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Shiels et al.

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(54) **THERMAL LINER FOR PROTECTIVE GARMENTS**

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See application file for complete search history.

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(52) **U.S. Cl.**
CPC **B32B 5/26** (2013.01); **A41D 31/0022** (2013.01); **A41D 31/0033** (2013.01); **B32B 3/266** (2013.01); **B32B 5/022** (2013.01); **B32B 5/08** (2013.01); **D04H 1/4342** (2013.01);
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(57) **ABSTRACT**

A nonwoven for use in a thermal liner for protective apparel includes 1-45 wt % of a first inherently heat resistant fiber excluding an aramid, and a balance of a second heat resistant fiber. The nonwoven excludes wool and has a thickness less than 3 mm and a basis weight of less than 2.9 osy (100 gsm). In another embodiment, the insulating layer for protective apparel includes a nonwoven including an inherently flame resistant fiber and fibers being inherently resistant to moisture absorption. The inherently flame resistant fiber is different from said inherently resistant to moisture absorption fiber. The nonwoven has an equivalent or better thermal protective performance (TPP) and a lower basis weight than an industry standard nonwoven consisting of a nonwoven of para-aramids or meta-aramids or a blend of both.

(58) **Field of Classification Search**
CPC D04H 1/4342; D04H 13/00; D04H 3/16; B32B 3/10; B32B 5/16; B32B 5/26; B32B 5/24; B32B 5/22; B32B 5/022; B32B 5/08; B32B 3/266; B32B 2250/20; B32B 2262/02; B32B 2262/0246; B32B 2262/062; B32B 2307/304; B32B 2307/306; B32B 2307/7265; B32B 2437/00; B32B 2571/00; Y10T 442/659; Y10T 442/696; Y10T 428/24273

10 Claims, 1 Drawing Sheet

