

[0081] FIG. 10 illustrates one embodiment of a touch switch implemented using infrared light source and infrared light sensor.

[0082] FIG. 11 shows another preferred embodiment of the present invention with a palm fin.

[0083] FIG. 12 shows a pointing device in accordance with the present invention as held by a user.

[0084] FIG. 13 shows a pointing device in accordance with the present invention with the scroll select touch switch.

[0085] FIG. 14 is a block diagram for a touchpad-based pointing device.

[0086] FIG. 15 is a block diagram for a track-ball based pointing device.

[0087] FIG. 16 is a portion of a preferred embodiment of the pointing device showing the channels for the index and middle fingers.

[0088] FIG. 17 shows a section from FIG. 16 to illustrate a mechanism for adjusting the placement of the light beam relative to the finger channels.

[0089] FIG. 18 shows a series of adjustment screws on a face of one embodiment of the pointing device.

[0090] FIG. 19 is a perspective view of a preferred embodiment of the present invention as viewed from above looking from wrist end and toward distal end.

[0091] FIG. 20 is a view of a preferred embodiment of the present invention as viewed from below the device.

[0092] FIG. 21 is a view of a preferred embodiment of the present invention as viewed for the palm fin side of a right-handed device.

[0093] FIG. 22 is a view of a preferred embodiment of the present invention as viewed from the left side of a right-handed device.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0094] The preferred embodiment of the invention comprises a plastic housing, a cursor navigation unit for x-y input, three small switches or buttons and internal electronics and cable with which to interface the device with a computer. The plastic housing is to be cast and constructed using methods and materials known to the pointing device industry.

[0095] The particular preferred embodiment of the invention shown in the accompanying figures and related text is configured for use with the right hand. However, it can be understood that the invention can be configured for use with the left hand by production of a device that is a mirror image of the device shown. Furthermore, the present invention is limited to the physical configuration of the pointing device and the way the various input actuators are placed in juxtaposition to the fingers to minimize fatigue. The electrical, electromechanical, and software interfaces necessary to convey the input signals to a computer application are well known in the art. To the extent that minor variations are necessary from existing device interfaces to create the necessary software interface (driver), and to integrate a

pointing device as described below with computer systems, such a variation can be done by those of suitable training and experience without undue experimentation.

[0096] In order to promote clarity in the description, common terminology for components is used. The use of a specific term for a component suitable for carrying out some purpose within the disclosed invention should be construed as including all technical equivalents which operate to achieve the same purpose, whether or not the internal operation of the named component and the alternative component use the same principles. The use of such specificity to provide clarity should not be misconstrued as limiting the scope of the disclosure to the named component unless the limitation is made explicit in the description or the claims that follow.

[0097] In order to provide orientation, the following convention will be used in this specification and the claims that follow:

[0098] As held properly in the user's right hand,

[0099] Top, when referencing a view indicates looking down on the user's thumb nail and the corresponding upward-facing surfaces of the device.

[0100] Front, when referencing a view indicates the view looking along the long axis of the main body or grip portion of the device and toward the face of the x-y input device.

[0101] Right, and left when referencing a view of the device correspond to the user's right and left sides when holding the device normally.

[0102] Bottom, when referencing a view indicates looking upward at the device from below as it is held by the user.

[0103] Back, when referencing a view indicates the view looking toward the device and facing the user; back view is the reverse of front view.

[0104] Returning to FIG. 1, the hand 100, has thumb 104, index finger 108, middle finger 112, ring finger 116, and little finger 120. The hand as depicted in FIG. 1 is in a stress-free, relaxed open grip posture with the thumb pointing forward at the top. A portion of the thumb, the thumb tip 124 is identified since the thumb tip will be used to provide input rather than the thumb pad 128. While the term fingertip is sometimes used to refer to any portion of the finger beyond the last digit joint, in this application, the term pad is used to refer to the surface opposite from the finger nail or thumb nail. The term tip is used to refer to the portion of the thumb or finger that is the distal surface of the finger or thumb which is located to distal and above the corresponding pad and just below the corresponding nail such as thumb nail 132. While there is not a clear line of demarcation between the thumb pad 128 and the thumb tip 124, the distinction is useful for describing the interaction between the thumb 104 and the present invention. In FIG. 1, the finger tips for the four fingers are visible, however, all or the majority of the pads for the four fingers are not visible.

[0105] FIG. 2 shows a pointing device 200 in the hand 100 of a user. Notice that the positioning of the hand, thumb and fingers is very much the same in FIG. 2 as is shown in FIG. 1.