Claims

1. An apparatus for launching and/or recovering a vessel, comprising:

a ramp and a ramp door pivotably arranged at one end of the ramp, the ramp door being movable between an opened position where the ramp door is arranged to be aligned with the ramp to collectively form a substantially continuous inclined surface, and a closed position where the ramp door is arranged to be elevated relative to the ramp;

a plurality of drive units arranged along the ramp and ramp door, each drive unit having a set of guide members for supporting the vessel's hull; and

an actuator configured to actuate the respective sets of guide members to cause the hull to move progressively along the continuous inclined surface for launch or recovery of the vessel, when the ramp door is in the opened position.

2. The apparatus of claim 1, further comprising a pulling means which is removably attachable to the vessel to, in conjunction with the respective sets of actuated guide members, progressively move the vessel along the inclined platform.

3. The apparatus of claim 2, wherein the pulling means includes a winch.

4. The apparatus of claim 1, wherein each drive unit comprises a plurality of side support members for supporting sides of the hull, the plurality of side support members being arranged adjacent to the set of guide members.

5. The apparatus of claim 4, wherein each side support member includes at least one roller for engaging with the sides of the hull, and a pivotable arm configured to support the at least one roller, the at least one roller configured to be free-rolling.

6. The apparatus of claim 5, wherein a position of the pivotable arm is adjustable to enable the at least one roller to engage with a respective shaped section of the hull.

7. The apparatus of claim 6, wherein the pivotable arm is adjustable to move between an angle of 5° and 40° relative to the base of each drive unit.

8. The apparatus of claim 6 or 7, further comprising an auxiliary arm for adjusting the position of the pivotable arm, the auxiliary arm being of a fixed length.

9. The apparatus of any preceding claim, wherein each drive unit further comprising at least one free-rolling guide member which is interleaved between the set of guide members.

10. The apparatus of any preceding claims, wherein the plurality of drive units include first and second drive units arranged on the ramp door, the first drive unit arranged to be near an end of the ramp door at where the vessel is launched or recovered.

11. The apparatus of claim 10, wherein at least one of the drive units is configured to be adjustable in a longitudinal axis of the ramp.

12. The apparatus of claim 10 or 11, further comprising a set of entry guide rollers arranged adjacent to the first drive unit for guiding the vessel towards or away from at least some of the plurality of drive units to enable recovery or launch of the vessel.

13. The apparatus of claim 12, further comprising a support guide unit being adjustable to support the bow section of the hull.

14. The apparatus of claim 13, wherein the support guide unit includes a pivotable arm configured to support at least one roller for engaging with the bow section, and the pivotable arm is adjustable to move between an angle of 12° and 80° relative to the base of the support guide unit.

15. The apparatus of any preceding claim, wherein the set of guide members include keel rollers.

16. The apparatus of any preceding claim, wherein the continuous inclined surface is configured to be inclined at an angle of approximately between 8° to 20° relative to a horizontal plane of the apparatus.

17. The apparatus of claim 10, wherein the first drive unit is arranged with a bevel gear assembly to enable adjustment of the first drive unit, when the ramp door is in the closed position.

18. The apparatus of claim 10, wherein the first drive unit is arranged with a worm gear assembly to enable adjustment of the first drive unit, when the ramp door is in the closed position.

19. A mother vessel for launching and/or recovering a vessel, comprising the apparatus of any preceding claim, wherein the apparatus is installed on a launch and recovery platform of the mother vessel, the platform being configured to be inclined at an angle of approximately between 8° to 20° relative to a horizontal plane of the mother vessel.

20. A method for launching and/or recovering a vessel using an apparatus, which includes a ramp, a ramp door pivotably arranged at one end of the ramp, the ramp door being movable between an opened position where the ramp door is arranged to be aligned with the ramp to collectively form a substantially continuous inclined surface, and a closed position where the ramp door is arranged to be elevated relative to the ramp, a plurality of drive units arranged along the ramp and ramp door, each drive unit having a set of guide members for supporting the vessel's hull, and an actuator configured to actuate the respective sets of guide members, the method comprises:

(i) moving the ramp door to the opened position; and

(ii) operating the actuator to actuate the respective sets of guide members to cause the hull to move progressively along the continuous inclined surface for launch or recovery of the vessel.

21. The method of claim 20, wherein each drive unit comprises a plurality of side support members for supporting sides of the hull, each side support member includes at least one roller, and a pivotable arm configured to support

the at least one roller, further comprises adjusting the pivotable arm to engage the at least one roller with a respective shaped section of the hull.

22. An apparatus for launching and/or recovering a vessel, comprising:

a ramp and a ramp door pivotably arranged at one end of the ramp, the ramp door being movable between an opened position where the ramp door is arranged to be aligned with the ramp to collectively form a substantially continuous inclined surface, and a closed position where the ramp door is arranged to be elevated relative to the ramp;

a plurality of support units arranged along the ramp and ramp door, each support unit having a set of side support guide members which are in an angularly adjustable arrangement with the base of the drive unit for supporting the sides of the vessel's hull; and

launch and recovery device to cause the hull to move progressively along the continuous inclined surface to be supported by the respective sets of adjusted side support guide members for launch or recovery of the vessel.

23. The apparatus of claim 22, wherein each side support member includes at least one roller for engaging with the sides of the hull, and a pivotable arm configured to support the at least one roller, the at least one roller configured to be free-rolling.

24. The apparatus of claim 23, wherein a position of the pivotable arm is adjustable to enable the at least one roller to engage with a respective shaped section of the hull.

25. The apparatus of any of claims 22 to 24, wherein each support unit further comprises a set of guide members which are configured to be free-rolling and arranged adjacent to the set of side support guide members.

26. The apparatus of any of claims 22 to 25, wherein the launch and recovery device includes a winch.