Claims

1. An apparatus for feeding an elongate article (6) from a floating vessel (2) and suspending a first portion (6a) of the elongate article in a body of water below the vessel, **characterized by**
a cylindrical body (10) rotatably supported on the vessel and comprising driving means (17; 85, 86) for controlling the rotation of the cylindrical body, the cylindrical body (10) further comprising a spooling-on region (P) and a spooling-off region (U) for the elongate article, and a cylindrical contacting surface (18; 18') for interaction with at least a portion of the elongate article (6) either directly or via a plurality of support elements (55; 55'; 55"; 55'''); the contacting surface (18; 18') being configured so as to support the first portion (6a), and first tensioner means (20) for the elongate article, arranged on the vessel between the spooling-on region (P) and a storage area (4) for the elongate article.

2. The apparatus of any one of the preceding claims, further comprising second tensioner means (21) for the elongate article, arranged on the vessel proximate to the spooling-off region (U).

3. The apparatus of any one of the preceding claims, wherein the axis of rotation of the cylindrical body is substantially horizontal.

4. The apparatus of any one of the preceding claims, further comprising a guiding apparatus (30; 30'; 88; 90a,b) arranged on the vessel proximate to at least a part of the contacting surface, arranged and configured for controlling the movement of the elongate article between the spooling-on region and the spooling-off region in a cylindrical body axial direction.

5. The apparatus of claim 4, wherein the guiding apparatus (30) comprises individual guiding means (32; 34; 35) for each turn of the elongate article around the contacting surface.

6. The apparatus of claim 4 or claim 5, wherein the guiding means are arranged non-parallel with a rotational plane of the cylindrical body and thus exhibits a pitch angle (α) different from zero degrees.

7 The apparatus of any one of claims 4 - 6, the guiding means comprising lifting means (34) for lifting the portion of the elongate article which is subjected to the guiding means off from the contacting surface, and subsequently allowing the elongate article to resume contact with the contacting surface.

8. The apparatus of any of the preceding claims, further comprising traction means (19) for the elongate article, arranged at intervals around the cylindrical body (10).

9. The apparatus of claim 8, wherein the traction means comprise a plurality of ridges (19), releasably arranged on the contacting surface (18), whereby at least a portion of the outer structure of the elongate article is elastically deformed when subjected to the ridges when the apparatus is in operation.

10. The apparatus of any one of claims 1 – 9, wherein the contacting surface (18) comprises a plurality of receptacles (54) arranged around the circumference of the cylindrical body (10), said receptacles (54) being configured for releasably receiving a plurality of support elements (55) for the elongate article.

11. The apparatus of any one of claim 10, wherein a plurality of support elements (55) are interconnected to form an endless belt (59) which is wrapped a number of turns around the cylindrical body.

12. The apparatus of claim 11, further comprising first (57a) and second (57b) guide funnels for the endless belt (59), said guide funnels being arranged proximate to the cylindrical body and an axial distance apart, whereby the endless belt temporarily is lifted off cylindrical body and moved in the cylindrical body axial direction before it is re-attached to the cylindrical body.

13. The apparatus of any one of claims 1 – 4, further comprising a plurality of support elements (55'; 55"; 55'''; 55*) configured for arrangement on the surface (18) and for providing support for the elongate article.

14. The apparatus of claim 13, wherein the support elements are connected in an end-to-end relationship to form an endless belt (87) wrapped around the cylindrical body,

15. The apparatus of claim 14, further comprising a take-off section (T) where a portion of the belt is temporarily lifted off the surface by means of a guide structure (90a,b), shifted in an axial direction of the cylindrical body, and brought back to the surface; said guide structure (90a,b) having a low profile, enabling large objects to pass by.

16. The apparatus of any one of claims 13 – 15, wherein each support element comprises a v-shaped profile (83, 84) for supporting at least a part of the elongated article.

17. The apparatus of any one of the preceding claims, wherein the spooling-on region (P) and the spooling-off region (U) are one the same side of the cylindrical body's (10) axis of rotation.

18. A vessel (2) for laying an elongate article (6), comprising a hull (3) and a deck (4), and further **characterized by**
a cylindrical body (10) rotatably supported on the vessel and comprising driving

means (17; 85, 86) for controlling the rotation of the cylindrical body; the cylindrical body (10) further comprising a spooling-on region (P) and a spooling-off region (U) for the elongate article, and a cylindrical contacting surface (18) for interaction with at least a portion of the elongate article (6).

19. The vessel of claim 18, further comprising the apparatus according to claims 1 – 17.

20. The vessel of claim 19, further comprising a storage area for a plurality of storage spools (7, 7a, 7b) for portions of the elongate article, upstream of the spooling-on region (P).

21. A method of laying an elongate article (6) from a vessel (2), comprising the steps of:

a) arranging a section of the elongate article around a cylindrical body (10) rotatably supported on the vessel;

b) feeding a first portion (6a) of the elongate article into a body of water below the vessel and suspending said first portion by the cylindrical body and a tensioner; and

c) rotating the cylindrical body and operate the tensioner so as to lower the elongate article into the water.

22. The method of claim 21, wherein step a comprises the winding of the elongate article one or more turns around a cylindrical contacting surface (18) on the cylindrical body.

23. The method of claim 21 or claim 22, wherein the elongate article is spooled off of one of a plurality of storage spools (7a, 7b, 7) on a deck area on the vessel and onto the cylindrical body, without intermediate storage.

24. The method of any one of claims 21 – 23, further comprising the use of a guiding apparatus (30) to effect a controlled movement of the portion of the elongate article which is wound onto the contacting surface (18), said movement being in the axial direction (A-A) of the cylinder and at increments per rotation of the cylindrical body which corresponds to the transverse dimension, such as the outer diameter, of the elongate article.

25. The method of any one of claims 21 – 24, wherein an endless belt (59) of cradles (55'; 55") is wound a number of turns around the cylindrical body, providing support for the elongate article.

26. The method of claim 25, further comprising a temporary removal of the belt off of the cylindrical body at a take-off section (T).

Claims

1. An apparatus for feeding an elongate article from a floating vessel and suspending a first portion of the elongate article in a body of water below the vessel, wherein

the apparatus comprises

a cylindrical body rotatably supported on the vessel and comprising

driving means for controlling the rotation of the cylindrical body;

the cylindrical body further comprising

a spooling-on region and a spooling-off region for the elongate article, and

a cylindrical contacting surface for interaction with at least a portion of the elongate article either directly or via a plurality of support elements; the contacting surface supporting the first portion during use, and

first tensioner means for the elongate article, arranged on the vessel between the spooling-on region and a storage area for the elongate article,

wherein the apparatus further comprises

a guiding apparatus arranged on the vessel proximate to at least a part of the contacting surface, arranged and configured for controlling the movement of the elongate article between the spooling-on region and the spooling-off region in a cylindrical body axial direction, wherein the guiding apparatus comprises individual guiding means for each turn of the elongate article around the contacting surface.

2. The apparatus of any one of the preceding claims, further comprising second tensioner means for the elongate article, arranged on the vessel proximate to the spooling-off region.

3. The apparatus of any one of the preceding claims, wherein the axis of rotation of the cylindrical body is substantially horizontal.

4. The apparatus of any of the preceding claims, wherein the guiding means are arranged non-parallel with a rotational plane of the cylindrical body and thus exhibits a pitch angle different from zero degrees.

5 The apparatus of any of the preceding claims, the guiding means comprising lifting means for lifting the portion of the elongate article which is subjected to the guiding means off from the contacting surface, and subsequently allowing the elongate article to resume contact with the contacting surface.

6. The apparatus of any of the preceding claims, further comprising traction means for the elongate article, arranged at intervals around the cylindrical body.

7. The apparatus of any one of claims 1 – 6, wherein the contacting surface comprises a plurality of receptacles arranged around the circumference of the cylindrical body, said receptacles being configured for releasably receiving a plurality of support elements for the elongate article.

8. The apparatus of claim 7, further comprising first and second guide funnels for the endless belt, said guide funnels being arranged proximate to the cylindrical body and an axial distance apart, whereby the endless belt temporarily is lifted off cylindrical body and moved in the cylindrical body axial direction before it is re-attached to the cylindrical body.

9. The apparatus of any one of claims 1 – 3, further comprising a plurality of support elements configured for arrangement on the surface and for providing support for the elongate article.

10. The apparatus of claim 9, wherein the support elements are connected in an end-to-end relationship to form an endless belt wrapped around the cylindrical body.

11. The apparatus of claim 10, further comprising a take-off section where a portion of the belt is temporarily lifted off the surface by means of a guide structure, shifted in an axial direction of the cylindrical body, and brought back to the surface; said guide structure having a low profile, enabling large objects to pass by.

12. The apparatus of any one of claims 9 – 11, wherein each support element comprises a v-shaped profile for supporting at least a part of the elongated article.

13. The apparatus of any one of the preceding claims, wherein the spooling-on region and the spooling-off region are one the same side of the cylindrical body's axis of rotation.

14. A vessel for laying an elongate article, comprising

the apparatus according to any one of claims 1-13,

a hull, and

a deck, the cylindrical body being rotatably supported on the vessel and comprising driving means for controlling the rotation of the cylindrical body.

15. A method of laying an elongate article from a vessel, comprising the steps of:

a) arranging a section of the elongate article around a cylindrical body rotatably supported on the vessel;

b) feeding a first portion of the elongate article into a body of water below the vessel and suspending said first portion by the cylindrical body and a tensioner; and

c) rotating the cylindrical body and operate the tensioner so as to lower the elongate article into the water,

wherein the method further comprising the use of a guiding apparatus to effect a controlled movement of the portion of the elongate article which is wound onto the contacting surface, said movement being in the axial direction of the cylinder and at increments per rotation of the cylindrical body which corresponds to the transverse dimension, such as the outer diameter, of the elongate article.