tection for the structure **101** and facilitates the application of pressure to individual conductive fibres within second conductive element **104**. However, sheath **107** is arranged to be stripped away from the structure **101**, to allow electrical connection to be made with a conductive element of the structure **101**. According to the present example, first conductive element **102** and second conductive element **104** are concentric.

Thus, the present invention provides a linear sensor having a first conductive element and a second conductive element normally spaced apart but arranged to make contact under applied pressure. The linear sensor may take a string-life form.

In a preferred embodiment of linear sensor, at least the second conductive element is constructed such that the fibres therein extend in a direction that is not along the same axis of the length of the linear sensor. This feature facilitates local stretching, which in turn facilitates bending and flexing of the sensor without causing unwanted contacts between the inner and outer conductive elements. Local stretching is further facilitated by the inclusion of elastic fibres, for example Lycra™ fibres, which help to return the structure to its original shape following the application of pressure thereto.

FIG. **2**

A cross-section of a linear sensor **201** according to the present invention is shown in FIG. **2**. The sensor **201** comprises an insulating element **203**, in this example polyurethane plastic. A first conductive element **204** comprising conductive fibres **205** surrounds the insulating element **203**. A second conductive element **206** comprising conductive fibres **207** and insulating fibres **208** surrounds the first conductive element. The diameter of the insulating fibres **208** of second conductive element **206** is greater than that of the conductive fibres thereof. The sensor **201** also comprises a third, central conductive element **202** located within the insulating element **203** such that it is surrounded by said insulating element and thereby insulated from the first conductive element **204**. A sheath **209** surrounds the second conductive element **206**. Thus, the base structure of linear sensor **201** is similar to the textile structure **101** shown in FIG. **1**, but with the addition of the further inner conductive element **202**.

In the present embodiment, the central conductive element **202** comprises conductive textile fibres of a similar type to those contained in the first and second conductive elements, but in an alternative embodiment the central conductive element comprises metallic wires.

Pressure applied to the sheath **209** causes it to deform and push conductive fibres **207** of second conductive element **206** inwards towards conductive fibres **205** of first conductive element **204**, until at a threshold pressure electrical contact is established between the conductive fibres **205**, **207** of the first and second conductive elements **204**, **206**. Thus, the insulating fibres generally insulate the first conductive element from the second conductive element unless an applied pressure forces said conductive elements together.

It should be noted that the function of the insulating element **203** differs from that of the insulating fibres **208** in that it continues to insulate the central conductive element **202** from the first conductive element **204** even when pressure is applied.

The central conductive element **202** provides a separate conductor that may be used to establish an electrical contact at each end of one of the first and second conductive elements **204**, **206**, to allow an electrical potential to be established across the ends of the conductive element.

FIG. **3**

An electrical arrangement for linear sensor **201** is illustrated in FIG. **3**. By use of central conductive element **202**, both +V and 0V electrical connections are made at one end of the linear sensor **201**. A first electrical connection is made by connecting +V to the second conductive element **206**. A second electrical connection is made by connecting 0V to the third conductive element **202**. A third connection is made to second conductive element **204**, which allows a voltage measurement reading to be taken.

At the other end to the first, second and third electrical connections, a terminating piece **301** provides an electrical connection between second conductive element **206** and the central conductive element **202**. Thus, the central conductive element **202** acts as a link to facilitate the application of an electrical potential across the linear sensor **201**.

An electrical potential is applied across one of the first and second conductive elements of linear sensor **201**, in this example across second conductive element **206**. Under sufficient applied pressure, electrical contact is made between the second and first conductive elements, whereafter the linear sensor **201** acts substantially as a potentiometer. A "wiper" voltage reading may then be taken at the third electrical connection to first conductive element **204**. Such a voltage reading provides an indication of the position of the centre of contact between the first and second conductive elements **204**, **206** along the length of the linear sensor **201**.

If the central conductive element **202** is omitted from the structure of the linear sensor **201**, the sensor may act as a switch, with two electrical connections, one each made to first conductive element **204** and second conductive element **206**. However, the electrical connection provided by central conductive element **202** provides the described potentiometer function and enables a configuration arranged to provide an indication of the position of a mechanical interaction along the linear sensor. It should be noted that in each embodiment, the sensor is a linear sensor in that it has a length which is substantially longer than its other dimensions.

A linear sensor according to the present invention may be connected to a data processing means, for example a PIC micro-controller, such as PIC16F71 incorporating an A to D converter. The data processing means may receive frequent voltage measurements taken from the linear sensor. This data may then be encoded and used to communicate with a separate device, such as a portable MP3 player or pendant mobile phone.

FIGS. **4** and **5**

An application of a linear sensor is illustrated in FIGS. **4** and **5**. A linear sensor is incorporated into a lanyard **401**, or neck-strap, on which a portable MP3 player **402** is worn around the neck of a user **501**. The lanyard **401** has characters or symbols **403** printed on the surface, representing controls. By stroking and/or pressing the characters or symbols **403**, the user **501** can interact with the linear sensor. Control data, processed from positional data from the sensor is sent to the MP3 player **402** via the micro-controller mounted in interface connector **404**. The neck-strap **401** may thus be used to control functions of the MP3 player **402** such as play functions and volume control.

The invention claimed is:

1. A linear sensor comprising electrically conductive textile fibres and electrically insulating textile fibres, said sensor comprising:

at least two conductive elements having electrically conductive textile fibres and electrically insulating textile fibres spaced to separate said two electrically conductive