[0023] **FIG. 11**A and **FIG. 11B** show an alternative construction for a detector;

[0024] **FIG. 12**A and **FIG. 12B** show a further alternative construction;

[0025] **FIG. 13** shows a further alternative construction;

[0026] **FIG. 14** shows a further alternative construction.

[0027] **FIG. 15** shows an alternative embodiment having a plurality of detectors;

[0028] **FIG. 16** shows an alternative detector configuration; and

[0029] **FIG. 17** shows multiple detectors of the type shown in **FIG. 16**.

[0030] **FIG. 18** shows a first embodiment in which a connector has been included during the machining process; and

[0031] **FIG. 19** shows an alternative embodiment in which a connector has been added during a machining process.

[0032] **FIG. 20** shows a detector constructed from fabric having a conductivity non-uniformity; and

[0033] **FIG. 21** shows an alternative embodiment with a conductivity non-uniformity.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0034] The invention will now be described by way of example only with reference to the previously identified drawings.

[0035] A position detector **101** constructed from fabric is shown in **FIG. 1**. The detector has two electrically conducting fabric planes, in the form of a first plane **102** and a second plane **103**. The planes are separated from each other and thereby electrically insulated from each other, by means of an insulating mesh **104**. When force is applied to one of the planes, the two conducting planes are brought together, through the mesh **104**, thereby creating a position at which electrical current may conduct between planes **102** and **103**. In this way, it is possible to identify the occurrence and/or position of a mechanical interaction.

[0036] The fabric planes are defined by fabric structures, which may be considered as a woven, non-woven (felted) or knitted etc. The fabric layers may be manufactured separately and then combined to form the detector or the composite may be created as part of the mechanical construction process.

[0037] When a voltage is applied across terminals **107** and **108**, a voltage gradient appears over plane **102**. When a mechanical interaction takes place, plane **103** is brought into electrical contact with plane **102** and the actual voltage applied to plane **103** will depend upon the position of the interaction. Similarly when a voltage is applied between connectors **111** and **112**, a voltage gradient will appear across plane **103** and mechanical interaction will result in a voltage being applied to plane **102**. Similarly, the actual voltage applied to plane **102** will depend upon the actual position of the interaction. In this way, for a particular mechanical interaction, it is possible to identify locations within the plane with reference to the two aforesaid measurements. Thus, connectors **107**, **108**, **111** and **112** are received by a control circuit **121**, configured to apply voltage potentials to the detector **101** and to make measurements of electrical properties in response to mechanical interactions.

[0038] Control circuit **121** identifies electrical characteristics of the sensor **101** and in response to these calculations, data relating to the characteristics of the environment are supplied to a data processing system, such as a portable computer **131**, via a conventional serial interface **132**.

[0039] Control circuit **121** is detailed in **FIG. 2**. The control circuit includes a micro-controller **201** such as a Philips 80C51 running at a clock frequency of twenty megahertz. Operations performed by micro-controller **201** are effected in response to internally stored commands held by an internal two kilobyte read-only memory. The micro-controller also includes one hundred and twenty-eight bytes of randomly accessible memory to facilitate intermediate storage while performing calculations. Micro-controller **201** includes a serial interface **202** in addition to assignable pins and an interface for communicating with an analogue to digital converter **203**, arranged to convert input voltages into digital signals processable by the micro-controller **201**.

[0040] The control circuit **121** includes two PNP transistors **211** and **212**, in addition to four NPN transistors **213**, **214**, **215** and **216**. All of the transistors are of relatively general purpose construction and control switching operations within the control circuit so as to control the application of voltages to the position detector **101**.

[0041] In operation, measurements are made while a voltage is applied across first plane **102** and then additional measurements are made while a voltage is applied across the second plane **103**; and output voltage only being applied to one of the planes at any particular time. When an output voltage is applied to one of the planes, plane **102** or plane **103**, input signals are received from the co-operating plane **103** or **102** respectively. Input signals are received by the analogue to digital converter **203** via a selection switch **221**, implemented as a CMOS switch, in response to a control signal received from pin C**6** of the micro-controller **201**. Thus, in its orientation shown in **FIG. 2**, switch **221** has been placed in a condition to receive an output from a first high impedance buffer **222**, buffering an input signal received from plane **102**. Similarly, when switch **221** is placed in its alternative condition, an input is received from a second high impedance buffer **223**, configured to receive an input signal from plane **103**. By placing buffers **222** and **223** on the input side of CMOS switch **221**, the switch is isolated from high voltage electrostatic discharges which may be generated in many conditions where the detector undergoes mechanical interactions.

[0042] In the condition shown in **FIG. 2**, switch **221** is placed in its upper condition, receiving input signals from buffer **222**, with output signals being supplied to the second plane **103**. Further operation will be described with respect to this mode of operation and it should be appreciated that the roles of the transistor circuitry are reversed when switch **221** is placed in its alternative condition. As previously stated, condition selection is determined by an output signal from pin C6 of micro-controller **201**. In its present condition the output from pin C**6** is low and switch **221** is placed in its alternative configuration when the output from pin **6** is high.