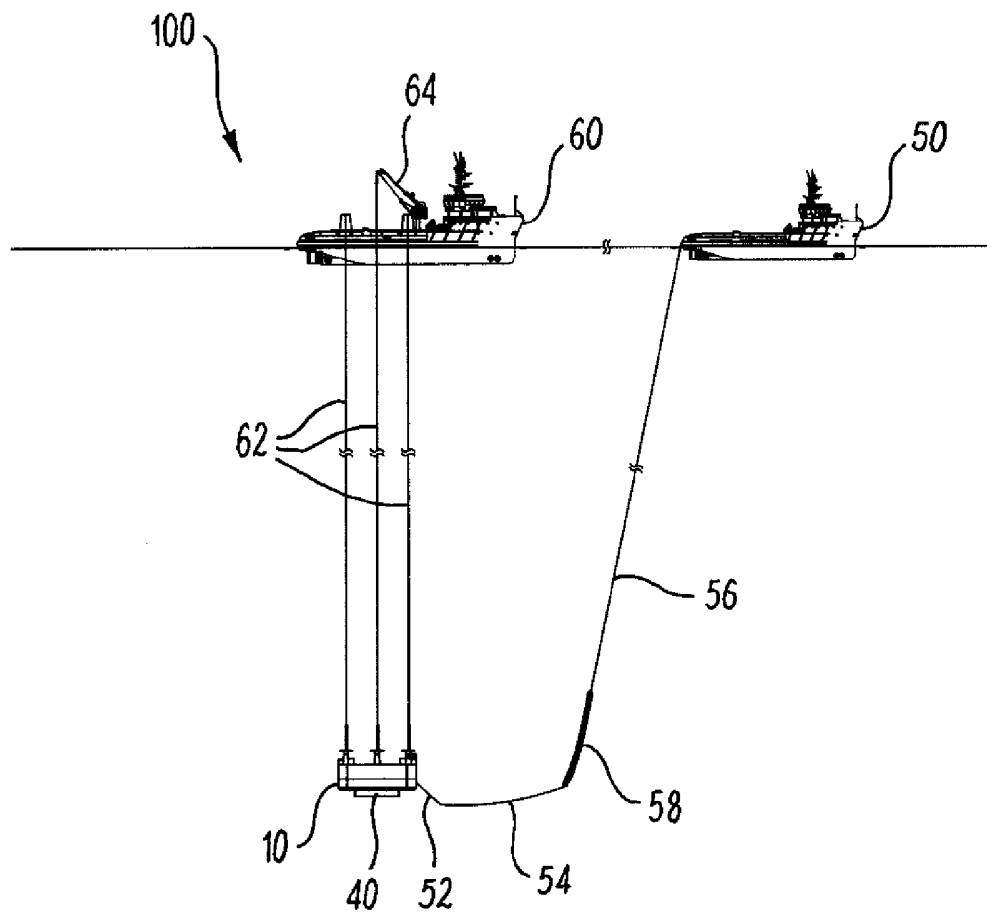


FIG. 2A

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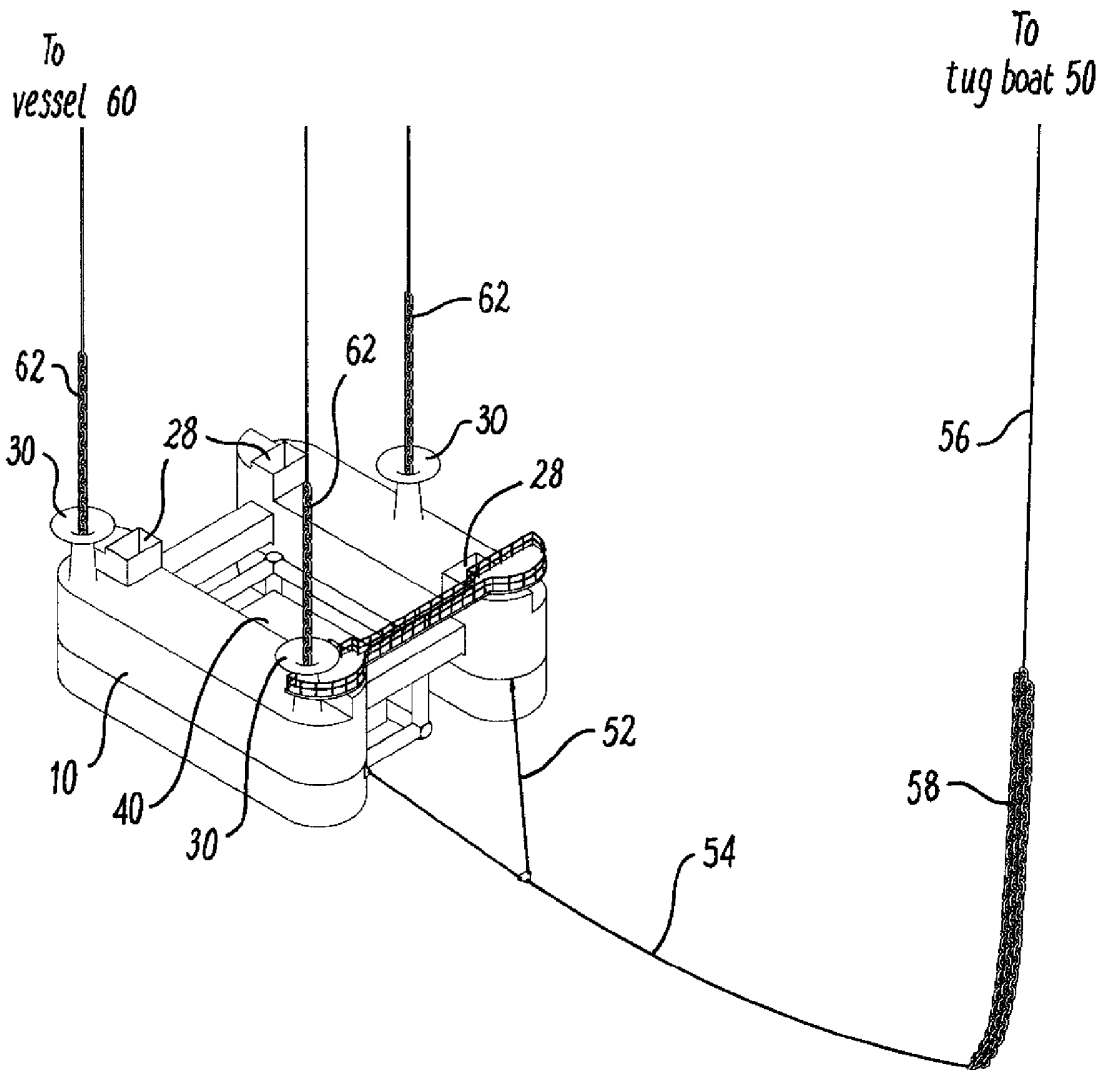


FIG. 2B

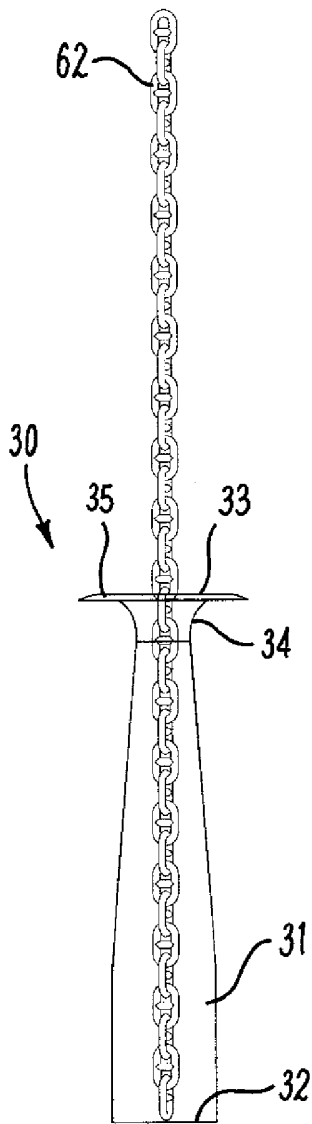


FIG. 3A

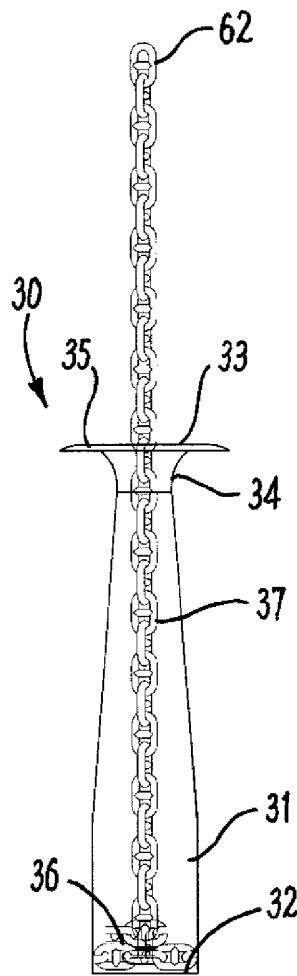


FIG. 3B

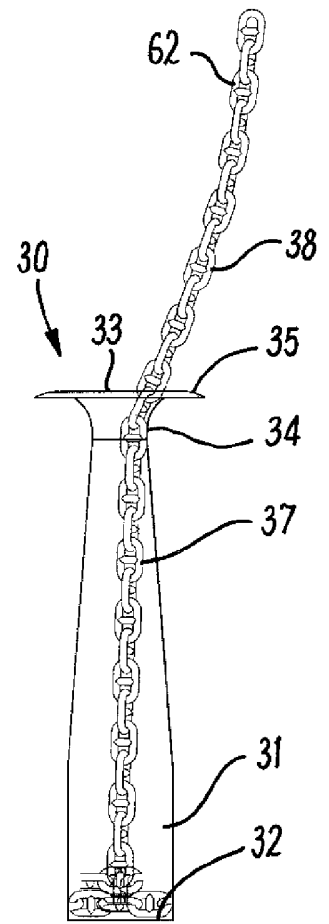
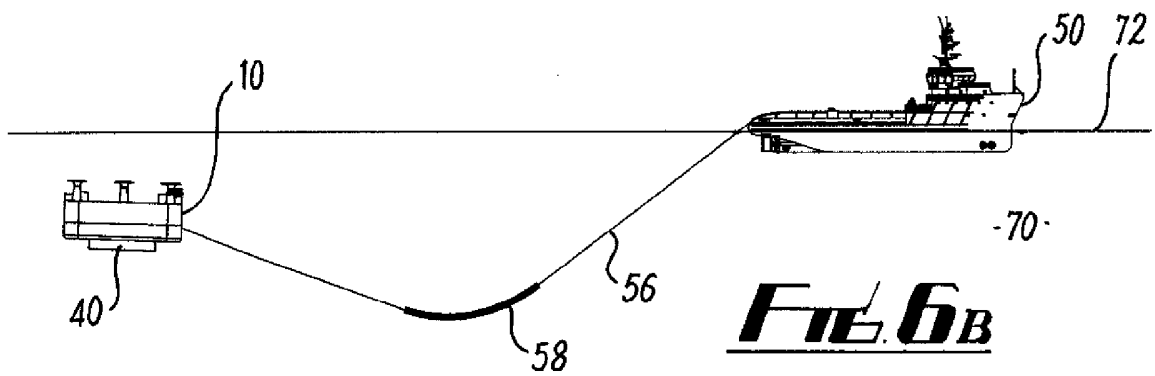
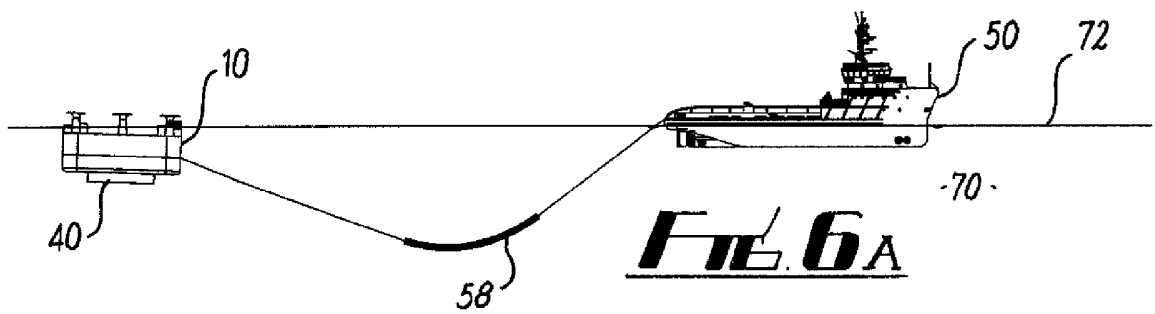
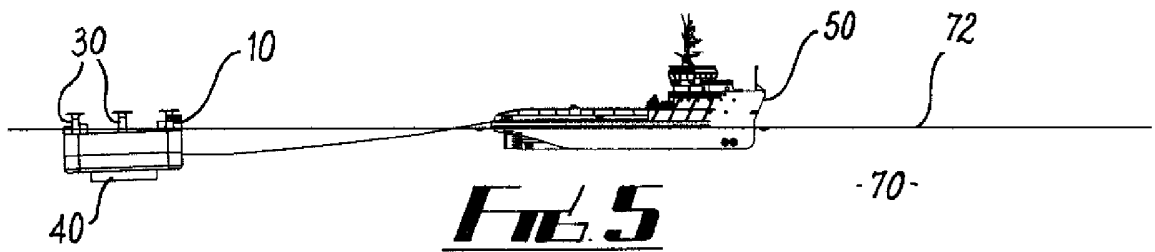
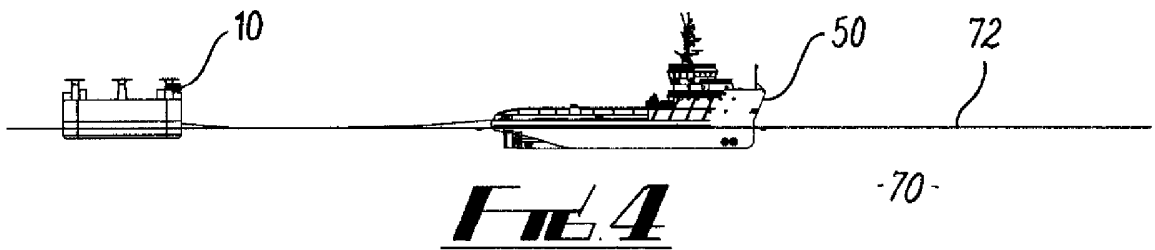
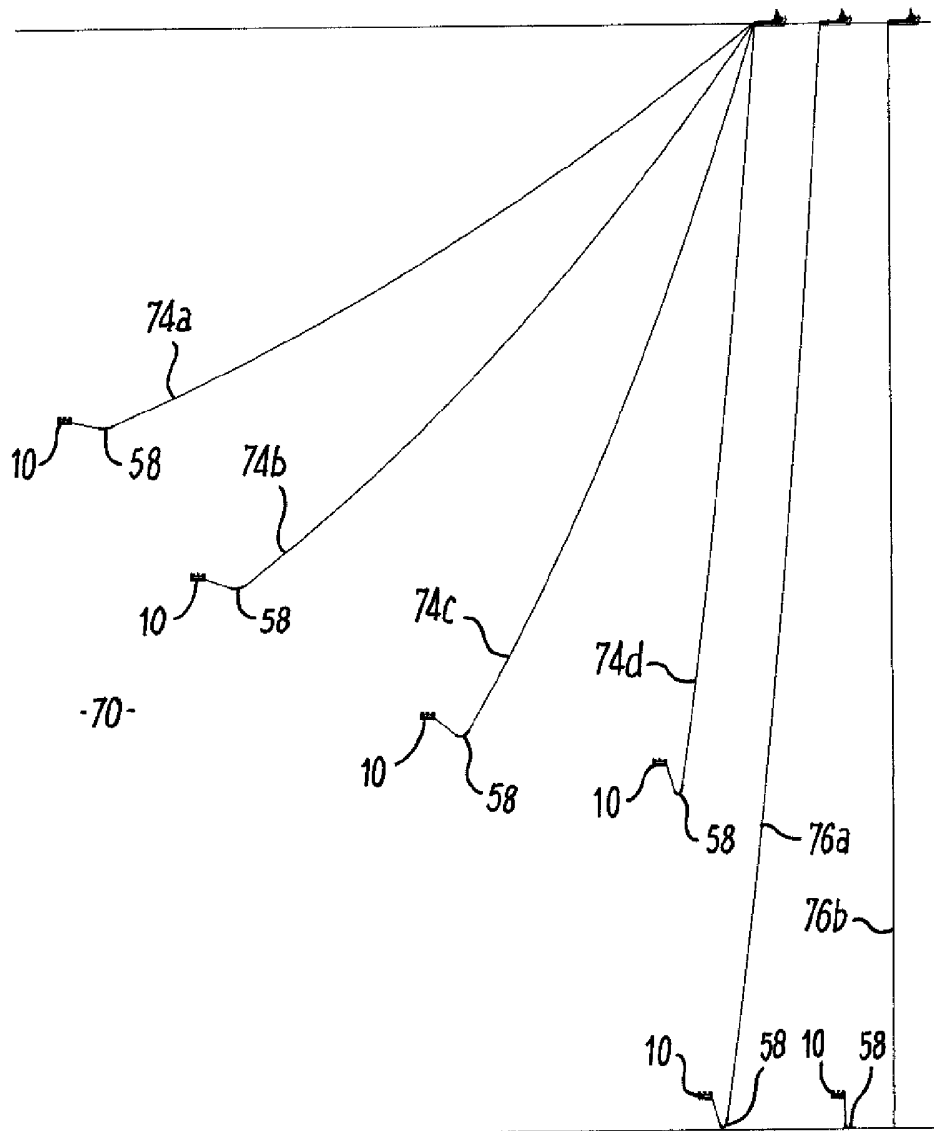
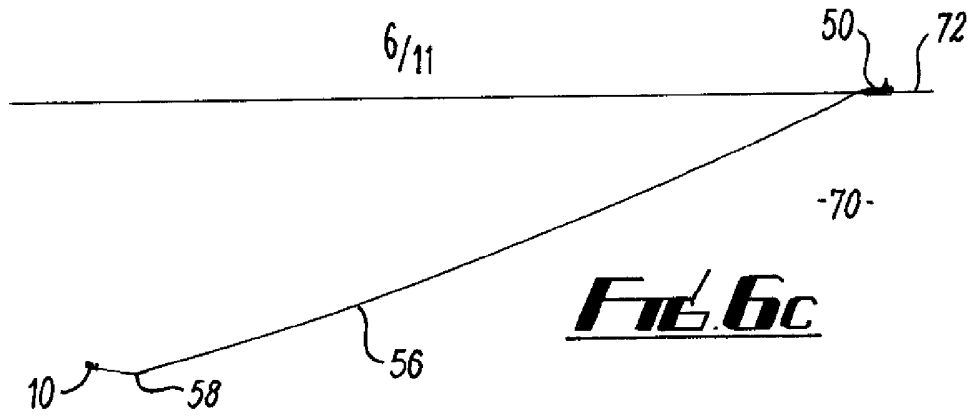


FIG. 3C

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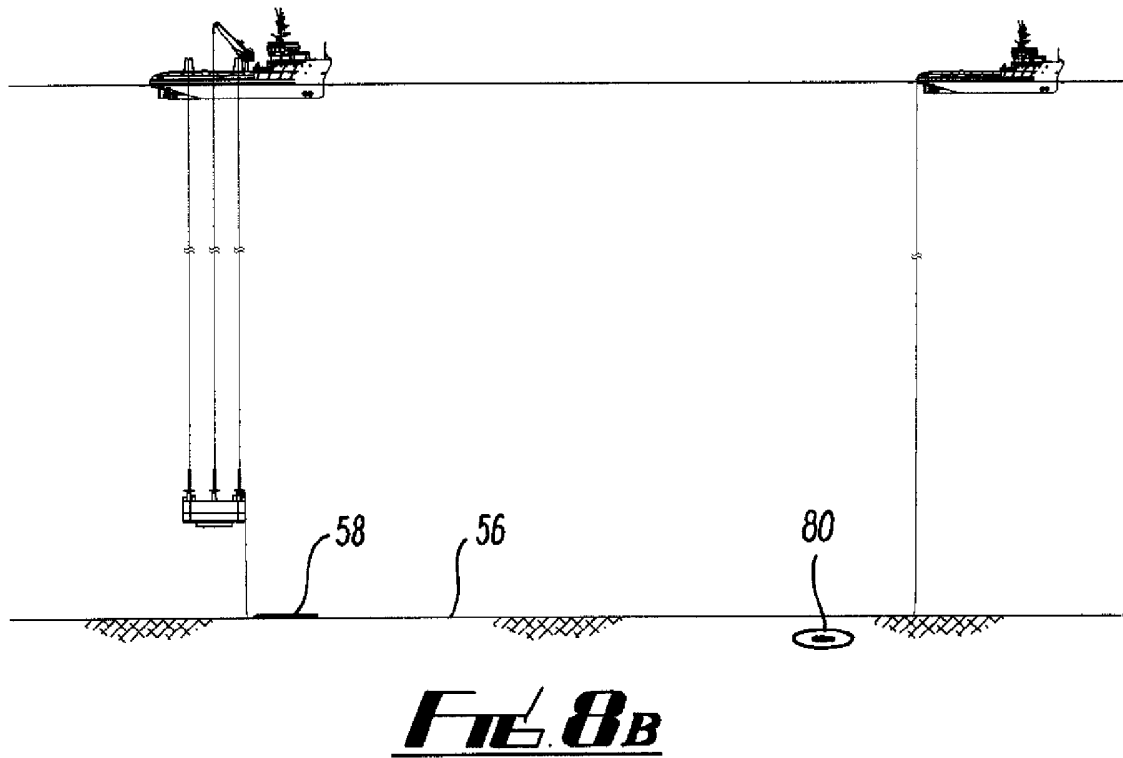
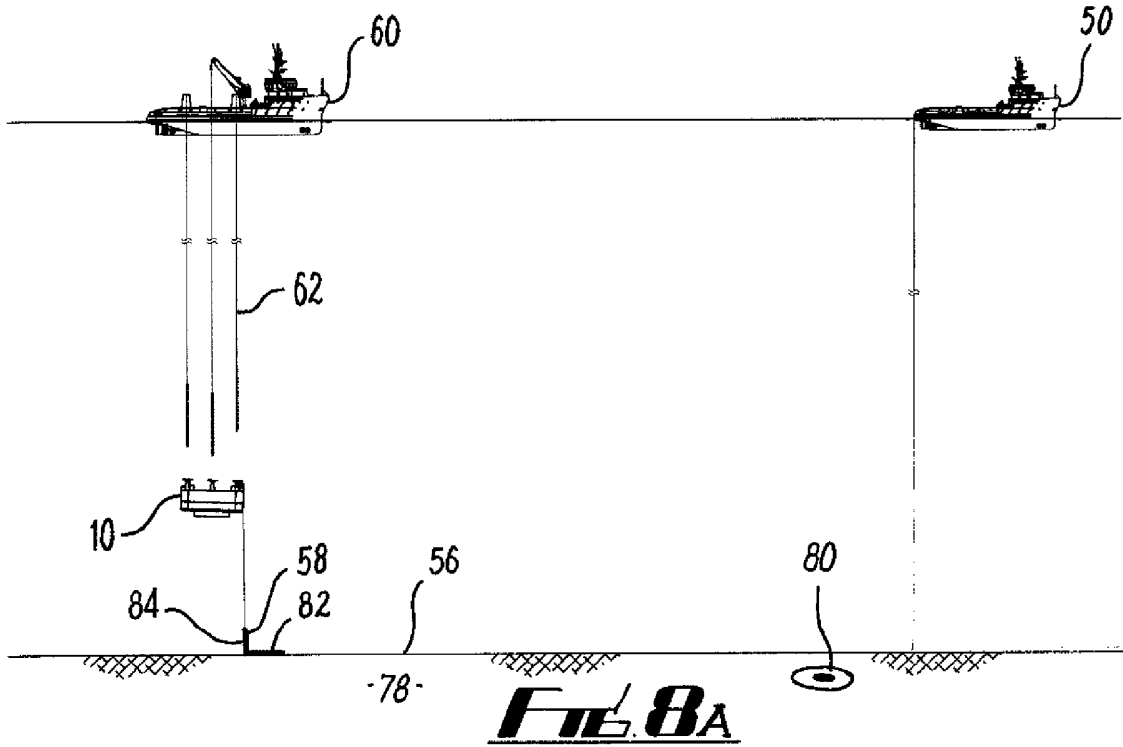




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FIG. 7

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FIG. 9A

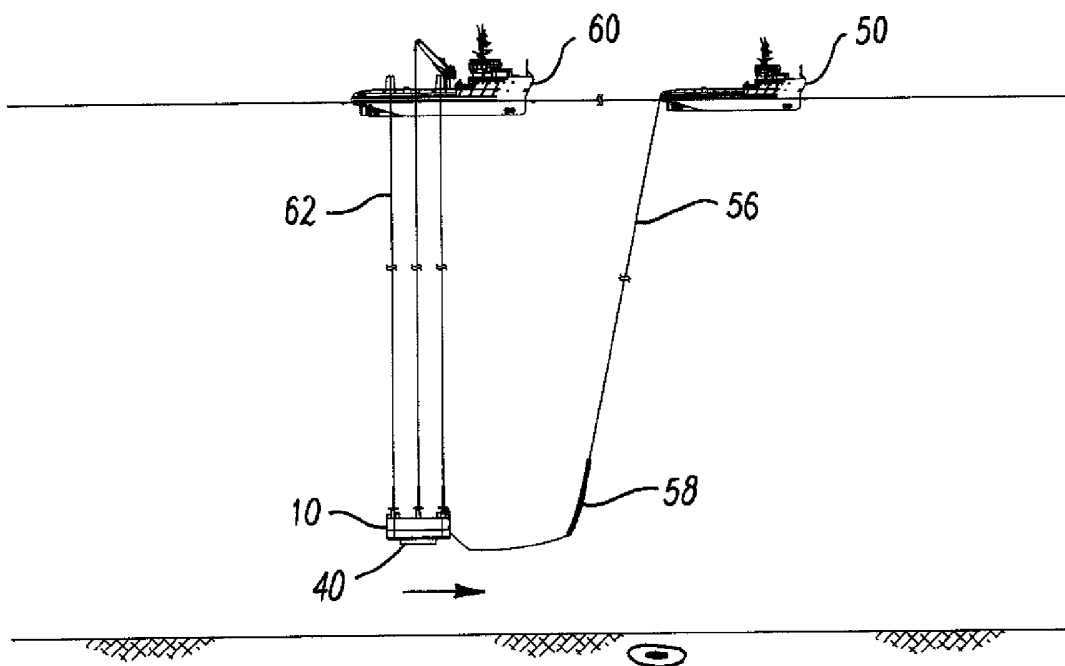
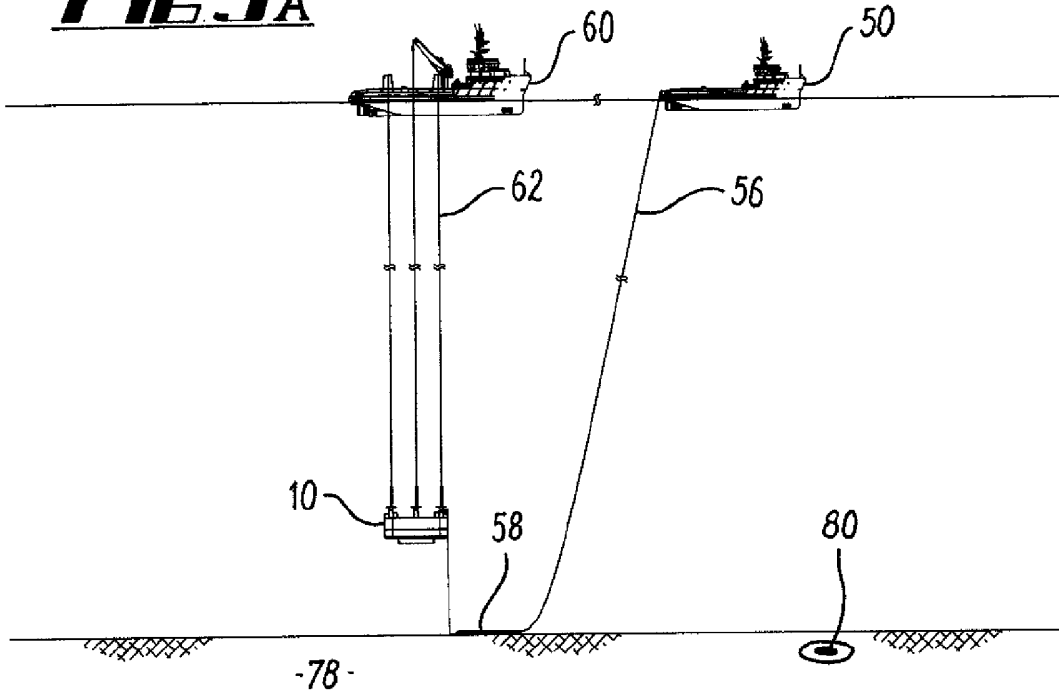
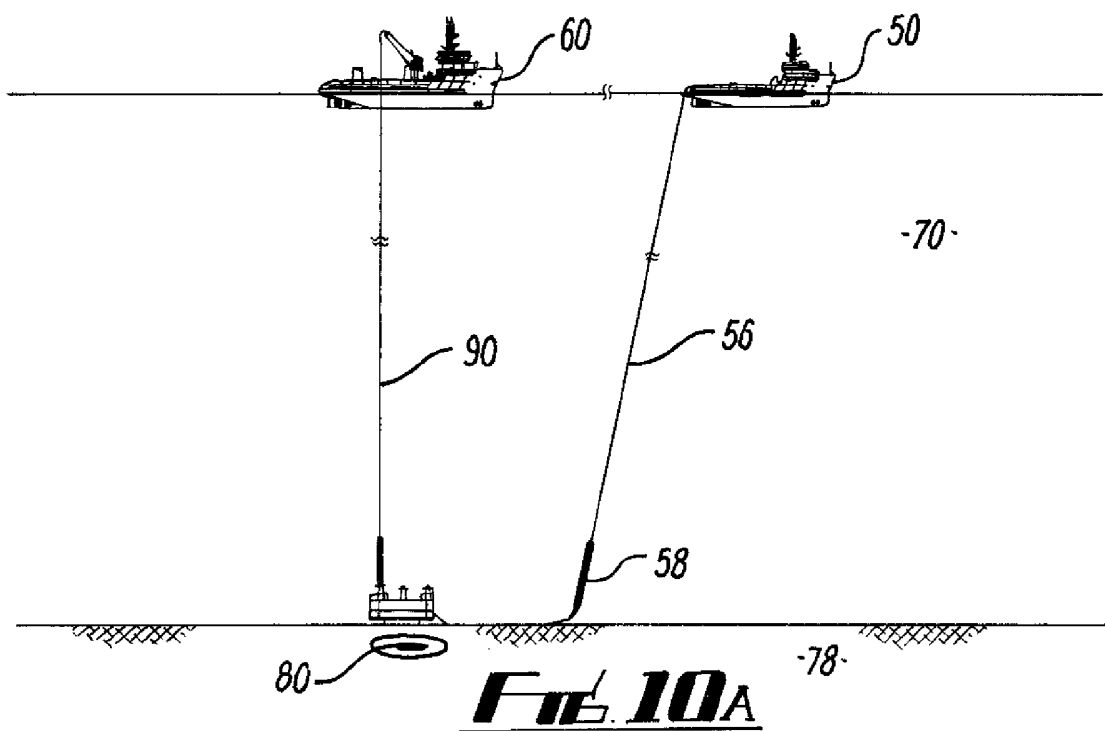
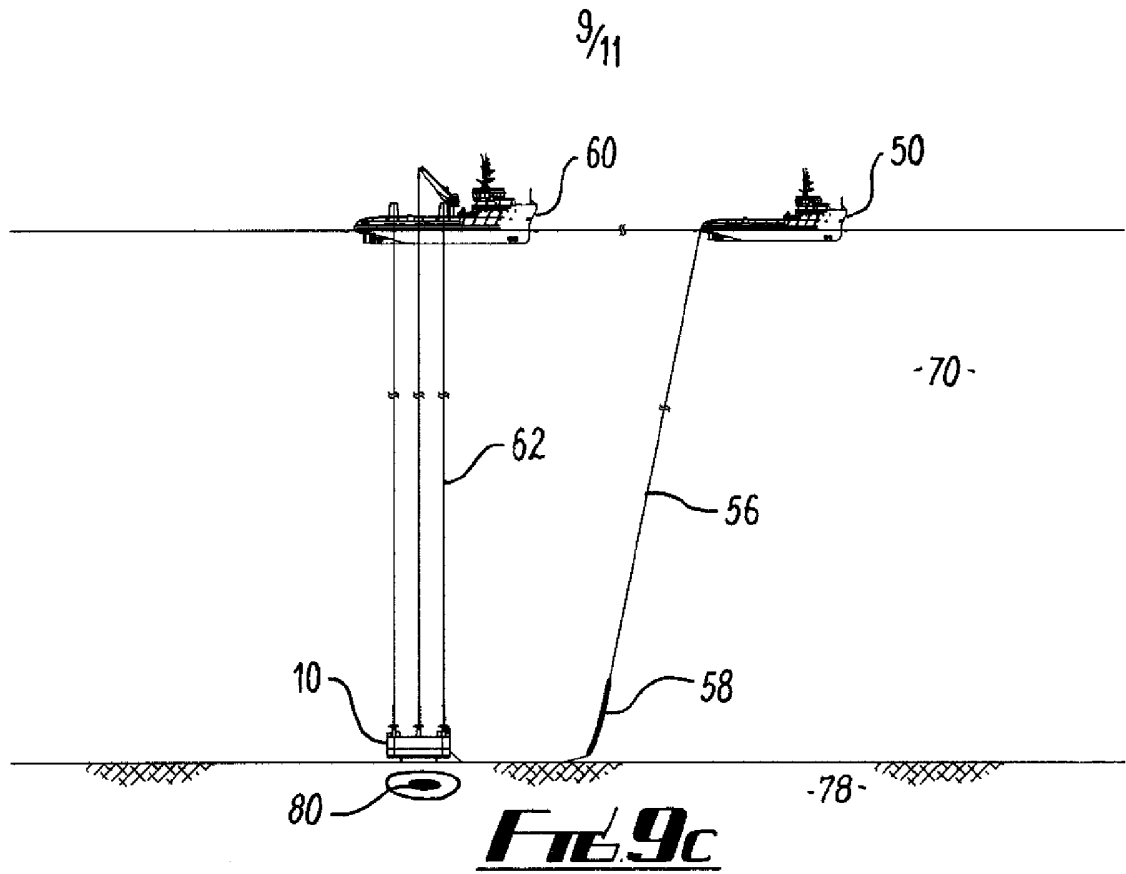
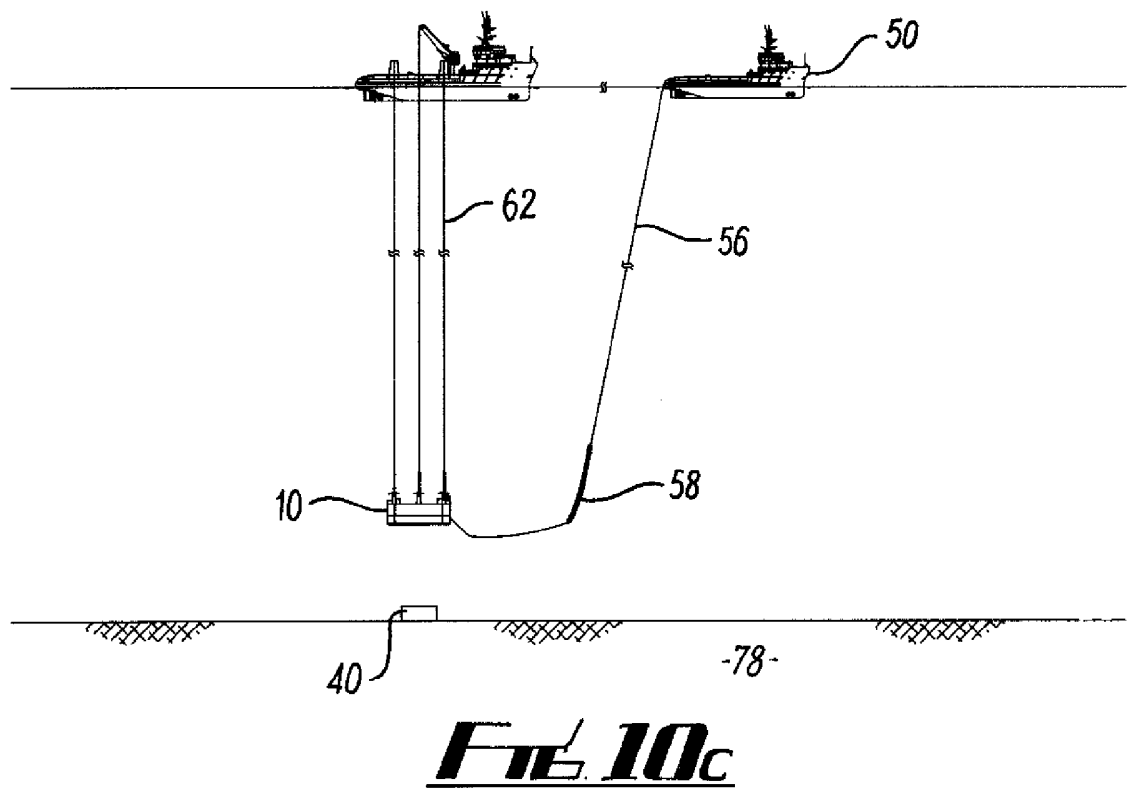
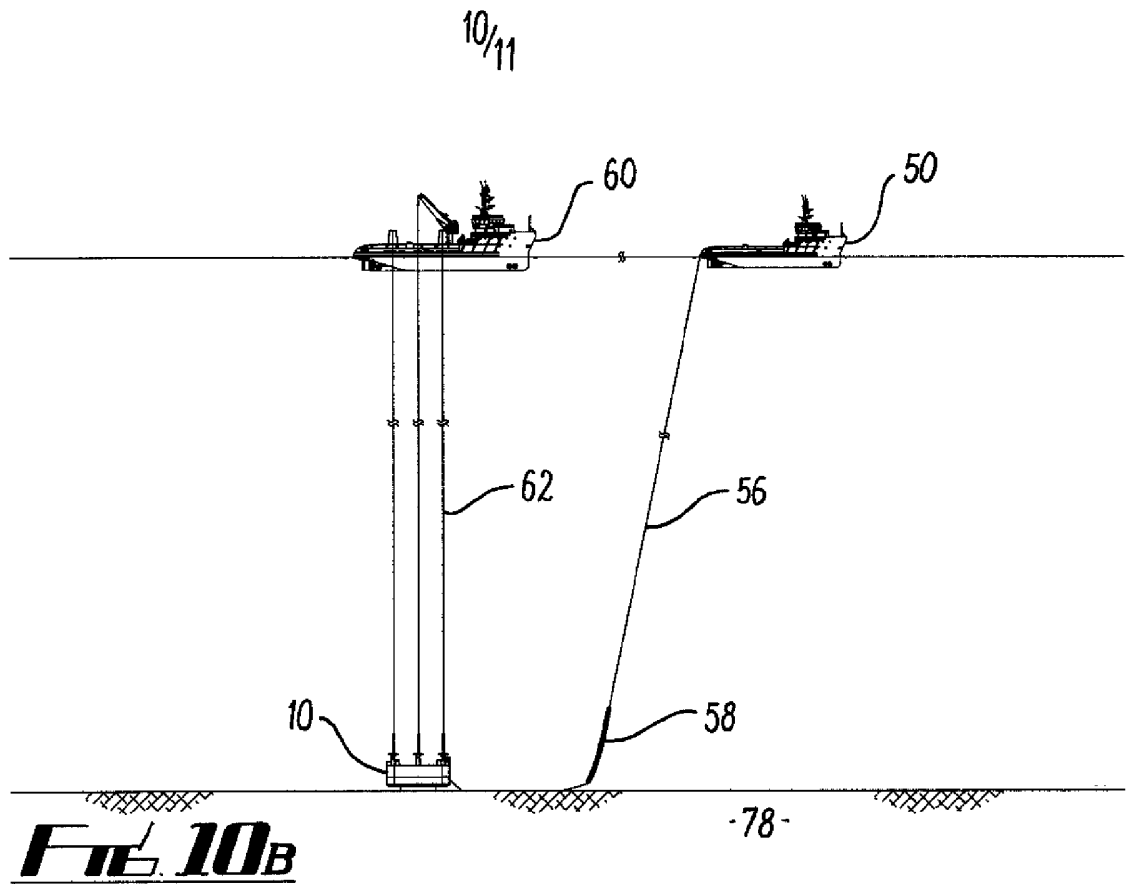


FIG. 9B





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