couplings **121***h*. Nevertheless, it should be noted that lateral restraint means **1409** provides a novel means of lateral assembly alignment having high perpendicular compliance.

[**0168**] We now consider sensors of a type made in accordance with embodiments of the invention where the principal element is made of an insulating material with a conductively coated area or areas.

[**0169**] Turning to **FIG. 15**A, epoxy glass PC board **1501** includes a region comprising principal element **106***k*. Principal element **106***k* comprises lands **113** and **114**, and such portions of the epoxy glass substrate as store significant elastic energy associated with changes in the capacitive gap.

[**0170**] As may be seen more clearly from cross sectional **FIG. 15B, a** predefined path carries applied force from touchable structure **401**, through force-coupling elastomeric pad **121***i,* upper capacitor plate **1503**, and spacing/connecting solder film **1505**, to central region **1506** of principal element **106***k*. Central region **1506** is flanked by slots **1502**, which serve both to increase and to relatively localize the flexure in the PC substrate. From central region **1506**, force passes both out and around the ends of slots **1502**, eventually reaching PC board supports **1504**. As force passes away from the immediate vicinity of the capacitive area and the slots **1502**, any additional flexure it produces ceases to relate to force-induced changes in the capacitive gap, and so is no longer passing through the force sensor. If present, supports **1504** placed close to the sensor may have some effect upon sensitivity and symmetry of response. Such close supports may be given a symmetrical disposition, such as that shown, not excessively close to central region **1506**. More remote supports may be placed in any pattern desired.

[**0171**] Elastomeric pad **121***i* provides both lateral softening and a degree of rotational softening. As such, pad **121***i* may serve as an alternative to the combination of raised feature **121** and lateral softener **107** shown in **FIG. 10B**. Pad **121***i* may be fastened adhesively to the capacitor plate **1503** below, but not attached above. Structures above may then be aligned and preloaded shown as elsewhere herein. Alternatively, pad **121***i* offers the possibility of maintaining alignment and assembly through adhesive attachments both above and below.

[**0172**] The variation presented in **FIG. 15C** alters the force path, as it now passes through the length of the upper capacitor plate **1503**. This upper plate **1503** may now make a significant contribution to the elastic energy storage associated with the capacitive gap; in which case, it is appropriate to view the upper plate **1503** as an additional principal element **106***q,*working in concert with lower principal element **106***m*. Force from element **106***q* through solder **1505***b* into element **106***m,* continues around slots **1502**, into central region **1506**, and thence to support **1504***b*.

[**0173**] Thus, many variations on the capacitive force sensor of the invention will be evident to one of ordinary skill in the art. These variations may share certain features, such as:

[**0174**] Major components of the sensor may be substantially planar, and may be manufactured from planar materials. This provides inexpensive access to high-precision flat surfaces, and to surfaces that are designed to deviate from flat by slight but precisely controlled amounts. Sensors according to various embodiments of the invention may involve one or more substantially planar principal elements. These receive and pass on forces through a predefined path, and respond to the normal component of such forces by a normal displacement of a capacitive surface that they expose. The capacitive surface so exposed may itself be subject to some degree of flexure. Note that the point at which force enters a principal element may be considered to be that point beyond which force transmitted may produce flexure directly affecting the measured capacitive gap.

[**0175**] Sensors according to various embodiments of the invention may have a very small gap; for this reason, in part, they may be made small in comparison with the containing touch location device. The gap-defining mechanical path of such sensors is small compared to the dimensions of the touch location device; as a direct result, the gap suffers only tiny error deflections due to device flexure. Furthermore, the small size of the gap-defining path may effectively provide additional error reduction through local stiffening and/or structural isolation.

[**0176**] To more precisely understand the meaning of the term "gap-defining path" as used herein, draw a curve through space that originates at the center of one capacitive area and terminates at the center of the opposing capacitive area. Pass this curve entirely within solid material fully contributing to the mechanical coupling between the two opposing capacitive areas. The term "gap-defining path" refers to the length of the shortest such curve.

[**0177**] In sensors according to various embodiments of the invention, the extent of the gap-defining path projected along a line normal to the sensor (referred to herein as the aggregate normal component of the gap-defining path) may be scarcely greater than the thickness of the gap itself. Since the sensor spring lies in the same plane as its corresponding capacitive area (e.g., both are embodied in the principal element **106**), and is a continuation of the same planar material defining the plane of that area, some means of directly spacing the width of the gap is all that may be required to construct the capacitor. In prior art designs of capacitive force sensors, wherein the normal component of the gap-defining path is substantially larger than the gap itself, the gap is effectively determined by the small difference of two larger numbers. This has previously limited the precision, stability, and economy with which a very small gap may be employed.

[**0178**] The precision with which the directly-spaced gaps of sensors of various embodiments of the invention may be made allows for a capacitive gap of high aspect ratio. Width and length that are large compared to the gap spacing itself allow an adequate absolute capacitance to be maintained as the sensor is miniaturized.

[**0179**] In some embodiments, some original material may be removed from regions of originally substantially planar materials. Thus, 1 or 2 mils of copper may be etched from between the support lands **113** and counter-electrode land **114**, to isolate them electrically. The surfaces of lands **113** and **114** remain highly coplanar, however. Thus, in spite of this, and similar operations that may be performed between the capacitive and support areas of substantially planar principal elements **106**, which operations may superficially increase the normal component of the gap defining path, the end surfaces continue to afford the same opportunity for establishing highly precise, directly-spaced gaps using off-