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Muvundamina

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(54) **PAPER LAMINATES MANUFACTURED USING FOAMED ADHESIVE SYSTEMS**

(75) Inventor: **Mutombo J. Muvundamina**, Minneapolis, MN (US)

(73) Assignee: **H.B. Fuller Company**, St. Paul, MN (US)

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(51) **Int. Cl.**

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(58) **Field of Classification Search** 156/78; 427/421.1; 264/41; 516/10

See application file for complete search history.

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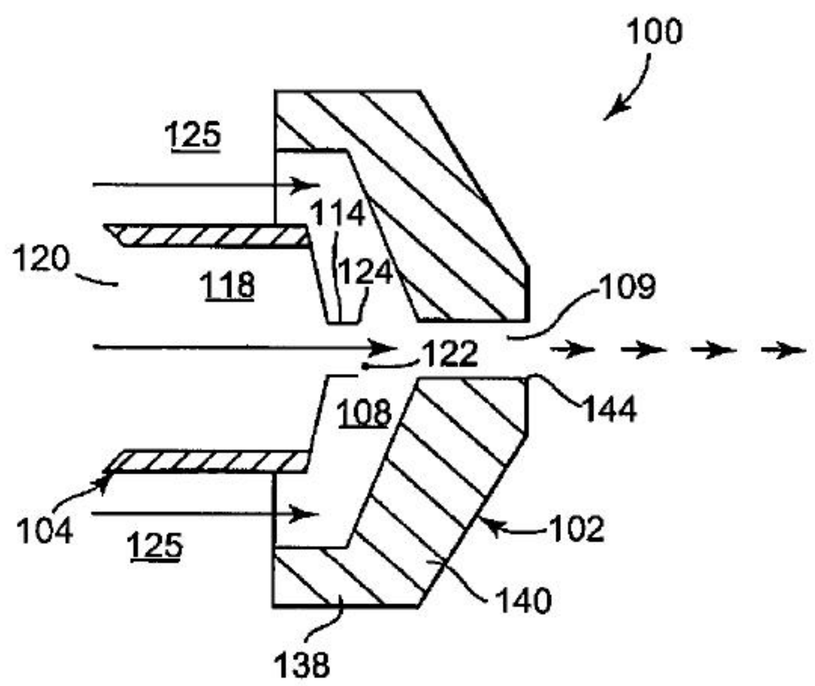
Primary Examiner—Philip C Tucker
Assistant Examiner—Michael N Orlando

(57) **ABSTRACT**

Foamed, aqueous adhesive compositions are used to manufacture tissue laminate products including or especially as bathroom tissue, facial tissue, paper towels, and the like. Foaming typically occurs by introducing pressurized gas and adhesive flows in a nozzle chamber on demand, wherein the kinetic energy of the flows is used to provide mixing energy. The adhesive preferably is dispensed as a plurality of discrete, foamed adhesive particles. The foamed adhesive can be used for intralamina bonds, interlaminate bonds, bonding loose sheet extremities, bonding roll to roll, and the like. The invention provides a reliable, straightforward way to accomplish in-nozzle foaming of an adhesive.

14 Claims, 4 Drawing Sheets