What we claim is:

1. A hair treatment apparatus adapted to reduce the temperature of hair, the apparatus including at least one thermal energy storage core formed from a material that only experiences a solidification or condensation phase change when cooled below 0°C and being arranged to draw heat out of hair, and at least one contact housing configured to enclose one thermal energy storage core, and a handle connected to at least one contact housing wherein said at least one thermal energy storage core is arranged to cool hair to a temperature below 0° Celsius.

2. A hair treatment apparatus as claimed in claim 1 wherein said at least one thermal energy storage core is arranged to store heat extracted from treated hair.

3. A hair treatment apparatus as claimed in claim 1 wherein the contact housing defines at least one contact surface arranged to contact hair during a treatment process.

4. A hair treatment apparatus as claimed in claim 1 wherein the contact housing is arranged to confine a fluid thermal energy storage core.

5. A hair treatment apparatus as claimed in claim 4 which includes a water based thermal energy storage core with 3.5-15% mass of ionic additives.

6. A hair treatment apparatus as claimed in claim 4 which includes a fluid thermal energy storage core which experiences a latent heat of fusion effect at approximately between -0° and -10°C.

7. A hair treatment apparatus as claimed in claim 4 which includes a fluid thermal energy storage core which experiences a latent heat of fusion effect at approximately between -3° and -8°C.

8. A hair treatment apparatus as claimed in claim 3 wherein a contact surface is formed from a waterproof and thermally conductive material.

9. A hair treatment apparatus as claimed in claim 8 wherein a contact surface is formed from any one or combination of metal and/or thermoplastic materials.

10. A hair treatment apparatus as claimed in claim 1 wherein a single layer of material is used to form a contact housing.

11. A hair treatment apparatus as claimed in claim 1 wherein the contact housing is formed from an inner containment liner which encloses the thermal storage core and an outer contact layer used to form at least one contact surface.

12. A hair treatment apparatus as claimed in claim 1 wherein the handle is formed from or includes a thermally insulating material.

13. A hair treatment apparatus as claimed in claim 1 wherein a contact housing is configured to project out and away from the handle.

14. A hair treatment apparatus as claimed in claim 1 wherein a contact housing has a removable connection to a handle.

15. A hair treatment apparatus as claimed in claim 14 which includes a plurality of removable thermal energy storage core cartridges.

16. A hair treatment apparatus as claimed in claim 15 wherein said plurality of cartridges include a variety of different configurations, shapes and sized contact housings.

17. A hair treatment apparatus as claimed in claim 1 wherein the area of contact between a contact housing and handle is minimised by at least one thermal break.

18. A hair treatment apparatus as claimed in claim 3 wherein the contact housing include at least one thermal transfer element.

19. A hair treatment apparatus as claimed in claim 18 wherein a thermal transfer element is provided by a metal shaft which projects from a contact surface into the interior of the volume occupied by the thermal storage core.

20. A hair treatment apparatus as claimed in claim 3 which includes at least one surface projection adapted to separate strands of hair placed in contact with a contact surface.

21. A hair treatment apparatus as claimed in claim 3 which includes at least one surface projection adapted promote the formation of variations in the alignment of hair placed in contact with the contact housing.

22. A hair treatment apparatus as claimed in claim 1 wherein the thermal energy storage core material phase change occurs between -20° and 0°C.

23. A hair treatment apparatus as claimed in claim 1 wherein the core is a liquid at temperatures above 0°C.

24. A hair treatment apparatus as claimed in claim 23 wherein the thermal energy storage core is formed by a material which experiences a latent heat of fusion effect at approximately -8°C degrees.

25. A hair treatment apparatus as claimed in claim 1 wherein a thermal energy storage core is formed from saline solution.

26. A hair treatment apparatus as claimed in claim 1 wherein a thermal energy storage core material is formed from any one or combination of gels, propylene glycol, hydroxethyl cellulose, vinyl coated silica gel, alcohols, liquid ammonia, or compounds formulated to undergo endothermic reactions between -20 and 0°.

27. A hair treatment apparatus as claimed in claim 1 wherein a handle includes a temperature sensor located in close proximity to the contact housing and an associated user indicator configured to alert a user if the temperature sensed exceeds a maximum operating temperature.

28. A hair treatment apparatus as claimed in claim 27 wherein a user indicator is formed from an LED light source.

29. A hair treatment apparatus as claimed in claim 27 wherein the temperature sensor and user indicator is formed from a thermo chromatic material.

30. A hair treatment apparatus as claimed in claim 1 which includes a base station arranged to receive at least a part of a contact housing and to cool the thermal storage core retained within the contact housing.

31. A hair treatment apparatus as claimed in claim 30 wherein the base station is arranged to receive a removable thermal energy storage core cartridge.

32. A hair treatment apparatus as claimed in claim 30 wherein the base station is arranged to receive one end only of a combined contact housing and handle.

33. A hair treatment apparatus as claimed in claim 30 wherein the base station is arranged to receive or connect to a plurality of contact housings at one time.

34. A hair treatment apparatus as claimed in claim 3 which includes a treatment fluid application element formed by a reservoir of treatment fluid arranged to periodically deliver a spray of treatment fluid on to a contact surface.

35. A hair treatment apparatus as claimed in claim 30 wherein the treatment fluid application element is formed from a interchangeable reservoir cartridge.

36. A hair treatment apparatus as claimed in claim 3 which includes a treatment fluid application element formed by a slow fluid release matrix material impregnated with treatment fluid, said matrix material being connected to or forming part of a contact surface to deliver fluid to hair placed in contact with the contact surface.

37. A hair treatment apparatus as claimed in claim 1 wherein a condensation promotion element is provided in association with a contact surface to encourage moisture to condense on or near the contact surface.

38. A hair treatment apparatus as claimed in claim 37 wherein a condensation promotion element is formed by a strip or section of metal adhered to a contact surface.

39. A hair treatment apparatus as claimed in claim 37 wherein condensation promotion element is formed by a hydrophilic, hydroscopic and hydrophobic coating or nano coating applied to a contact surface.

40. A hair treatment method characterised by the steps of

i. cooling a thermal energy storage core provided by a hair treatment apparatus, the thermal energy storage core being cooled to below 0°C and being enclosed in a contact housing connected to a handle,

ii. exposing hair to be treated to the contact housing enclosing the thermal energy storage core to extract heat from the hair and reduce the temperature of the hair.