CLAIMS

1. Fluidtight and thermally insulating tank built into a bearing structure ~~(1)~~ to contain a fluid, in which one wall of the tank comprises:

a bearing wall ~~(2, 3)~~ of the bearing structure,,

a multi-layer structure comprising a fluidtight barrier ~~(5, 105, 205)~~ and a thermally insulating barrier ~~(4, 104)~~ which is arranged between the fluidtight barrier and the bearing wall, the thermally insulating barrier comprising juxtaposed insulating elements ~~(10, 110, 210)~~, an insulating element including:

thermally insulating lagging material arranged in the form of a layer parallel to the bearing wall,

bearing elements ~~(12, 112, 212)~~ which rise up through the thickness of the thermally insulating lagging material to react compressive loads, and

a cover panel ~~(11, 111, 211)~~ placed on the bearing elements and having a support surface ~~(16)~~ parallel to the bearing wall for supporting the fluidtight barrier,

and retaining rods ~~(22, 122, 222)~~ attached to the bearing wall between the insulating elements and extending in the direction of the thickness of the multi-layer structure to hold the multi-layer structure on the bearing wall,

in which crossmembers ~~(30, 130, 230)~~ are attached to the retaining rods ~~(22, 122, 222)~~ such that in each instance a crossmember extends between two retaining rods at the interface between two insulating elements,

characterized in that:

an anchor plate ~~(33, 133)~~ is arranged in line with the interface between two insulating elements, connected with the crossmember ~~(30, 130)~~ so as to lie flush with the cover panel ~~(11, 111)~~ of an adjacent insulating element, the anchor plate having a lower surface which bears against an edge of the cover panel and an upper surface on which the fluidtight barrier ~~(5, 105)~~ is placed, so that:

the cover panel ~~(11, 111, 211)~~ that covers the insulating elements is connected to the crossmember ~~(30, 130, 230)~~ by the anchor plate so as to be held against the bearing wall via the crossmember, and

the fluidtight barrier ~~(5, 105, 205)~~ is connected to the crossmember ~~(30, 130, 230)~~ by the anchor plate so as to be held against the cover panels that cover the insulating element via the crossmember.

2. Tank according to Claim 1, in which the anchor plate ~~(33, 133)~~ protrudes in each side of the crossmember ~~(30, 130)~~ parallel to the bearing wall so as to collaborate with the cover panels ~~(11, 111)~~ of the two insulating elements between which the crossmember is arranged.

3. Tank according to Claim 1 or 2, in which the anchor plate ~~(33, 133)~~ is arranged midway between the two retaining rods ~~(22, 122)~~ to which the crossmember is attached.

4. Tank according to one of Claims 1 to 3, in which the fluidtight barrier ~~(5, 105)~~ comprises a metallic membrane having corrugations and flat parts situated between the corrugations, the anchor plates ~~(33, 133)~~ being made of metal, the metallic membrane being welded to the anchor plates at the flat parts.

5. Tank according to one of Claims 1 to 3, in which the retaining rods ~~(222)~~ are arranged in such a way as to form a plurality of parallel rows on the bearing wall, and in which the crossmembers ~~(230)~~ which extend between the retaining rods of one row each bear an elongate weld support ~~(41)~~ which protrudes at right angles to the bearing wall between the cover panels ~~(211)~~ of the insulating elements ~~(210)~~ adjacent to the row of retaining rods,

and in which the fluidtight barrier ~~(205)~~ comprises a metallic membrane made of a steel with a low coefficient of expansion which is made up of flat strips ~~(42)~~ of sheet metal arranged on the cover panels ~~(211)~~ of the insulating elements and having edges ~~(43)~~ that are turned up towards the inside of the tank, the turned-up edges of the strips of sheet metal being welded continuously to the elongate weld supports to form deformable gussets capable of deforming in a direction transverse to the elongate weld supports.

6. Tank according to one of Claims 1 to 5, in which the multi-layer structure ~~(104, 105)~~ constitutes a primary barrier of the tank, the tank wall further comprising a second multi-layer structure ~~(4, 5)~~ arranged between the first multi-layer structure ~~(104, 105)~~ and the bearing wall, the second multi-layer structure ~~(4, 5)~~ comprising a secondary fluidtight barrier and a secondary thermally insulating barrier which is arranged between the secondary fluidtight barrier and the bearing wall,

and in which the insulating elements ~~(104)~~ of the primary barrier bear against the secondary fluidtight barrier.

7. Tank according to Claim 6, in which the secondary insulating barrier ~~(4, 5)~~ comprises juxtaposed secondary insulating elements ~~(10)~~, a secondary insulating element including:

thermally insulating lagging material arranged in the form of a layer parallel to the bearing wall,

bearing elements ~~(12)~~ which rise up through the thickness of the thermally insulating lagging material to react compressive loads, and

a cover panel ~~(11)~~ placed on the bearing elements and having a support surface parallel to the bearing wall for supporting the secondary fluidtight barrier,

and in which the retaining rods ~~(22)~~ attached to the bearing wall ~~(2, 3)~~ extend between the secondary insulating elements ~~(10)~~ in the direction of the thickness of the second multi-layer structure to hold the second multi-layer structure also on the bearing wall,

in which secondary crossmembers ~~(30)~~ are attached to the retaining rods such that in each instance a secondary crossmember extends between two retaining rods at the interface between two secondary insulating elements ~~(10)~~,

the cover panels ~~(11)~~ of the secondary insulating elements being connected to the secondary crossmembers ~~(30)~~ so as to be held against the bearing wall via the secondary crossmembers,

and the secondary fluidtight barrier ~~(5)~~ being connected to the secondary crossmembers ~~(30)~~ so as to be held against the cover panels of the secondary insulating elements via the secondary crossmembers,

the secondary fluidtight barrier ~~(5)~~ having the retaining rods ~~(22, 122)~~ attached to the bearing wall passing through it and having fluidtight connections around the retaining rods.

8. Tank according to one of Claims 1 to 3, in which the multi-layer structure ~~(4, 5)~~ constitutes a secondary barrier of the tank, the tank wall further comprising a second multi-layer structure arranged on the first multi-layer structure ~~(4, 5)~~ on the opposite side to the bearing wall, the second multi-layer structure comprising a primary fluidtight barrier ~~(105)~~ and a primary thermal insulation barrier ~~(106)~~ which is arranged between the primary fluidtight barrier and the secondary fluidtight barrier.

9. Tank according to Claim 7 or 8, in which the secondary fluidtight barrier ~~(5)~~ is made of a composite material comprising a metal foil and a fibreglass mat bonded to the metal foil by a polymer resin.

10. Tank according to one of Claims 1 to 9, in which a retaining rod ~~(22, 122, 222)~~ bears a crossmember connector ~~(25, 125)~~ arranged at a level lower down than the cover panels ~~(11, 111, 211)~~ of the insulating elements, the crossmember connector comprising several fasteners arranged around the retaining rod to collaborate with complementary fasteners arranged at the ends of the crossmembers ~~(30, 130, 230)~~.

11. Tank according to one of Claims 1 to 10, in which the bearing elements ~~(12, 112, 212)~~ comprise posts, the cross section of which is small by comparison with the dimensions of the insulating element.

12. Tank according to one of Claims 1 to 11, in which the thermally insulating lagging comprises a flexible insulating substance.

13. Tank according to one of Claims 1 to 12, in which the bearing elements ~~(12, 112, 212)~~ and the cover panel ~~(11, 111, 211)~~ of an insulating element are made of wood.

14. Tank according to one of Claims 1 to 13, in which the bearing structure ~~(1)~~ is built on foundations fixed to continental or subsea ground.

15. Ship for transporting a cold liquid product, the ship comprising a double hull and a tank according to one of Claims 1 to 13 arranged in the double hull, the double hull forming the bearing structure of the tank.

16. Method of using a ship according to Claim 15, in which method a cold liquid product is conveyed through insulated piping from or to a floating or on-shore storage facility to or from the tank of the ship in order to load or offload the ship.

17. System for transferring a cold liquid product, the system comprising a ship according to Claim 15, insulated piping designed to connect the tank installed in the hull of the ship to a floating or on-shore storage facility and a pump for causing the cold liquid product to flow through the insulated piping from or to the floating or on-shore storage facility to or from the tank of the ship.