

**APPARATUS FOR LAYING A PIPELINE IN DEEP WATER**

The invention relates to an apparatus for laying a pipeline in water, comprising a vessel with means for assembling a pipeline from pipe parts, an elongate curved guide body arranged on the hull of the vessel for guiding
5 the pipeline from the vessel into the water, and means for carrying the guide body into respectively out of the water.

Depending on the pipe diameter, such an apparatus is suitable for laying a pipeline to a certain depth, for
10 instance about 1.5 km at a pipe diameter of 300 mm. When a pipeline is laid at greater depth with such an apparatus the loads on the hull become too great. These loads consist mainly of static vertical forces of the magnitude of the submerged weight of that part of the pipeline
15 situated between the vessel and the bed of the water, and the dynamic forces which occur due to the swell of the waves. Already known is a body consisting of pivoting joints for the purpose of compensating the above forces, but it is not easily possible therein to properly control
20 the bending radius of the pipeline at the position of the guide body, whereby, depending on the conditions, plastic deformation of the pipe occurs.

The object of the present invention is to provide an apparatus of the above described type wherein the above
25 stated drawbacks are obviated.

This objective is achieved in accordance with the characterizing measures of claim 1, wherein the elongate guide body is box-like. The advantage of an apparatus according to the invention is that when the box-like body
30 takes an air and watertight form the guide body acquires a buoyancy, whereby a part of the forces exerted by the pipeline is absorbed by the guide body and the load on the hull is reduced. The closed, fixed guide surface formed by the box form also better supports the pipeline
35 lying on roller supports.

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An embodiment according to the invention comprises a box-like body which in any cross-section has a small width relative to the height. The hydrodynamic forces are hereby minimal, while the box-like body is sufficiently strong to absorb the substantially vertical pipeline forces and vessel movements.

In a further embodiment according to the invention the guide body comprises a curved guide surface formed from pipe supporting elements, preferably rollers, which rollers are arranged at a mutual distance such that the greatest bending of the pipe takes place at the position of the rollers, wherein the bending is acceptable in terms of safety and design provisions.

A further embodiment according to the invention comprises a rod-like member which is arranged hingedly on the hull and carries the box-like body in respectively out of the water and which extends between a point on the vessel and a point on the box-like body at a distance from the hinge. This rod carries the box-like body out of the water in the case of bad weather conditions or in the case of transport, and carries the box-like body into the water for laying of a pipeline, wherein depending on the resultant force it exerts a tensile force or pressure force on the box-like body.

Another embodiment according to the invention comprises a box-like body in air and watertight form which is provided with one or more closed spaces for receiving ballast. It is hereby possible to regulate the excess or lack of buoyancy in particular cases by receiving for instance water in the spaces or pumping it therefrom.

Various aspects will be further elucidated with reference to the drawings of a preferred embodiment.

Figure 1 shows a side view of a preferred embodiment according to the invention.

Figure 2 shows a side view of the guide body of figure 1 on enlarged scale.

Figure 3 shows a top view of the guide body of figure 1 on enlarged scale.

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A preferred embodiment according to the invention comprises a ship 1 with means (not further shown) for assembling a pipeline 1 from pipe parts (see fig. 1). Ship 1 is a vessel with a modified propelling and positioning device for correcting the position of the ship such that the pipeline can be laid with the correct precision in the water.

The assembled pipeline 2 is carried into the water from ship 1 via an elongate guide body 4 (fig. 1). Guide body 4 is constructed in box shape and in airtight manner from a number of compartments, wherein in any cross-section the body has a small width relative to the height (see fig. 2 and 3). If the guide body is used in rough weather regions it is recommended to have the height decrease toward the free end.

The guide body is further arranged hingedly on the stern of the ship and connected at a distance from the hinge to a rod 3 for carrying thereof in respectively out of the water.

In a conventional apparatus for laying a pipeline the load is absorbed via the hull and the rod due to the weight of the depending pipe.

In the apparatus according to the invention the guide body 4 in airtight, box-like form has a buoyancy whereby a part of the load of the depending pipe is absorbed and it is now possible to take up a greater load, whereby a pipeline can be laid at greater depth than with the currently known apparatus.

On the top of guide body 4 are arranged a large number of rollers 5 for supporting and guiding pipeline 2. The rollers are adjustable in vertical direction and, if desired, resiliently yielding to allow passage of diameter differences of the pipe. In addition, they are placed at a mutual distance such that the maximum bending occurring at the position of the rollers is acceptable. A good control of the bending of the pipe is hereby obtained.

CLAIMS

1. Apparatus for laying a pipeline in water, comprising a vessel with means for assembling a pipeline from pipe parts, an elongate curved guide body arranged on the hull of the vessel for guiding the pipeline from the vessel into the water, and means for carrying the guide body into respectively out of the water, characterized in that the elongate guide body is box-like.

2. Apparatus as claimed in claim 1, characterized in that in any cross-section the box-like body has a small width relative to the height.

3. Apparatus as claimed in claim 1 or 2, characterized in that the height of the box-like body decreases toward the end remote from the hull.

4. Apparatus as claimed in claims 1-3, characterized in that pipe supporting elements forming a curved guide surface are arranged on or recessed into the box-like body.

5. Apparatus as claimed in any of the claims 1-4, wherein the guide body is arranged hingedly on the hull, characterized in that the means comprise at least one rod-like member which carries in respectively out of the water and which extends between a point on the vessel and a point on the box-like body at a distance from the hinge in order to fix the body relative to the vessel.

6. Apparatus as claimed in any of the claims 1-5, characterized in that the box-like body takes an air and/or watertight form and is provided with one or more closed spaces for receiving ballast.



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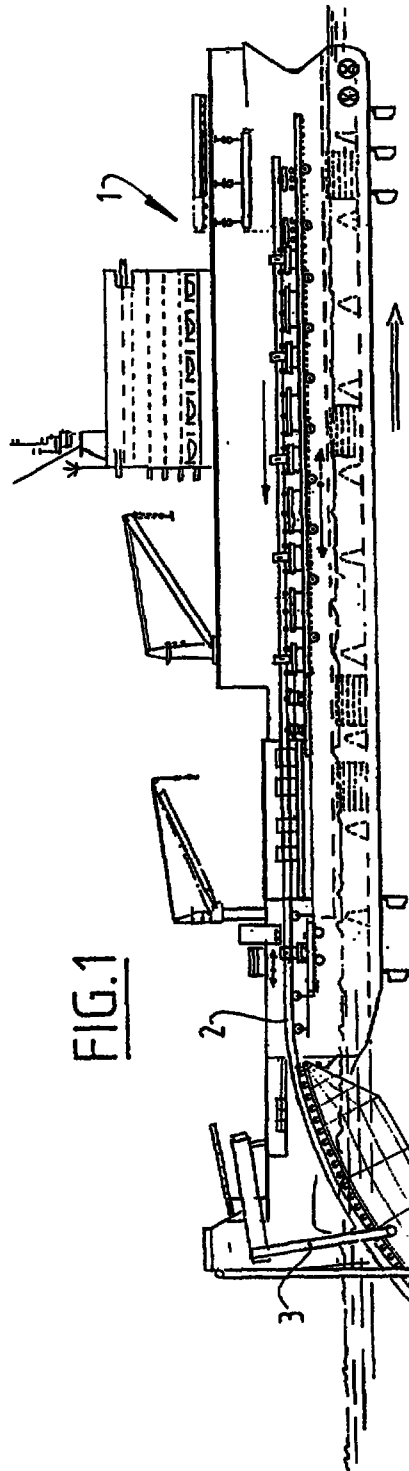


FIG. 1

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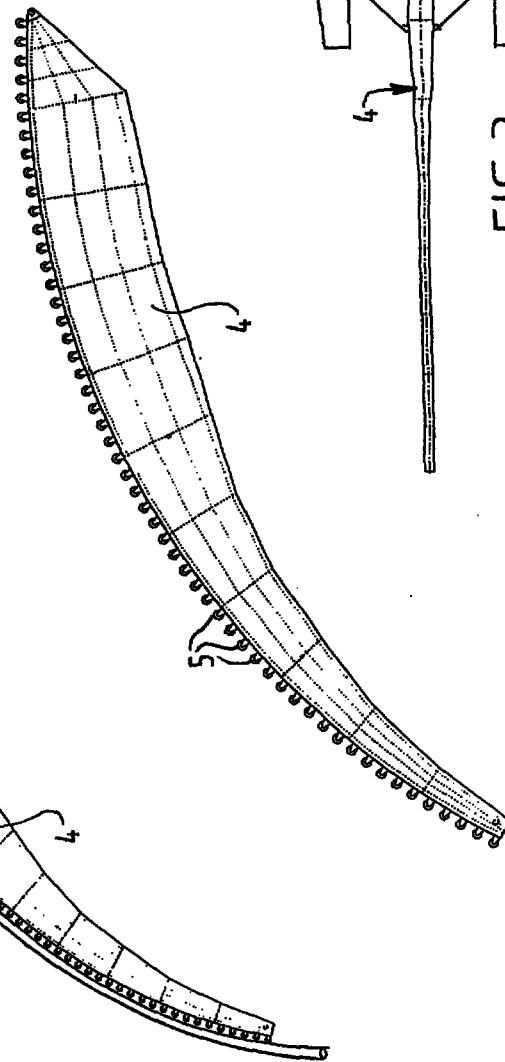


FIG. 2

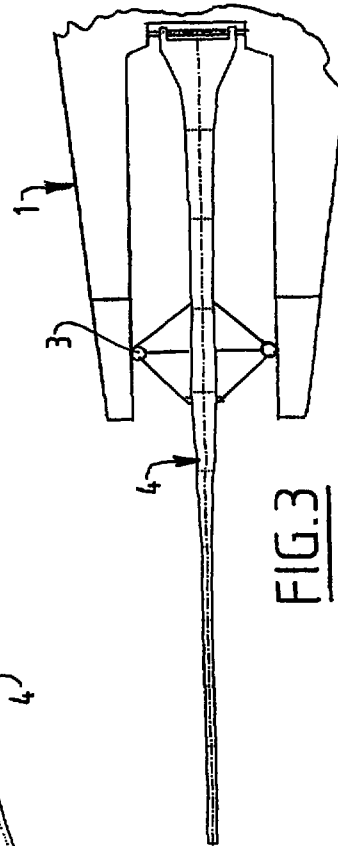


FIG. 3

APPARATUS FOR LAYING A PIPELINE IN DEEP WATER

The invention relates to an apparatus for laying a pipeline in water, comprising a vessel with means for assembling a pipeline from pipe parts, an elongate curved guide body arranged on the hull of the vessel for guiding the pipeline from the vessel into the water, and means for carrying the guide body into respectively out of the water, said body takes an air and/or watertight form and is provided with one or more closed spaces for receiving ballast.

10 A stinger apparatus like this is disclosed in US-A-3822558. Depending on the pipe diameter, such an apparatus is suitable for laying a pipeline to a certain depth, for instance about 1.5 km at a pipe diameter of 300 mm. When a pipeline is laid at greater depth with
15 such an apparatus the loads on the hull become too great. These loads consist mainly of static vertical forces of the magnitude of the submerged weight of that part of the pipeline situated between the vessel and the bed of the water, and the dynamic forces which occur due to the
20 swell of the waves. Already known is a body consisting of pivoting joints for the purpose of compensating the above forces, but it is not easily possible therein to properly control the bending radius of the pipeline at the position of the guide body, whereby, depending on the
25 conditions, plastic deformation of the pipe occurs.

The object of the present invention is to provide an apparatus of the above described type wherein the above stated drawbacks are obviated.

This objective is achieved in accordance with the
30 characterizing measures of claim 1, wherein the elongate guide body is box-like. The advantage of an apparatus according to the invention is that when the box-like body takes an air and watertight form the guide body acquires a buoyancy, whereby a part of the forces exerted by the
35 pipeline is absorbed by the guide body and the load on the hull is reduced. The closed, fixed guide surface formed by the box form also better supports the pipeline lying on roller supports.

REPLACEMENT SHEET

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CLAIMS

1. Apparatus for laying a pipeline in water, comprising a vessel with means for assembling a pipeline from pipe parts, an elongate curved guide body arranged on the hull of the vessel for guiding the pipeline from the vessel into the water, and means for carrying the guide body into respectively out of the water, said body takes an air and/or watertight form and is provided with one or more closed spaces for receiving ballast, characterized in that the elongate guide body is box-like, wherein any cross-section the box-like body has a small width relative to the height.

2. Apparatus as claimed in claim 1, characterized in that the height of the box-like body decreases toward the end remote from the hull.

3. Apparatus as claimed in claims 1 or 2, characterized in that pipe supporting elements forming a curved guide surface are arranged on or recessed into the box-like body.

4. Apparatus as claimed in any of the claims 1-4, wherein the guide body is arranged hingedly on the hull, characterized in that the said carrying means comprise at least one rod-like member which carries in respectively out of the water and which extends between a point on the vessel and a point on the box-like body at a distance from the hinge in order to fix the body relative to the vessel.



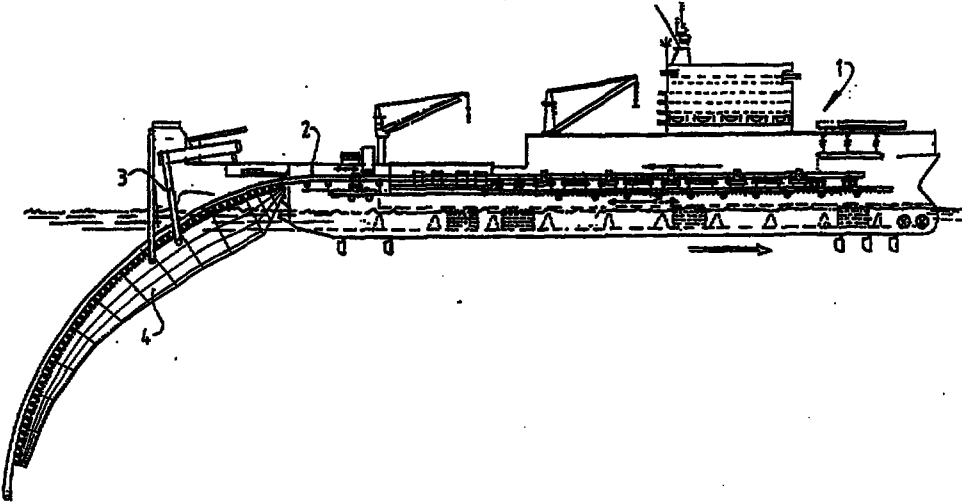
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(21) International Application Number: PCT/NL98/00212 (22) International Filing Date: 15 April 1998 (15.04.98) (30) Priority Data: 1005824 16 April 1997 (16.04.97) NL (71) Applicant (for all designated States except US): ALLSEAS GROUP S.A. [CH/CH]; 5, route de la Coula, CH-1618 Châtel-Saint-Denis (CH). (72) Inventor; and (75) Inventor/Applicant (for US only): VAN GELDER, Klaas, Boudewijn [NL/NL]; Maerten Trompstraat 12, NL-2628 RD Delft (NL). (74) Agent: HOORWEG, P., N.; Arnold & Siedsma, Sweelinckplein 1, NL-2517 GK Den Haag (NL).		(81) Designated States: BR, GB, NO, SG, TR, US. Published With international search report.
(54) Title: APPARATUS FOR LAYING A PIPELINE IN DEEP WATER  (57) Abstract An apparatus for laying a pipeline (2) in water, comprising a vessel (1) with means for assembling a pipeline from pipe parts, an elongate curved guide body (4) arranged on the hull of the vessel for guiding the pipeline from the vessel into the water, and means (3) for carrying the guide body into respectively out of the water, wherein the elongate guide body is box-like, whereby a part of the forces exerted by the pipeline is absorbed by the guide track and the load on the hull is reduced.		