Claims

1. A fluid conditioner for use in a tank containing computers or other electronic devices immersed in fluid in the tank, the fluid conditioner comprising

a housing having at least one chamber,

an outlet,

a heat exchanger located in the chamber of the housing, the heat exchanger having an inlet for cooling medium to enter the heat exchanger and an outlet for cooling medium to exit the heat exchanger,

pump means arranged, in use, to pump fluid such that the fluid passes into contact with the heat exchanger,

wherein, in the upright, operational orientation of the fluid conditioner, the pump means and the heat exchanger are vertically spaced relative to one another and the heat exchanger is located above the outlet of the fluid conditioner, and wherein in use, fluid is drawn into and through the pump means to be discharged from the pump means such that fluid passes into contact with the heat exchanger to thereby cool the fluid, and the cooled fluid exits the fluid conditioner via the outlet of the fluid conditioner and passes into the lower region of the tank for circulation through the tank.

2. A fluid conditioner according to claim 1, wherein the pump means is located above the heat exchanger such that, in use, the fluid passes into contact with the heat exchanger to thereby cool the fluid after the fluid passes through the pump means.

3. A fluid conditioner according to claim 2, wherein the outlet of the fluid conditioner comprises an outlet of the chamber.

4. A fluid conditioner according to claim 1, wherein the pump means is located beneath the heat exchanger such that, in use, the fluid passes into contact with the heat exchanger to thereby cool the fluid before the fluid passes through the pump means.

5. A fluid conditioner according to claim 4, wherein the outlet of the fluid conditioner comprises the outlet of the pump means.

6. A fluid conditioner according to any one of the preceding claims, wherein the chamber in which the heat exchanger is located separates the fluid that is cooled by the heat exchanger in the chamber from the warmer fluid in the tank.

7. A fluid conditioner according to claim 6 when appended to claim 2 or claim 3, wherein the chamber comprises substantially solid walls except for the outlet from which fluid is able to exit the chamber.

8. A fluid conditioner according to claim 6 when appended to claim 4 or claim 5, wherein the chamber comprises substantially solid walls except for an inlet through which fluid is able to enter the chamber.

9. A fluid conditioner according to claim 7 or 8, wherein all or part of the remainder of the housing comprises a fluid permeable structure.

10. A fluid conditioner according to claim 9, wherein the fluid permeable structure comprises rigid mesh or a cage-like structure.

11. A fluid conditioner according to claim 9, wherein the fluid permeable structure comprises a frame-like structure.

12. A fluid conditioner according to any one of claims 7 to 11, wherein the wall of the chamber that separates the heat exchanger from the pump means comprises a first baffle and is permeable to the fluid.

13. A fluid conditioner according to claim 12, wherein the first baffle is mounted in the housing and such that it is located between the pump means and the heat exchanger.

14. A fluid conditioner according to claim 12 or 13, further comprising a second baffle such that a second chamber is formed between the first baffle and the second baffle, and the pump means is located in the second chamber.

15. A fluid conditioner according to claim 1, wherein the pump means is mounted between the first baffle and the second baffle.

16. A fluid conditioner according to any one of the preceding claims, further comprising an inlet for fluid to enter the housing, and the inlet is located above the pump means.

17. A fluid conditioner according to any one of the preceding claims, further comprising an inlet chamber in the housing adjacent to the inlet of the fluid conditioner.

18. A fluid conditioner according to any one of the preceding claims, further comprising conduits, in fluid communication with the inlet and the outlet, respectively, of the heat exchanger.

19. A fluid conditioner according to any one of the preceding claims, further comprising filter or strainer means to prevent contaminants entering the pump means and/or the housing.

20. A fluid conditioner according to any one of the preceding claims, further comprising temperature sensor means to sense the temperature of the fluid just prior to the fluid being drawn into the pump means.

21. A cooling system comprising

at least one fluid conditioner according to any one of claims 1 to 20,

a tank to contain the fluid conditioner, the tank also to contain one or more computers or other electronic devices and a fluid in which the fluid conditioner and the one or more computers or other electronic devices are immersed,

a heat exchange unit located exterior of the tank, and

piping or hosing to convey cooling medium between the heat exchanger of the fluid conditioner and the heat exchange unit.

22. A method of cooling fluid in a tank, the tank having an opening at the top and containing computers or other electronic devices immersed in the fluid, the method comprising the steps of:

(a) providing a housing enclosing a heat exchanger and a pump means, the pump means arranged to circulate the fluid in the tank through the housing, the heat exchanger located above an outlet of the housing;

(b) circulating the fluid, from the upper region of the tank into the housing;

(c) moving the fluid within the housing downwardly to pass into contact with the heat exchanger to give up heat from the fluid to the heat exchanger and thereby cool the fluid;

(d) moving the cooled fluid from the heat exchanger to pass through the outlet of the housing;

(e) flowing the cooled fluid from the lower region of the tank, upwardly in the tank and around the one or more computers or other electronic devices in the tank, to take up heat from the one or more computers or other electronic devices, and to rise to the upper region of the tank;

(f) repeating steps (b) to (e) in a substantially continuous manner; and

(g) performing steps (b) to (f) without the fluid leaving the tank.