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(54) **SOFT HEATING ELEMENT AND METHOD OF ITS ELECTRICAL TERMINATION**

(75) Inventors: **Arkady Kochman**, Highland Park; **Mikhail Lavit**, Itasca; **Dmitry Kochman**, Vernon Hills, all of IL (US)

(73) Assignee: **Thermosoft International Corporation**, Buffalo Grove, IL (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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Related U.S. Application Data

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(52) **U.S. Cl.** **219/545**; 219/212; 219/529; 219/549

(58) **Field of Search** 219/529, 544-549, 219/212; 338/208, 210, 211, 275, 262, 258, 259

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Primary Examiner—Tu Ba Hoang

(74) *Attorney, Agent, or Firm*—Liniak, Berenato, Longacre & White

(57) **ABSTRACT**

A soft heating element, utilizing electro conductive textile threads as a heating means having additional safety functions as TCO (thermal cut-off) and TSL (temperature self-limiting) devices. The thermal cut-off function is achieved through melting of the electro conductive threads at the temperatures above 120° C. and below 350° C., which results in termination of electrical continuity in the heating element. The temperature self-limiting capability is achieved through a heating thread electrical resistance increase during slow elevation in its temperature, which is below its melting point. Methods of electrical and mechanical connection between heating threads and metal conductors, utilizing winding of connections with flexible strands of fibers or wires, with optional subsequent placement of a rigid mechanical fastener over the winding. Method of providing electrical redundancy of heating circuits by stitching, laminating, weaving or knitting an electrically conductive thread across the multiple runs of the heating thread.

29 Claims, 7 Drawing Sheets

