of the cavity **125** will decrease, forcing a volume of the fluid **120** to backflow through the channel **138**. The flow sensor preferably detects and/or measures the backflow of the fluid **120** through the channel **138** to determine the occurrence of a deformation of the particular region **113** and/or the magnitude of deformation of the particular region **113**. To measure the backflow, the flow sensor is preferably placed in a location in the channel **138** wherein fluid flow is only seen when there is backflow due to the inward deformation of the particular region **113**. In one example, the channel **138** may also include a valve **122** that is normally closed to maintain a constant volume of fluid **120** within the cavity. When there is inward deformation of the particular region **113**, the valve **122** is opened, allowing backflow to the rest of the channel **138**. The flow sensor may be a flow rate sensor that measures the flow rate of the fluid. The volume of fluid **120** that flows through the channel **138** may be calculated from the known cross sectional area of the channel **138** and the flow rate. For demonstration and conciseness, the valve **122** and/or sensor **140** are shown to be located in relatively close proximity to the cavity **125** in FIG. **19***b*. However, the valve **122** and/or sensor **140** may be placed in any other suitable location relative to the cavity **125** (for example, in a region not pictured in FIG. **19***b*), that enables contact with fluid flowing through the channel **138**. The pressure sensor may alternatively be a Hall effect sensor or any other type of sensor that senses the opening of the valve **122** due to the backflow of the fluid **120**. However, the flow sensor may be any other type of fluid sensor that is able to detect and/or measure backflow of the fluid **120**.

[0046] The sensor **140** may alternatively be a strain sensor. The strain gage sensor preferably measures the strain of the particular region **113** of the surface **115**. By knowing the nominal strain of the particular region **113** of the surface **115** in the retracted volume setting and in the extended volume setting, the strain sensor identify when the particular region of the surface has been depressed in the extended volume setting. A plurality of strain sensors may facilitate determining the location of the user input relative to the particular region **113**. Multiple strain gauges may be coupled either on, under, or within the surface, and the difference in deformation of one portion of the surface relative to another may help indicate the location of the user input relative to the particular region **113**.

[0047] Because the capacitive, the resistance, the pressure, the flow, and the strain sensor variations of the sensor **140** may allow the location of a user input or a shift in the location of user input along the deformation of the particular region **113** (e.g., as the user "sweeps" from one location to another) to be detected, the sensor **140** of these variation may be applied to the slide and the pointing stick variations of the deformation of the particular region **113** described above.

[0048] The sensor **140** is preferably one of the variations described above, but may be any other sensor suitable to sensing the inward deformation of the particular region **113**. The sensor **140** may also be of any suitable combination of the variations described above.

4. The Processor

[0049] The user interface system **100** of the preferred embodiment may also include a processor, which is coupled to the displacement device **130** and to the sensor **140**. As shown in FIG. **20**, the processor **160** functions to operate the user interface system **100** in an Extended Cavity Mode and a Retracted Cavity Mode. In the Extended Cavity Mode when the particular region **113** of the surface is outwardly deformed, then a force of a first degree or magnitude applied by the user onto the deformed particular region of the surface **113** is preferably recognized as a user input of a first type. A force of a second degree or magnitude applied by the user onto the deformed particular region **113** of the surface, wherein the second degree is less than the first degree, is preferably recognized as a user input of a second type. In an example, if the force of the second degree is the result of the user resting his or her finger on the particular region **113**, then the processor **160** preferably ignores the user input of the second type. In this manner, the deformation of the particular region **113** additionally functions to distance the user touch from the sensor **140** and to allow the user to rest their fingers on the deformation (the location of an input) without actuating the input. Alternatively, if the force of the second degree is the result of the user lightly applying force to the particular region **113**, then the processor **160** may interpret the user input of the second type as an input of a lower magnitude than the user input of the first type. However, any other suitable relationship between the user input of the first type and the second type may be applied. The determination of whether the force applied by the user on the particular region **113** is of the first degree or the second degree may be set or modified by the manufacturer, the processor, and/or the user. In the Retracted Cavity Mode when the particular region **113** of the surface is not outwardly deformed, then a user touch at the particular region in the surface **115** is preferably not recognized as a user input of the first type or the second type, but rather as a user input of a third type that is distinguishable from a user input of the first type and the second type. The user input of the third type may also be ignored. Additionally, in the Extended Cavity Mode, a force applied by the user of a third degree, wherein the third degree is lower than the first degree but higher than the second degree, may be interpreted as a user input of a fourth type. However, any additional degrees of force applied by the user on the particular region **113** may be detected and interpreted as any suitable type of user input.

[0050] The processor **160** may also function to detect the rate at which the user applies a force to the particular region **160**. In the Extended Cavity Mode when the particular region **113** of the surface is outwardly deformed, then a force applied at a first rate of change onto the deformed particular region of the surface **113** is preferably recognized as a user input of a first type. An applied force of a second rate of change onto the deformed particular region **113** of the surface, wherein the second rate is higher than the first rate, is preferably recognized as a user input of a second type. For example, the inward deformation of the particular region **113** may be interpreted by the processor **160** as an indication of the user to scroll through a webpage. When the user applies a force at the first rate, the processor will scroll through the webpage at a first speed. When the user applies a force at the second rate, then the processor will scroll through the website at a second speed, wherein the second speed is faster than the first speed. In this manner, the sensor **140** and the processor **160** are able to determine a larger range of user inputs from the inward deformation of the particular region **113**. However, any other suitable relationship between the user input of the first type and the second type may be applied. The question of whether the force applied by the user on the particular region **113** is of the first rate or the second rate may be set or modified by the manufacturer, by the processor, or by the user. In the Retracted Cavity Mode when the particular region **113** of the