SENSOR ASSEMBLY

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a sensor assembly, in particular to the assembly of a sensor comprising a plurality of textile layers.

2. Description of the Related Art

A fabric sensor comprising a plurality of conductive textile layers is described in international patent publication WO 00/072239.

A factor in the particular construction of a sensor utilising conductive textile layers is the prevention of unwanted electrical contact within the sensor, for example resulting from insufficient separation between conductive layers or from frayed edges of a conductive textile layer.

A further example of a mechanical contact apparatus and a method of production is described in United Kingdom patent publication GB 2 386 339 A. According to the method of production described in this publication, individual layers are brought together in a stack arrangement to form an assembly, whereafter a sealing process is performed during which the edges of the assembly are encapsulated within an applied material.

BRIEF SUMMARY OF THE INVENTION

According to a first aspect of the present invention there is provided a sensor comprising a plurality of layers, comprising a first mask layer; a second mask layer; a third mask layer disposed between said first and second mask layers and defining an aperture; and a first conductive layer disposed between the first mask layer and the third mask layer; a second conductive layer disposed between the second mask layer and the third mask layer; and a separator layer extending across the aperture in the third mask layer, said separator layer being configured to separate the first and second conductive layers when no pressure is applied to the sensor and to allow electrical contact between said first and second conductive layers during a mechanical interaction with said sensor, wherein each mask layer is formed from an electrically insulating material and has at least one side attached to another of said mask layers by adhesive.

According to a second aspect of the present invention the sensor further comprises a conductive track for applying electrical potentials to said first conductive layer, wherein a portion of said conductive track is disposed directly on said first mask layer and a portion is positioned directly on the conductive layer.

According to a third aspect of the present invention the conductive layers of the sensor comprise conductive textile layers.

According to a fourth aspect of the present invention the mask layers of the sensor are formed from a plastics material.

According to a fifth aspect of the present invention the adhesive is a thermoplastic adhesive.

According to a sixth aspect of the present invention the separator layer of the sensor is formed from a mesh material.

According to a seventh aspect of the present invention there is provided a method of assembling a plurality of layers to form a sensor comprising, the steps of: obtaining a first mask layer and second mask layer; obtaining a third mask layer defining an aperture and formed from an electrically insulating material; locating a first conductive layer between the first mask layer and the third mask layer; locating a second conductive layer between the third mask layer and the second mask layer such that the third mask layer is disposed between said first and second mask layers, and attaching at least one side of each mask layer to another of said mask layers by adhesive, wherein a separator layer is located between said first and second conductive layers such that it extends across the aperture in the third mask layer, and wherein said separator layer is configured to separate the first and second conductive layers when no pressure is applied to the sensor and to allow electrical contact between said first and second conductive layers during a mechanical interaction with said sensor.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

FIG. **1** is a flow chart illustrating an assembly order for layers of a sensor;

FIG. **2** shows an exploded view of component layers of a sensor having layers in the order of the layer assembly order of FIG. **1**;

FIG. **3** illustrates two subassemblies of the sensor of FIG. **2**;

FIG. **4** illustrates an assembly technique of the component layers of the sensor of FIG. **2**.

WRITTEN DESCRIPTION OF THE BEST MODE FOR CARRYING OUT THE INVENTION

FIG. **1**

FIG. **1** is a flow chart illustrating an assembly order for layers of a sensor. In this example, the sensor is configured to generate signals in response to mechanical interactions, the signals representing X-axis and Y-axis co-ordinate data of mechanical interactions within the sensing area of the sensor. European patent publication no. EP 0 989 509 describes a sensor and electrical arrangement allowing the sensor to detect both the position of a mechanical interaction within the sensing area (X-axis and Y-axis data) and also an additional property of the mechanical interaction, for example the extent or pressure of the mechanical interaction (Z-axis data).

At step **101**, a first mask layer (base mask) is positioned to receive further layers thereon. At step **102**, a first conductive textile layer is placed upon the first mask layer (base layer). At step **103**, first conductive tracking is located upon the first conductive textile layer. At step **104**, a second mask layer (intermediate mask) is positioned over the first conductive textile layer and first conductive tracking, as described in further detail below with reference to FIG. **2**. At step **105** a partially insulating mesh separator layer is located upon the second mask layer (intermediate mask). At step **106** a second conductive textile layer is placed over the mesh separator layer and at step **107** second conductive tracking is located upon the second conductive layer. At step **105** a third mask layer (top mask) is positioned over the second conductive textile layer and second conductive tracking to complete the layer assembly. In alternative orders of layer assembly, the conductive tracking may be laid down before or after the adjacent conductive textile layer.

FIG. **2**

An example of a sensor having layers in the order of the layer assembly order of FIG. **1** is shown in FIG. **2**.

FIG. **2** shows an exploded view of component layers of a sensor **201**. Sensor **201** comprises three mask layers **202**, **203** and **204**. Each of these layers is fabricated from a polyurethane material coated on one side with a thermoplastic adhesive. Suitable material is sold under the trade mark Nylemark by Victory Designs Limited UK. Preferably, the melting point