particular regions **113** may also be detected, expanding the range of input types and query types for the device. Sensors **140** placed adjacent to the cavities **125** may also be used to more accurately locate the particular region **113** upon which the user provided the input.

[0073] The sensor **140**, cavity **140**, and second cavity **140** may are preferably in arranged in one of the variations described above, but may also be any combination of the variations described above. However, any other suitable arrangement or method of controlling the cavities **125** may be used.

[0074] 6. Power Source

[0075] The user interface system **100** of the preferred embodiments may also include either a power source or a power harnessing device, which both function to power the displacement device **130** (and possibly other elements of the user interface system, such as the sensor **140** and/or the display **150**). The power source is preferably a conventional battery, but may be any suitable device or method that provides power to the displacement device **130**. The power-harnessing device, which is preferably integrated into the hinge of a flip phone or laptop, functions to harness a portion of the energy involved in the normal use of the electronic device (such as the physical energy provided by the user in the opening of a flip phone or the screen on a laptop). The power-harnessing device may alternatively be integrated in a separate mechanical input device (such as a button on the side of a mobile phone, or a "self-winding" device found in automatic watches) or any other suitable device or method to harness a portion of the energy involved in the normal use of the electronic device.

[0076] As a person skilled in the art will recognize from the previous detailed description and from the figures and claims, modifications and changes can be made to the preferred embodiments of the invention without departing from the scope of this invention defined in the following claims.

We claim:

1. A user interface comprising:

a substrate comprising an attachment face and a support member continuous with the attachment face, the substrate defining a fluid channel configured to communicate fluid through the support member;

a tactile layer comprising an outer tactile surface and a back surface opposite the tactile surface, the back surface coupled to the attachment face at an undeformable region of the tactile layer, the back surface adjacent to and disconnected from the support member at a deformable region of the tactile layer, wherein the deformable region is of a thickness at least as great as a width dimension of the fluid channel, and wherein the support member limits inward deformation of the deformable region due to a force applied to the tactile surface;

a displacement device configured to displace fluid through the fluid channel and toward the back surface of the deformable region to transition the deformable region from a retracted setting to an expanded setting, wherein the expanded setting is tactilely distinguishable from the retracted setting at the tactile surface;

a sensor coupled to the substrate and configured to detect a deformation of the deformable region due to a touch on the tactile surface.

2. The user interface of claim **1**, wherein the attachment face and the support member are planar.

3. The user interface of claim **1**, wherein the deformable and undeformable regions of the tactile layer are adjacent and of substantially similar thicknesses.

4. The user interface of claim **1**, wherein, in the retracted setting, the tactile surface of the deformable region is flush with the tactile surface of the undeformable region.

5. The user interface of claim **4**, wherein, in the expanded setting, the tactile surface of the deformable region is elevated above a portion of the tactile surface of the undeformable region.

6. The user interface of claim **1**, wherein, in the retracted setting, the back surface of the deformable region is in contact with the support member.

7. The user interface of claim **1**, further comprising a display coupled to the substrate and configured to visually output an image through the tactile surface.

8. The user interface of claim **7**, wherein the display is configured to output the image that is an input key substantially aligned with the deformable region.

9. The user interface of claim **1**, wherein the substrate further defines a second fluid channel configured to communicate fluid between the displacement device and the fluid channel.

10. The user interface of claim **1**, wherein the displacement device is a pump.

11. user interface of claim **1**, wherein the displacement device is further configured to displace fluid away from the back surface of the deformable region to transition the deformable region from the expanded setting to the retracted setting.

12. The user interface of claim **1**, wherein the substrate further comprises a second support member continuous with the attachment face, the substrate further defining a second fluid channel configured to communicate fluid through the second support member, wherein the back surface of the tactile layer is adjacent to and disconnected from the second support member at a second deformable region of the tactile layer, wherein the support member limits inward deformation of the second deformable region, and wherein the displacement device is further configured to displace fluid, through the second fluid channel, toward the back surface of the second deformable region to transition the second deformable region from a retracted setting to an expanded, wherein the expanded setting is tactilely distinguishable from the retracted setting at the second deformable region of the tactile surface.

13. The user interface of claim **12**, wherein the displacement device is configured to selectively transition the deformable region and the second deformable region between the retracted and expanded settings.

14. The user interface of claim **1**, wherein the substrate further defines a cavity proximal the support surface and configured to communicate fluid between the fluid channel and the displacement device.

15. The user interface of claim **14**, wherein a portion of the sensor is arranged within the cavity.

16. The user interface of claim **14**, wherein the sensor is a pressure sensor configured to sense fluid pressure changes within the cavity.

17. The user interface of claim **14**, wherein the sensor is a capacitive sensor comprising a first conductor, arranged within the cavity, and a second conductor, coupled to the tactile layer.