non-conductive material used for a touch-sensitive surface, and a PC board on which is mounted the touchpad circuitry. The touch-sensitive surface is coupled to the touchpad circuitry mounted on the PC board using a novel connection system that does not rely on a pressure connector of the prior art.

One of the most advantageous aspects of the invention is the flexible touch-sensitive surface. This aspect is advantageous because the touch-sensitive surface can conform to arcuate surfaces. For example, an ergonomic keyboard often has a wrist rest. The wrist rest is a curved plastic surface below the keys. The present invention can advantageously be disposed underneath the curved wrist rest area without having to modify the keyboard case. This is because the touchpad of the present invention is also capable of sensing through non-conductive materials. Thus, the touchpad is protected under the hard plastic of the keyboard case, and conforms to the arcuate surface of the case.

Another advantageous aspect of the invention comes from the manner in which touchpad sensing electrodes are disposed on the touch-sensitive surface. Specifically, electrical traces are formed from conductive ink. This is the same conductive ink that is used to generate electrical traces for many prior art keyboard designs. Furthermore, although the process of silk-screening electrical traces onto plastic typically results in variations in spacings between them, these are tolerated by the touchpad circuitry of the present invention because of a large dynamic range.

The alternative embodiment of a keyboard that includes a built-in touchpad can share manufacturing processes that are used for creating the sensing grid for keys of the keyboard. The exact position of the touchpad in the keyboard is not particularly relevant in the present invention. It is only important that the plastic sheets on which electrical traces are disposed for the keys are extended outwards in a particular direction so that the touchpad sensing electrodes can also be disposed thereon. Accordingly, the touchpad is manufactured as an integral component of the plastic sheets used for the keyboard.

Accordingly, FIG. **4** shows a perspective view of two plastic sheets which fit together in the same manner as the sheets of FIG. **3**, with the addition of a smaller space off to a right edge which is to be used for the touchpad sensing electrodes. It should be apparent that the space reserved for the touchpad sensing electrodes can be at any arbitrarily selected location, just so long as it can be conveniently used as space for the touch-sensitive surface when a keyboard cover is disposed over the plastic sheets. Thus, it should be apparent that the extension in the plastic for the touchpad sensing electrodes can be manufactured in any direction. It is also an aspect of the invention that the plastic used for the touchpad sensing electrodes can also be manufactured as a separate article.

It is considered to be a novel aspect of the invention to use an inexpensive silk screening process, with its inherent imprecision in layout of the touchpad sensing electrodes as compared to using PC boards.

Another novel aspect of the invention is the ability to eliminate any supporting surface for the plastic sheets. This is accomplished by adhering the plastic sheets up against a bottom surface of a keyboard cover. There are several apparent advantages to this design, with the first being the elimination of a support surface. Another advantage is that the keyboard manufacturer can choose to highlight the area under which the touchpad is disposed if the touchpad technology is included, or not highlight the area if a touchpad is not included. The advantage to the seller is that the same keyboard cover can be used in both instances.

Typically, use of a touchpad in a keyboard case necessitates that a hole be cut in the keyboard top cover so that the user has access to the touchpad surface. However, the present invention can use, for example, the touchpad technology which is incorporated into capacitance-sensitive touchpads of CIRQUE CORPORATION(TM) which will still operate using keyboard top covers of average thickness. Accordingly, the keyboard top covers are easier to manufacture because the hole for the touchpad surface does not have to be cut or created using a mold with an aperture disposed therein.

Another novel aspect of the invention is the ability to eliminate the pressure connector that is used to apply pressure to the plastic sheets and the PC board where the control circuitry of the touchpads is mounted. A typical pressure connector is shown in FIGS. **5**A and **5**B, where a bar **50** is screwed down on top of at least one plastic sheet **52** and the PC board **54** in order to make a secure connection between them. Pressure is applied in this manner so that there is good electrical contact where the surfaces **56** of the plastic sheet **52** and the PC board **54** meet. Disadvantageously, screws **58** are required, as are holes into which the screws can be secured.

Eliminating the pressure connector is accomplished by first introducing solder bubbles. Solder bubbles **60** are preferably created on the PC board **62** as shown in FIG. **6**. The solder bubbles **60** advantageously create an area that causes the plastic sheet **64** to bend in order to be secured to the PC board **62** in area **66**. The plastic sheet **64** is secured to the PC board **62** by applying an adhesive to the PC board in area **66**, to the plastic sheet **64** where it is on contact with the PC board **62**, or both. As should now be understood, the raised solder bubbles **60** cause a greater force to be applied by the plastic sheet **62** where the plastic sheet is in contact with the solder bubbles simply because the plastic sheet is being bent. The stiffness of the plastic sheet **62** is sufficient to enable a good contact to occur.

FIG. **7** is provided to demonstrate that another novel feature of the invention is the staggering of the solder bubbles. While the spacing is visible in FIG. **6** in area **66** and creates the tension for a good connection, another purpose of the staggering is that the connections on the PC board are thus capable of being made closer together. FIG. **7** shows that the plurality of solder bubbles **60** are disposed in a staggered pattern.

FIG. **8** is provided to illustrate another method of connecting touchpad sensing electrodes on plastic sheets to electrical traces on a PC board. For example, suppose that a PC board is being used as a surface against which the touchpad sensing electrodes can rest. In one scenario, the touchpad sensing electrodes are disposed on two different plastic sheets. In a second scenario, one set of touchpad sensing electrodes is on the PC board, and the other set is on a plastic sheet. Either way, the touchpad sensing electrodes must be brought into electrical contact with the control circuitry mounted on a PC board. This is accomplished as shown in FIG. **8**. A PC board **70** is being used as a substrate. Solder bumps **72** are disposed on the PC board **70**. A first plastic sheet **74** is disposed on the PC board, with several holes cut therein to give access to the solder bumps **72** beneath. A second plastic sheet **76** with touchpad sensing electrodes thereon is to be put in contract with the solder bumps **72** of the PC board **70**. A portion of the first plastic sheet **74** is raised and a portion of the second plastic sheet