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Parrish et al.

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[54] COOLING DEVICE AND METHOD FOR HAZARDOUS MATERIALS SUITS

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[57] ABSTRACT

A relatively lightweight cooling device and method utilizing adsorption of perspirated water vapor to permit evaporative cooling of a person wearing a sealed suit for defined time periods. The device can be constructed in the form of a rectangular pad or the like having an open cell foam adjacent the person's skin to permit static transport of perspirated water vapor to an adsorbent layer. The open cell foam or a separate material acts as a thermal insulator to prevent heat flow back toward the skin resulting from the exothermic heat of adsorption produced by the adsorbent layer. In lieu of static movement of the water vapor, a small fan can be operatively associated with the fan for actively moving the water vapor to a single point to enhance the evaporative cooling, particularly where a smaller amount of adsorbent material is used. The vest itself can be the evaporator and filled with working fluid which is vaporized as the evaporator section of the vest absorbs heat from the body; the vapor is transported to a bed which can contain a desiccant, molecular sieve, adsorbent or absorbent material. Alternatively, the wear's vest can be the adsorbent bed of the system initially completely charged with a working fluid which is driven off the bed as a reuslt of the generation of body heat. The vapor can be transported from the bed to an internal heat exchanger or directly to the environment, e.g. outer space.

8 Claims, 5 Drawing Sheets