

[0044] As a result, when the A hinge 32 is being rotated to move the display unit 10 in the opening direction, the friction resisting rotation of the A hinge 32 may be less than the friction resisting rotation of the B hinge 30. Accordingly, when a separating force is initially applied to the display unit 10 and the base unit 12, the A hinge 32 rotates first and the B hinge 30 does not rotate. Thus, when the display unit 10 is first moved to change the portable computer from the closed configuration to the laptop configuration, the A hinge 32 rotates first and allows movement of the display unit 10 to approximately 110 degrees relative to the base unit 12.

[0045] The A hinge 32 may have sufficient friction resisting rotation in either the opening or the closing direction to keep the display unit 10 of the portable computer tilted. The minimum friction necessary to maintain the display unit in the tilted position may be calculated based on the weight of the display unit 10 and the laptop tilt angle of the display unit in the laptop configuration. In embodiments in which the base unit 12 rests partially on the A hinge 32 as shown in FIGS. 1-5 and as described in greater detail below, the minimum friction force required may also depend upon the weight of the base unit 12 and the angle between the base unit 12 and the surface upon which it rests.

[0046] Conversely, when the display unit 10 is moved in the closing direction to change the portable computer from the tablet configuration to either the laptop configuration or the closed configuration, the friction resisting rotation of the A hinge 32 may be stronger than the friction resisting rotation of the B hinge 30 due to engagement of the directional clutch 40. Thus, in the closing direction, the friction resisting rotation of the A hinge 32 may be greater than the friction resisting rotation of the B hinge 30, so that the B hinge 30 rotates first when a closing force is applied. Accordingly, a closing force applied to the display unit 10 and the base unit 12 causes the B hinge 30 to rotate first and allows the portable computer to move to the laptop configuration from the tablet configuration. When the portable computer reaches the laptop configuration, the B hinge's rotation may be complete (i.e., the B hinge 30 may reach a lower limit of its range of rotation) and the A hinge 32 may begin to rotate in direction 2 to place the display unit 10 on top of the base unit 12 to reach the closed configuration. The latching assembly 60, described below with respect to FIGS. 6(a)-6(e), may be used to hold both the display unit 10 and the base unit 12 together in the closed configuration.

[0047] In addition, when the portable computer is operating in the laptop configuration, the base unit 12 may tilt at a slight angle with respect to its supporting surface and may partially rest on the A hinge 32 to allow for comfortable usage of the keyboard 18. FIGS. 2(b) and 4(b) illustrate the tilting of the base unit 12 according to an embodiment of the present invention. As the A hinge 32 is rotated to place the display unit 10 at the laptop tilt angle (approximately 110 degrees in the embodiment shown) relative to the base unit 12, the B hinge 30 may move from a position above (and to the right of) the A hinge 32 to a position below (and to the right) of the A hinge 32. As a result, the rear portion of the base unit 12 may be elevated off of the support surface, while the front portion of the base unit 12 continues to rest on the support surface. In alternative embodiments of the invention, the B hinge 30 may begin at a position above and to the left of the A hinge 32 in the closed configuration and may move to a position below and to the left of the A hinge

32 in the laptop configuration. Furthermore, as mentioned above, in embodiments of the invention, the B hinge 30 may be rotated to change the portable computer from the closed configuration to the laptop configuration and the A hinge 32 may not rotate during this transition. In other embodiments of the invention, the rotation of the A hinge 32 and the B hinge 30 may not be isolated during the transition from the closed configuration to the laptop configuration to the tablet configuration.

[0048] As discussed above, in the illustrated embodiment of the invention, the B hinge 30 may not rotate initially when the portable computer is being opened to put the portable computer in the laptop configuration from the closed configuration. When moving the display unit 10 in the opening direction to place the portable computer into either the laptop configuration or the tablet configuration, the A hinge 32 may rotate first because the friction force resisting rotation of the A hinge 32 is less than that resisting rotation of the B hinge 30. FIG. 2(b) illustrates how the B hinge 30 has not rotated significantly even though the display unit 10 has been tilted to the laptop tilt angle relative to the base unit 12. The B hinge 30 may begin to rotate when the A hinge 32 reaches an upper limit in its range of rotation. As discussed above, this upper limit may result from the location of a physical stop on an external or internal surface of the A hinge 32. The lower limit of the range of rotation will generally correspond to the portable computer reaching the closed configuration, in which case, the base unit 12 may act as a physical stop to create the lower limit.

[0049] FIGS. 2(c) and 4(c) illustrate the location of the A hinge 32 and B hinge 30 when the portable computer is in the tablet configuration. In the tablet configuration, the display unit 10 is tilted 360 degrees relative to the bottom disclosure 12 from its original starting position in the closed configuration. In the tablet configuration, the bottom surface 15 of the base unit 12 rests next to the rear surface 17 of the display unit 10, while the keyboard 18 and the pointing device 20 rest on the planar surface on which the portable computer rests. FIG. 5 presents a top perspective view of the portable computer in the tablet configuration according to an embodiment of the present invention.

[0050] In moving from the laptop configuration to the tablet configuration, the B hinge 30 is rotated to its full extent to allow the display unit 10 to tilt 360 degrees relative to the base unit 12 as illustrated in FIG. 2(c). Accordingly, the range of rotation of the B hinge 30 may have an upper limit imposed by the location of the bottom surface of the base unit 12. In the embodiment shown, the B hinge 30 may have a rotation range of about 250 degrees. As shown in FIG. 3, a friction force may be applied to the B hinge shaft 36 by a high friction device 34. In embodiments of the invention, the B hinge 30 may experience the same amount of friction when rotating in either direction. The high friction device 34, low friction device 38 and directional clutch 40 may be selected such that the amount of friction resisting rotation of the B hinge 30 may be selected so as to be greater than the amount of friction resisting rotation of the A hinge 32 in the opening direction and less than the amount of friction resisting rotation of the A hinge 32 in the closing direction. When moving the portable computer from the laptop configuration to the tablet configuration (i.e., moving the display unit 10 in the opening direction), the B hinge 30 may start to rotate once the A hinge 32 has completed its full