CLAIMS

1. Arrangement for storing thermal energy, comprising at least two tunnels (1a, 1b) for holding a fluid,

wherein said tunnels (1a, 1b) are connected to each other by a plurality of channels (2), such that fluid communication is allowed between said tunnels (1a, 1b), said channels being arranged in a tight pattern in between said tunnels (1a, 1b), and

wherein each tunnel (1a, 1b) extends at least partially along a respective circular arc, and

wherein said tunnels (1a, 1b) comprise an inner tunnel (1a) and an outer tunnel (1b), the outer tunnel (1b) being arranged around the inner tunnel (1a),

each tunnel (1a, 1b) being configured as a helix, the two tunnels (1a, 1b) forming an inner helix (1a) and an outer helix (1b), wherein the outer helix (1b) is arranged around the inner helix (1a).

2. Arrangement according to claim 1, further comprising at least one shaft (3), and wherein said tunnels (1a, 1b) are connected to said shaft (3) by at least one channel (2) and/or at least one passage (4), such that fluid communication is allowed between said tunnels (1a, 1b) and said shaft (3).

3. Arrangement according to any of the previous claims, wherein said tunnels (1a, 1b) are connected to each other by at least one passage (4), such that fluid communication is allowed between said tunnels (1a, 1b).

4. Arrangement according to any of the previous claims, wherein at least a centre axis of said inner tunnel (1a) and/or said outer tunnel (1b) and/or said at least one shaft (3) extend essentially in a vertical direction.

5. Arrangement according to any of claims 3-4, wherein said at least one passage (4) is arranged at an angle relative a horizontal plane allowing thermal natural convection.

6. Arrangement according to any of the previous claims, wherein said channels (2) are arranged at an angle relative a horizontal plane allowing thermal natural convection.

7. Arrangement according to any of the previous claims, wherein said tunnels (1a, 1b) are arranged at least partially at different vertical levels.

8. Arrangement according to any of the previous claims, wherein the tunnel (1a) forming said inner helix has a greater inclination than the tunnel (1b) forming said outer helix.

9. Arrangement according to any of claims 2-8, wherein said passages (4) are arranged such that they are not located directly above each other in a vertical direction.

10. Arrangement according to any of the previous claims, wherein the middle section of said arrangement has larger dimensions than at least one end section of said arrangement, as seen in the direction of its centre axis.

11. Arrangement according to any of the previous claims, wherein said fluid is chosen from a group comprising: water, a mixture of water and a coolant, any liquid fuels, such as hydro carbons of fossil origin or biological origin (bio fuel), salt solution, ammonia, or other refrigerants.

12. Arrangement according to any of the previous claims, further comprising at least one fluid communication means (5) arranged to extract an arbitrary portion of said fluid from the tunnels (1a, 1b) and/or shaft (3) at a suitable vertical level so as to allow processing of said fluid by means of at least one heat exchanger, wherein said fluid communication means (5) further is arranged to return processed fluid to the tunnels (1a, 1b) and/or shaft (3) at a suitable vertical level.

13. Arrangement according to claim 12, further comprising an energy source coupled to said heat exchanger, which heat exchanger is arranged to increase or decrease the thermal energy of the fluid.

14. Arrangement according to claim 13, wherein said energy source is any of a group of energy sources comprising: an industrial facility or other sources of waste heat, a combined heat and power plant (CHP), solar panels for heating or for combined electrical generation and heating, a heat pump, a bio fuel boiler, an electrical heater, or a fossil fuel boiler.

15. Arrangement according to any of claims 2-14, further comprising a second shaft (6) being connected to a bottom of said first shaft.

CLAIMS

1. Arrangement for storing thermal energy, comprising at least two tunnels for holding a fluid,

wherein said tunnels are connected to each other by a plurality of channels, such that fluid communication is allowed between said tunnels, said channels being arranged in a tight pattern in between said tunnels, and

wherein each tunnel extends at least partially along a respective circular arc, and

wherein said tunnels comprise an inner tunnel and an outer tunnel, the outer tunnel being arranged around the inner tunnel,

each tunnel being configured as a helix, the two tunnels forming an inner helix and an outer helix, wherein the outer helix is arranged around the inner helix.

2. Arrangement according to claim 1, further comprising at least one shaft, and wherein said tunnels are connected to said shaft by at least one channel and/or at least one passage, such that fluid communication is allowed between said tunnels and said shaft.

3. Arrangement according to any of the previous claims, wherein said tunnels are connected to each other by at least one passage, such that fluid communication is allowed between said tunnels.

4. Arrangement according to any of the previous claims, wherein at least a centre axis of said inner tunnel and/or said outer tunnel and/or said at least one shaft extend essentially in a vertical direction.

5. Arrangement according to any of claims 3-4, wherein said at least one passage is arranged at an angle relative a horizontal plane allowing thermal natural convection.

6. Arrangement according to any of the previous claims, wherein said channels are arranged at an angle relative a horizontal plane allowing thermal natural convection.

7. Arrangement according to any of the previous claims, wherein said tunnels are arranged at least partially at different vertical levels.

8. Arrangement according to any of the previous claims, wherein the tunnel forming said inner helix has a greater inclination than the tunnel forming said outer helix.

9. Arrangement according to any of claims 2-8, wherein said passages are arranged such that they are not located directly above each other in a vertical direction.

10. Arrangement according to any of the previous claims, wherein the middle section of said arrangement has larger dimensions than at least one end section of said arrangement, as seen in the direction of its centre axis.

11. Arrangement according to any of the previous claims, wherein said fluid is chosen from a group comprising: water, a mixture of water and a coolant, any liquid fuels, such as hydro carbons of fossil origin or biological origin (bio fuel), salt solution, ammonia, or other refrigerants.

12. Arrangement according to any of the previous claims, further comprising at least one fluid communication means arranged to extract an arbitrary portion of said fluid from the tunnels and/or shaft at a suitable vertical level so as to allow processing of said fluid by means of at least one heat exchanger, wherein said fluid communication means further is arranged to return processed fluid to the tunnels and/or shaft at a suitable vertical level.

13. Arrangement according to claim 12, further comprising an energy source coupled to said heat exchanger, which heat exchanger is arranged to increase or decrease the thermal energy of the fluid.

14. Arrangement according to claim 13, wherein said energy source is any of a group of energy sources comprising: an industrial facility or other sources of waste heat, a combined heat and power plant (CHP), solar panels for heating or for combined electrical generation and heating, a heat pump, a bio fuel boiler, an electrical heater, or a fossil fuel boiler.

15. Arrangement according to any of claims 2-14, further comprising a second shaft being connected to a bottom of said first shaft.