

Material Science: Fabric/Textiles

Title: *Auxetic Fabric Structures and Related Methods (UMD 07-15)*

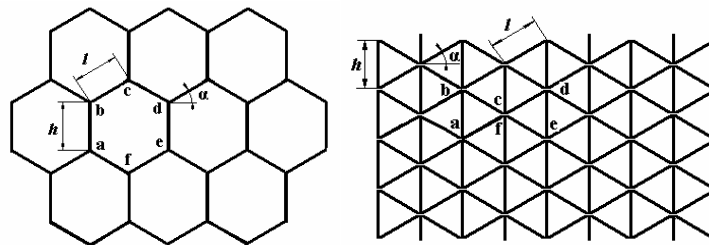
Inventors: *Samuel Ugbolue et al.*

Applications: Production of safer surgical mesh materials for use in hernias and other surgical procedures, as well as better fitting garments (e.g. athletic wear, bathing suits, brassieres, pantyhose, leotards, etc.) to dramatically reduce so-called “creep” or “ride-up.”

- Benefits:**
- Maintenance of dimensional stability and evenly distributed pressure, to enhance safety of surgical materials
 - Reduction of undesirable tourniquet action when mesh is pulled in one direction
 - Ability to integrate production with current manufacturing techniques
 - Little or no effect on the overall bulk mechanical properties of mesh materials.

Technology Description: This invention provides improved methods of producing auxetic materials. Auxetics are materials that become thicker perpendicularly to the applied force when stretched. They have a negative Poisson's ratio, that is, they get thicker and not thinner when stretched. The present invention provides a cost effective method of producing auxetic knit structures from readily available filaments by employing geometrically engineered structures and novel design configurations. Specifically, the inventors have developed novel designs and methods of inserting the fillet and in-lay filaments in the knit structures. The auxetic fabrics of the invention become fatter when deformed because of the geometrical and design improvements engineered in the structures. Desired fabric features can be achieved by choice of the specific material to be used.

Patent Status: [US Patent No. 8,772,187.](#)



Conventional Structure

Auxetic Structure

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