Claims

[Claim 1] A sealed and thermally insulating tank (71) for storing a liquefied gas, wherein the tank (71) includes a bottom wall (12), a ceiling wall (13) and peripheral walls (1) connecting the bottom wall (12) to the ceiling wall (13) so as to form a polyhedral tank (71), the peripheral walls (1) including a sealing membrane (4) intended to be in contact with the liquefied gas contained in the tank (71) and at least one thermal insulation barrier (3) arranged between the sealing membrane (4) and a supporting wall of a supporting structure (2), the thermal insulation barrier including a plurality of juxtaposed insulating panels (5), wherein the sealing membrane (4) includes corrugated metal plates (9) juxtaposed to each other and comprising a first series of parallel corrugations (10), extending along a direction x and a second series of parallel corrugations (11) extending along a direction y, the direction x being a direction of greater slope of the peripheral wall (1), the direction y being perpendicular to the direction x, the corrugations protruding towards the inside of the tank (71) and forming channels (14) for circulating a gas present in the thermally insulating barrier (3), wherein the peripheral walls (1) comprise filling elements (15) with pressure loss, which are disposed in the corrugations of the first series of corrugations (10) so as to obstruct the circulation channel (14) of said corrugations, so as to form a belt (16) of filling elements embodied in a plane parallel to the bottom wall (12) and extending all round the tank (71), the belt (16) of filling elements being formed of at least one obstruction part (17) where each corrugation of the first series of corrugations (10) is obstructed by one of the filling elements (15), and of at least one discontinuation part (18) configured to allow the gas present in the circulation channels (14) to circulate through the belt (16) of filling elements, said or each obstruction part (17) being delimited by said or two discontinuation parts (18), the belt (16) of filling elements including at most one discontinuation part (18) per peripheral wall (1), and the filling elements (15) being configured to generate a pressure loss reducing a gaseous flow passing through said circulation channel (14), the filling elements (15) of a said obstruction part (17) of the at least one belt (16) of filling elements being inclusively disposed each time between two adjacent corrugations of the second series of corrugations (11).

[Claim 2] The tank (71) as claimed in claim 1, wherein the filling elements (15) of the obstruction part (17) of the at least one belt (16) of filling elements are aligned with each other along the direction y, the direction y being perpendicular to the direction x.

[Claim 3] The tank (71) as claimed in claim 1 or claim 2, wherein the tank (71) comprises a plurality of belts (16) of filling elements spaced from each other by a pitch substantially equal to a dimension of the insulating panels (5) in the direction x.

[Claim 4] The tank (71) as claimed in claim 3, wherein the at least one discontinuation part (18) is situated close to an edge of a said peripheral wall (1), the discontinuation parts (18) of two adjacent belts (16) of filling elements being disposed either side of the peripheral wall (1).

[Claim 5] The tank (71) as claimed in claim 3, wherein the belts (16) of filling elements comprise a single discontinuation part (18), the discontinuation parts (18) of two adjacent belts (16) of filling elements being situated on peripheral walls (1) opposite each other.

[Claim 6] The tank (71) as claimed in one of claims 1 to 5, wherein the at least one discontinuation part (18) is situated in one to nine corrugations of the first series of corrugations (10), said one to nine adjacent corrugations being without filling elements (15).

[Claim 7] The tank (71) as claimed in one of claims 1 to 5, wherein the at least one discontinuation part (18) is situated in a plurality of corrugations of the first of corrugations (10), preferably three to nine corrugations, the discontinuation part (18) including a staggered grid (19) of filling elements (15), the staggered grid (19) being configured to create a fluidic communication path between the circulation channels (14) situated below the belt (16) of filling elements and the circulation channels (14) situated above the belt (16) of filling elements, said fluidic communication path including a plurality of bends.

[Claim 8] The tank (71) as claimed in one of claims 1 to 7, wherein the filling elements (15) are made in closed cell polymer foam.

[Claim 9] The tank (71) as claimed in claim 8, wherein the filling elements (15) are made in polystyrene or polyethylene foam.

[Claim 10] The tank (71) as claimed in one of claims 1 to 9, wherein the filling elements (15) are situated above, below or at a corrugation node (20) in the direction of greater slope, the corrugation nodes (20) being formed by an intersection between a corrugation of the first series of corrugations (10) and a corrugation of the second series of corrugations (11).

[Claim 11] The tank (71) as claimed in one of claims 1 to 10, wherein the filling elements

(15) comprise, on an upper face (24) turned towards the corrugation to close, at least one beading (26) extending in the direction y, the at least one beading (26) being configured to be compressed during assembly so as to form a seal.

[Claim 12] The tank (71) as claimed in one of claims 1 to 11, wherein the sealing membrane (4) is a primary sealing membrane and the thermally insulating barrier (3) is a primary thermally insulating barrier, said juxtaposed insulating panels (5) being primary insulating panels, the tank walls (1, 12, 13) further comprising, successively in a direction of thickness, a secondary thermally insulating barrier including a plurality of juxtaposed secondary insulating panels, the secondary insulating panels being held against the supporting wall of the supporting structure (2), and a secondary sealing membrane supported by the secondary thermal insulating barrier and disposed between the secondary thermal insulating barrier and the primary thermally insulating barrier (3) such that the primary insulating panels (5) are held against the secondary sealing membrane.

[Claim 13] The tank (71) as claimed in one of claims 1 to 12, wherein the bottom wall (12) comprises a sealing membrane (4) intended to be in contact with the liquefied gas contained in the tank and at least one thermal insulation barrier (3) arranged between the sealing membrane and a supporting wall of a supporting structure, the thermal insulation barrier including a plurality of juxtaposed insulating panels,

wherein the sealing membrane of the bottom wall includes corrugated metal plates (9) juxtaposed to each other and comprising a first series of parallel corrugations (10), extending along a first direction and a second series of parallel corrugations (11) extending along a second direction, the corrugations protruding towards the inside of the tank and forming channels (14) for circulating a gas present in the thermally insulating barrier.

[Claim 14] The tank (71) as claimed in claim 13, wherein the bottom wall (12) comprises filling elements (15) with pressure loss, which are disposed in the corrugations of the first series of corrugations (10) or of the second series of corrugations (11) so as to obstruct the circulation channel of said corrugations, the filling elements (15) being distributed over the entire bottom wall so as to form a staggered grid (19) of filling elements (15) in the circulation channels (14) of the bottom wall (12), and the filling elements (15) being configured to ensure a pressure loss reducing a gaseous flow passing through said circulation channel (14) by at least 80%.

[Claim 15] The tank (71) as claimed in claim 13 or claim 14, wherein the tank (71)

comprises filling elements (15) with pressure loss, which are disposed in the corrugations of the first series of corrugations (10, 28) or of the second series of corrugations (29) in each tank angle formed by the bottom wall (12) and one of the peripheral walls (1) so as to obstruct the circulation channel of said corrugations, the filling elements (15) forming an edge belt (27), the edge belt (27) being formed all round the bottom wall at said angles.

[Claim 16] The tank (71) as claimed in claim 15, wherein each corrugation of the first series of corrugations (28) and of the second series of corrugations (29) of the bottom wall (12) is aligned with a corrugation of the first series of corrugations (10) of a peripheral wall (1) so as to form continuous circulation channels crossing the angles of the tank, the filling elements (15) of the edge belt (27) being disposed in each of said continuous circulation channels.

[Claim 17] A vessel (70) for transporting a cold liquid product, the vessel including a double hull (72) and a tank (71) as claimed in one of claims 1 to 16 disposed in the double hull.

[Claim 18] A system for transferring a cold liquid product, the system including a vessel (70) as claimed in claim 17, insulated pipes (73, 79, 76, 81) arranged so as to connect the tank (71) installed in the hull of the vessel to a floating or land storage installation (77) and a pump for sending a flow of cold liquid product through the insulated pipes from or to the floating or land storage installation to or from the tank of the vessel.

[Claim 19] A method for loading or unloading a vessel (70) as claimed in claim 17, whereby a cold liquid product is fed through insulated pipes (73, 79, 76, 81) from or to a floating or land storage installation (77) to or from the tank (71) of the vessel.