

1 **Claim :**

1. An electrical induction heating and thermal cracking assembly comprising an induction heating coil surrounding and being thermally insulated from a concentric closed cylindrical chamber having an inlet and an outlet, an electrically conductive element located within or forming part of the chamber, means for uniform distribution of material to be heated and thermally cracked in the chamber and a body of discrete agitating media contained within the chamber.
- 10 2. An assembly as claimed in claim 1 which includes pressurisation means for the chamber, preferably in the form of pressure control valves in a processing circuit to which the chamber is operatively connected, more preferably in the form of pressure control valves proximate the inlet and outlet of the chamber.
- 15 3. An electrical induction heating assembly comprising an induction heating coil surrounding and being thermally insulated from a concentric closed cylindrical chamber having an inlet and an outlet, an electrically conductive element located within or forming part of the chamber, means for uniform distribution of material to be heated in the chamber and a body of discrete agitating media contained within the chamber, which includes pressurisation means for the chamber.
- 20 4. An assembly as claimed in claim 3 in which the pressurisation means comprises pressure control valves in a processing circuit to which the chamber is operatively connected, more preferably pressure control valves proximate the inlet and outlet of the chamber.
- 25 5. An assembly as claimed in claims 1 to 4 in which the agitating media is electrically conductive and comprises the electrically conductive element within the chamber.
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6. An assembly as claimed in claim 1 to 5 in which the chamber is electrically conductive and comprises the electrically conductive element forming part of the chamber.
- 5 7. An assembly as claimed in any one of the preceding claims in which the inlet is located proximate a first end of the chamber and the outlet is located proximate a second end of the chamber.
- 10 8. An assembly as claimed in any one of the preceding claims in which the thermal insulation between the induction heating coil and the chamber comprises a thermal insulating blanket.
- 15 9. An assembly as claimed in any one of the preceding claims in which the uniform distribution means comprises a rotatable axial shaft carrying at least one radial stirring paddle and a drive motor is mounted adjacent the chamber and connected to the shaft.
- 20 10. An assembly as claimed in claim 9 in which the shaft and paddle are electrically conductive and comprise a further electrically conductive element within the chamber.
- 25 11. An assembly as claimed in claim 10 in which the shaft includes a conduit to which the inlet is connected around a liquid flow path, and the conduit has longitudinally spaced outlet openings into the chamber.
12. An assembly as claimed in any one of the preceding claims in which the agitating media includes steel balls.
- 30 13. An assembly as claimed in any one of the preceding claims in which the agitating media comprise stainless steel balls.
14. An assembly as claimed in any one of the preceding claims in which the outlet includes a screw conveyor.

15. An assembly as claimed in any one of claims 1 to 8 in which the uniform distribution means comprises a cylindrical cage complimentary shaped to the inner dimensions of the chamber and secured to a rotatable axial shaft which is connected to a drive motor mounted adjacent the chamber, 5 the cage containing the body of discrete agitating media.

16. An assembly as claimed in any one of the preceding claims in which the chamber comprises a right circular cylindrical chamber.

10 17. A method of heating and thermally cracking a fluid comprising heating a body of electrically conductive stirred agitating media by electrical induction in a chamber having an inlet and an outlet, receiving the fluid through the inlet in the chamber and stirring the heated body of agitating media in the chamber to thermally crack the fluid, and collecting the 15 heated and thermally cracked product through the outlet.

18. A method as claimed in claim 17 which includes transporting by agitation of the media solid material formed during the cracking of the fluid to the outlet and removing the solid material from the outlet.

20 19. A method as claimed in claim 17 or 18 which includes pressurisation of the chamber.

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