[0045] The upper **12** and lower **14** fabric layers maybe fabricated from any flexible sheet material. Nylon fabric woven for dimensional stability has been found to work particularly well for the bottom layer that preferably carries the circuits or trace patterns. The sheet material is desirably lightweight, strong and flexible. The upper layer **12** is preferably a lightweight, four-way stretch material, such as Lycra®. The fabric may be made in any color or color pattern, which opens many marketing opportunities for creative design. There may be instances where the lower layer is not flexible, for example a keyboard mounted on a wall or other hard surface. Alternatively, a desktop version may be provided where the upper layer of the keyboard is made of a flexible sheet material, but the lower layer is built into a finished piece of wood, stone, or other hard material.

[0046] The upper surface of upper layer **12** is printed with indicia representing desired keyboard keys. Each such key indicia is printed over the corresponding switch. Preferably, the key itself is formed by printing the upper surface of the upper layer with a polymeric material to form a raised, cup-shaped area for receiving the finger tip of a user, each such area corresponding to the keys **30** or other indicia. Alternatively, keys may be formed by embossing or molding the upper layer **12**, as shown in **FIG. 11**.

[0047] The electric circuits **26** and contacts **23** and **27** may be formed of any suitably conductive material. Conductive ink screen printed to the aforementioned nylon fabric is preferred. Acceptable conductive ink is CMI 114-31, available from Creative Materials, Tyngsboro, Mass. The ink or other conductive material must be able to withstand repeated fatigue without forming cracks or other defects that could to lead to failure of the circuit.

[0048] Optionally, foam or other materials may be inserted between layers **12** and **14** to improve the feel or tactile response of the panel. However, these are generally not preferred as they add bulk to the panel, makes it more difficult to collapse, and increases the size of the panel in its collapsed configuration.

[0049] Frame **18** is preferably fabricated from spring steel. Alternatively, the frame may be made from other materials, such as plastic, as shown in **FIGS. 7 and 8**. Alternatively, the frame may be formed of composite materials, e.g., fiberglass, or a composite steel and extruded polypropylene structure. Regardless of material chosen, the frame should have spring-like characteristics. Thereby, the frame is adapted to twist and collapse into three (or more) lobes, and on release, to spring back to its original shape. The frame functions to hold layers **12** and **14** taut and juxtaposed relative to one another. The height of the frame is preferably about 3-5 mm. This will result in spacing apart the layers **12** and **14** by 3 mm or more. The spacing is important, particularly to create the proper tactile response. It is too small, false contacts between traces **22** and **26** could result. If the spacing is too large, it may be cumbersome to make desired contacts. A frame height may be adjusted as desired to provide a comfortable keystroke.

[0050] It is contemplated that means other than a spring-like flexible frame could be employed for stretching or otherwise holding layers **12** and **14** taut and juxtaposed relative to one another. For example, a rigid frame could be used to mount the layers of sheet material on an automobile steering wheel. A flexible, albeit not collapsible, frame of polymer material could be used to incorporate the panel of the invention into clothing.

[0051] The peripheral margins of the flexible layers may be attached to the frame in any manner. The upper and lower layers may be sewn together with the frame loosely held between layers. Flexible layers can also be attached either by using adhesives or sonic welding. Alternatively, the frame may include fasteners, such as grooves **19**, for holding the edges of the sheet material. The frame may further include, if desired, a channel or other passageway for holding a cable **21**.

[0052] The data entry panel of the invention may desirably include a pointing device, such as a touch panel, mouse, or pointing stick, for moving a cursor on a display. A touch panel **36** is shown. The pointing device is electrically connected to a microprocessor having a display. Finger movement on the panel is transmitted to underlying circuitry which senses the direction of finger movement and transmits the same to the microprocessor's screen driver circuitry which repositions the cursor on the screen, as is known in the art. As the panel **10** of the invention collapses into essentially three lobes, it is possible to incorporate a thin, relatively inflexible component, such as a touch panel, in one of the lobes. The touch panel may be mounted in any conventional manner, for example by sewing the panel to the upper layer **12**.

[0053] The data entry panel of the invention may be used for a variety of functions. A computer keyboard is shown in **FIG. 1**. A music keyboard, e.g., piano, is shown in **FIG. 9**. A key pad for a personal communication device is shown in **FIG. 11**. A pocket calculator is shown if **FIG. 12**. Other applications for the invention will be apparent to those skilled in the art.

[0054] A second embodiment of the invention is shown in FIGS. **12-15**. In the second embodiment, the reference numerals generally correspond to the first embodiment, but in the **100** series. A collapsible date entry panel **110** comprises an upper flexible layer of flexible sheet material **112**, a lower layer of flexible sheet material **114**, and intermediate layer of flexible sheet material **116**, and a flexible frame **118** for holding the layers of sheet material in a substantially taut relationship. An inner surface **120** of the upper layer carries a conductive trace **122** and a plurality of contacts **123**, as shown in **FIG. 13**. The inner surface **124** of the lower layer carries a conductive trace **126** with corresponding contacts **127**, as shown in **FIG. 15**. The intermediate layer **116** has a pattern of holes **28** that correspond respectively to the contacts in the upper and lower traces. The upper layer of sheet material **112** has keys **130** or other indicia on its outer surface, which likewise correspond to the contacts **123** and **127**. The traces **122** and **126** are electrically connected to a multiple conductor cable **132**. Cable **132** terminates in a plug **134**. When a user of the data entry panel of the invention depresses a key the upper layer **112** depends downwardly causing the upper **123** and lower **127** contacts to contact one another through the respective hole **128**. This completes a circuit that is unique to the depressed key. As in the first embodiment, decoding circuitry (not shown) converts the specific completed circuit into a signal representing the key that had been depressed for input to a microcomputer or other electronic device.