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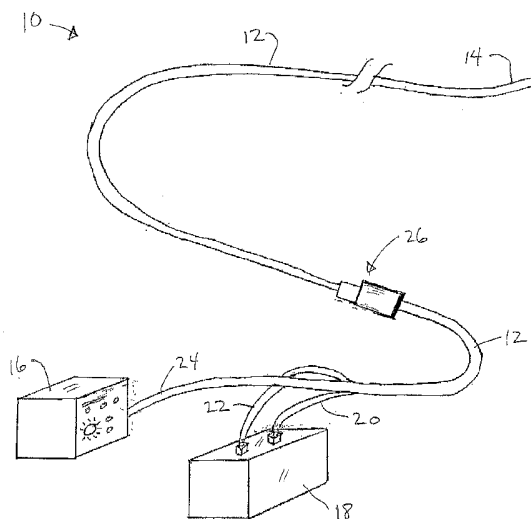
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(54) Title: MINIATURE X-RAY TUBE COOLING SYSTEM



(57) Abstract: A miniature X-ray tube is cooled using a catheter (12) preferably having multiple small lumens for inflow and outflow of coolant. Inflow maybe through an outer lumen(s) in a concentric-extrusion catheter, the liquid turning back at the distal end (14) of the catheter to a proximal flow over the anode end of the X-ray tube and through an inner lumen within which the X-ray tube is positioned. A coolant distribution head may engage with the anode end of the X-ray tube, with small orifices so as to distribute coolant essentially evenly over the anode surface. Temperature and flow rate of the inflowing coolant liquid are balanced so as to optimize heat transfer while efficiently carrying coolant through small lumens without the need for high pressures. Some embodiments use the inflation liquid in an applicator balloon as the coolant, with the liquid actively flowing or in a simplified system with liquid static.

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A. CLASSIFICATION OF SUBJECT MATTER

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B. FIELDS SEARCHED

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US Re. 34,421 E (PARKER et al.) 26 October 1993 (26.10.1993) entire document	23-26, 30-40
Y, P	US 2004/0218724 A1 (CHORNENKY et al.) 4 November 2004 (04.11.2004), entire document	23-26, 30-40
Y	US 6,390,967 B1 (FOREMAN et al.) 21 May 2002 (21.05.2002), entire document	23-26, 30-40



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See patent family annex.

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