CLAIMS

1. Liquefied gas storage device, in particular for a liquefied gas carrier or for a land-based facility, comprising:

- at least one liquefied gas storage tank (12) that has a tank bottom (14) and a tank ceiling (16) which together define a tank height (H),

- means (20) for drawing off gas, in liquid and/or gaseous form, in said tank, and

- means (10) for injecting gas in liquid form into said tank, which means are connected to the gas draw-off means,

characterized in that said gas injection means comprise at least one injector-mixer (10) which is located in a lower zone of said tank extending between 0 and 25% of the tank height measured from said tank bottom, and which is intended to be immersed in said liquefied gas contained in the tank, wherein said injector-mixer (10) comprises a main pipe (40) for passage of a main jet (42) of liquid, and a secondary pipe (44) for forced passage of a secondary jet (46) of liquid by the Venturi effect.

2. The device according to the preceding claim, wherein said at least one injector-mixer (10) is configured to inject a flow of liquid gas in a direction which is inclined upwardly at an angle α relative to a horizontal plane.

3. Device according to the preceding claim, wherein said angle α is between 5° and 85°, preferably between 15° and 75°, and more preferably between 30° and 60°.

4. Device according to one of the preceding claims, wherein said at least one injector-mixer (10) is located at a distance of less than one meter to a longitudinal side wall (12c) of said tank.

5. Device according to one of the preceding claims, wherein said injection means comprise at least one horizontal row of injectors-mixers (10) which are configured to inject flows of liquid gas in parallel or different directions.

6. Device according to one of the preceding claims, wherein said injection means comprise at least two horizontal rows of injectors-mixers (10) which are

arranged respectively on and/or along two longitudinal side walls (12c) of said tank.

7. Device according to one of the preceding claims, wherein said gas injection means (10) are connected by reliquefaction means (22) to means for drawing off gas in said tank or in another tank.

8. Device according to the preceding claim, wherein said reliquefaction means (22) are configured to recondense boil-off gas drawn off from said tank or from another tank and then pressurized, by heat exchange with liquefied gas drawn off from said tank or from another tank.

9. Device according to one of claims 1 to 4, wherein said gas injection means (10) are connected by sub-cooling means (22) to means (20) for drawing off liquid gas from said tank or from another liquefied gas storage tank.

10. Device according to one of the preceding claims, wherein said draw-off means (20) are configured to draw off liquid gas from said lower zone.

11. Device according to one of the preceding claims, wherein said draw-off means comprise at least one pump (20) located in said tank (12) or in another tank and intended to be submerged in said liquefied gas.

12. Device according to the preceding claim, wherein said pump (20) is configured to have a variable flow rate.

13. Device according to one of the preceding claims, wherein said tank (12) is of the “all-fill” type and is configured to be filled to any level.

14. Device according to one of the preceding claims, wherein said draw-off means (20) and said injection means (10) are located in said tank (12) and connected to each other by pipes (34) located entirely in the tank.

15. Device according to the preceding claim, wherein said draw-off means (20) and said injection means (10) are located perpendicular to a liquid dome (LD) of said tank (12), and preferably equip a pump tower which is accessible by this liquid dome.

16. Device according to the preceding claim, wherein said at least one injector-mixer (10) is connected to a liquid column of said pump tower, and is supported by this column.

17. Device according to one of the preceding claims, wherein said injection means (10) and said draw-off means (20) are positioned relative to one another and configured so that they generate back pressure and suction effects in the tank, these effects generating a predetermined stirring cycle of the liquefied gas in the tank.

18. Liquefied gas carrier, comprising at least one liquefied gas storage device according to one of the preceding claims, this device being devoid of sub-cooling and reliquefaction means between said draw-off and injection means, said tank being of the “all-fill” type and being configured to be filled to any level.

19. Liquefied gas carrier, comprising at least one liquefied gas storage device according to one of claims 1 to 17, this device comprising means for sub-cooling and/or reliquefaction between said draw-off and injection means, said tank being of the “all-fill” and/or “restricted fill” type.

20. Method for injecting gas in liquid form into a tank of a ship according to claim 18 or 19.

21. Method according to claim 20, wherein said tank is of “restricted fill” type and the injection takes place when the tank is filled to a volume of 10% and less.

22. Method according to claim 20, wherein the injection takes place when the “all-fill” tank has any level of filling, the injection angle being identical irrespective of this level and the injection rate being controlled according to this level.

23. Method according to the preceding claim, wherein the greater the volume of liquid in the tank, the greater the injection rate.

24. Method according to one of claims 20 to 23, wherein the injected liquefied gas has a temperature lower than that of the liquefied gas contained in said tank.

25. Method according to one of claims 20 to 24, wherein said injection means (10), or even also said draw-off means (20), are controlled so that they generate back pressure and suction effects in the tank, these effects generating a predetermined stirring cycle of the liquefied gas in the tank.

26. Method according to the preceding claim, wherein the stirring cycle is designed so that liquefied gas circulates substantially parallel to the liquid-gas interface (18) in the tank, and close to this interface.