

ing elements 102 are compressed and the lever arms 92 are flexed. Thus, the touch screen display 24 is further displaced after actuation of the switch 32 to a total displacement of "d". In FIG. 7, however, the force "C" is applied to the touch screen display 24, on one side thereof. Thus, the touch screen display 24 pivots against the underside of the frame 86 on the side opposite to the side at which the force is applied, as described above. In the view shown in FIG. 7, the left side of the touch screen display 24 to which the force is applied is displaced a distance of "d" to cause the lever arms 92B to pivot, displacing the switch 32 away from the base 22 and toward the touch screen display 24. Thus, the center of the touch screen display 24 is displaced approximately $\frac{1}{2}$ "d" and the switch 32 is displaced approximately $\frac{1}{2}$ "d". The total relative movement of the switch 32 toward the center of the touch screen display and the center of the touch screen display 24 toward the switch 32 is "d" to actuate the switch 32. It will again be appreciated that the position of the pivots 94 can be determined for best performance and the pivots 94 are not required to be centrally located along the respective lever arms 92.

[0061] Reference is now made to FIGS. 9 to 11 to describe an electronic device according to yet another embodiment. Many of the features of the present embodiment are similar to those in the previously described embodiments and are therefore not further described herein. The feedback mechanism 30 of the present embodiment differs from the feedback mechanism described above, however. Again, the portable electronic device 20 includes the feedback mechanism 30 which, in the present embodiment, includes the switch 32 as well as other components for providing tactile feedback to the user of the portable electronic device 20 when applying a force by user-pressing on the input surface 28 of the touch screen display 24. The switch 32 can be, for example, a mechanical dome-type switch 32 and is shown in FIG. 9 in the uncompressed or non-actuated state. The switch 32 is moveable away from the base 22, in the direction of the touch screen display 24. In the present exemplary embodiment, two lever arms 92 extend from an underside of the switch 32, where they are located between the switch 32 and the base 22, toward respective sides of the touch screen display 24. Each of the lever arms 92 is pivotable about a respective pivot pin 104 located between ends of the lever arm 92, as shown in FIG. 9. The location of the pivot pin 104 can be selected to provide suitable operation of the feedback mechanism 30. The lever arms 92 are each shaped to provide a respective support surface 106 on an end thereof on which the switch 32 is located. The respective support surfaces 106 rest against the base 22 when no force is applied to the touch screen display 24. Referring to FIG. 10, a top view of the support surfaces 106 is shown. Each support surface 106 includes fingers 108 that are interlaced between the fingers 108 of the other support surface 106 to support the switch 32 for displacement of the switch 32. In the present embodiment, each lever arm 92 is shaped to provide a projection 98 on the end, opposite the end with the support surface. The projection is spaced from the touch screen display 24 when the touch screen display is in the rest position, absent an applied force to the input surface 28. Again, stops 99 extend from the base near respective ends of the lever arms 92 for limiting displacement of the lever arms 92 and the touch screen display 24.

[0062] It will be appreciated that each lever arm 92 is pivotable about the respective pivot pin 104 to cause movement of the switch 32 between the base 22 and the touch screen

display 24. Thus, displacement of the touch screen display 24 by a force applied by a user pressing on the touch screen display, causes the touch screen display 24 to contact at least one of the two projections 98. Application of a force on one side of the touch screen display 24 by a user pressing on the touch-sensitive input surface 28, causes pivoting of the touch screen display 24 such that the side to which the force is applied, moves toward the base 22 and contacts the respective projection 98, causing pivoting of the respective lever arm 92. Pivoting of the lever arm 92 results in displacement of the respective support surface 106 and thus, displacement of the switch 32 away from the base 22, toward the touch screen display 24 to actuate the switch 32 as a result of compression against the display support 89. Application of a force near a center of the touch screen display 24 by a user pressing on the touch-sensitive input surface 28, proximal a center thereof, causes displacement of the touch screen display 24 into contact with the projections 98 resulting in actuation of the switch 32.

[0063] Continued reference is made to FIG. 11 to describe movement of the touch screen display 24 within the housing 84 of the portable electronic device 20. FIG. 11 shows a simplified sectional side view of the portable electronic device 20 according to an exemplary embodiment in which a force is applied by, for example, a user pressing a finger on the touch-sensitive input surface 28 of the touch screen display 24, in the direction of the arrow "E". As shown, the user presses on the touch screen display 24 proximal one side of the portable electronic device 20, resulting in pivoting of the touch screen display 24 such that the display support 89 contacts the projection 98 on the end of the lever arm 92 at the same side of the touch screen display 24 to which the force is applied. It will be appreciated from the Figure that when a force is applied on the touch screen display 24, the touch screen display 24 pivots against the underside of the frame 86, along an edge on the opposite side of the portable electronic device 20. In the example of FIG. 11, the touch screen display 24 contacts the projection 98 on the right-hand side as a result of the force "E" being applied on the right-hand side of the touch screen display 24, causing pivoting of the respective lever arm 92. With the pivoting of the lever arm 92 on the right-hand side of the portable electronic device 20, the switch 32 is displaced by the support surface 106 of the respective lever arm 92, away from the base 22, toward the display support 89, causing actuation of the switch 32.

[0064] When a force is applied near the center of the touch screen display 24 of the present embodiment, the touch screen display 24 is displaced into contact with the projections 98 and causes flexing of the lever arms 92 after actuation of the switch 92 such that both lever arms 92 abut the stops 99.

[0065] In FIG. 9, no force is applied to the input surface 28 of the touch screen display 24 and therefore the touch screen display 24 is in the rest position in which it is biased towards the frame 86 by biasing elements (not shown). A relative displacement of the touch screen display 24 and the switch 32 of a distance "d" toward each other, results in actuation of the switch 32. In the present embodiment, the touch screen display 24 contacts the projections 98 prior to actuation of the switch 32. Further displacement of the touch screen display 24 toward the base 22 causes pivoting of the lever arm (or arms 92). When a force is applied to the center of the touch screen display, the touch screen display 24 is displaced a distance of "d" at each side and a similar distance of "d" at the center as the touch screen display 24 contacts the projections