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(54) **SOFT ELECTRICAL HEATER WITH CONTINUOUS TEMPERATURE SENSING**

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(65) **Prior Publication Data**

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**Related U.S. Application Data**

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(51) **Int. Cl.<sup>7</sup>** ..... **H05B 3/34**

(52) **U.S. Cl.** ..... **219/549; 219/529**

(58) **Field of Search** ..... 219/520, 527-529, 219/538, 539, 542, 545, 548, 549, 200, 201, 212, 211; 174/107; 337/159, 293, 295

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(57) **ABSTRACT**

A soft and flexible heater utilizes electrically conductive threads or fibers as heating media. The conductive fibers are encapsulated by insulating materials, forming continuous heating cables. One or more heating cables can be formed into heaters of various configurations including tapes, sleeves or sheets. Such heaters may be connected in different combinations, in parallel or in series. The heater may contain continuous temperature sensors to prevent overheating and fire. Such temperature sensors can be made of electrically conductive fibers, metal wires or fiber optical filaments. When required by the heater design, the electrically conductive threads/fibers may have a polymer base, which acts as a Thermal-Cut-Off (TCO) at predetermined temperatures. Electrically conductive fibers comprised of such polymer base can melt between 120° C. and 350° C. thereby terminating electrical continuity in the heater.

**28 Claims, 6 Drawing Sheets**

