

[0085] The display unit 20 and a form change detection unit 30 may share some of their parts, as will be explained in full detail later. Alternatively, the form change detection unit 30 may be incorporated into the display unit 20. Or, the display unit 20 may be incorporated into the form change detection unit 30. On the other hand, as for the display unit 20 and the form change detection unit 30, those whole parts do not need to be laminated completely.

[0086] The form change detection unit 30 may be laminated only on a part of display unit 20, as will be explained later with reference to FIG. 14, for example. Alternatively, the display unit 20 and the form change detection unit 30 may not be laminated, but they may be arranged adjacently, as will be explained later with reference to FIG. 51, for example.

[0087] The drive judging unit 12 has the display drive unit 120 and fits the signal judging unit 130. The display drive unit 120 has the role to output a display signal IS to the display unit 20, and a predetermined picture is displayed on the display unit 20. On the other hand, the signal judging unit 130 judges the inputted information based on the signal received from the form change detection unit 30. These display drive unit 120 and a signal judging unit 130 may be integrated in the display input devices 10, or they may be provided in the exterior of the display input device 10 as the separate elements.

[0088] The display unit 20 and the form change detection unit 30 have a flexibility in "bending". In the embodiment, a stress is impressed to the display input device 10 and a deformation such as "bending" B is created in order to input a predetermined data. Then, the form change detection unit 30 detects the "bending" B and the signal about the direction and amount of stress is outputted. That is, an analog output AS corresponding to the quantity of the "bending" is given.

[0089] A signal judging unit 130 judges the inputted data. The signal judging unit 130 may also change this analog signal AS to a signal, such as a voltage signal, suitable for an output to external apparatus.

[0090] The place where bending B is added may be an image displaying area of the display units 20 (not shown), or may be domains other than an image displaying area. If the detection of bending B is enabled in an image display area, various forms of data input in conjunction with an image display and a position of data input will become possible, as will be explained in more detail later.

[0091] A place where bending B is added may be near the center of a display input device. Alternatively, a bending which covers the whole display input device 10 and makes it in a shape of a concave or a convex may be added.

[0092] If a substrate which consists of organic material, such as a plastic film, is used as a support substrate of the display unit 20 and the form change detection unit 30, not only improvement in a weight saving or impact resistance, but also an excellent flexibility in "bending" can be obtained. That is, it becomes easy to create bending into the form change detection unit 30 by impressing stress from the outside. A user can hold the display input device 10 with one hand or both hands, and can arbitrarily adjust the position, the condition and the area to add the bending.

[0093] For example, it is as the following when a user holds a display input device 10 of the shape of a film of A4 size with the left hand. That is, the user can add the bending near the upper end on the left-hand side of the film, or he can add the bending near the lower end. Moreover, he can adjust the conditions such as the power to create the bending, curvature of the bending, speed and acceleration to create the bending. Thus, he can input a data in an analog fashion.

[0094] These information is detected by the electric signal transformation of the form change detection unit 30, and signal processing is carried out in a signal judging unit 130. As the result, information which the user inputted with the left hand is judged.

[0095] FIGS. 2A and 23 are schematic diagrams which illustrate the fundamental sectional structures of the display input devices of the embodiment. As shown in FIG. 2A, the form change detection unit 30 can be made to laminate to the back side of the display unit 20.

[0096] When reflective-liquid-crystal mode is adopted for the display unit 20, it becomes unnecessary for a form change detection unit 30 to have optical transparency. Therefore, the form change detection unit 30 can be formed by opaque materials.

[0097] On the other hand, as shown in FIG. 2B, the form change detection unit 30 may be laminated on the front side of the display unit 20. In this case, it is needed for the form change detection unit 30 to have predetermined transparency so that the display of the display unit 20 may not be interrupted.

[0098] FIG. 3 is a schematic diagram showing the principle for inputting data in an analog fashion in the embodiment. That is, this figure is a perspective diagram showing a corner of the display input device of the embodiment.

[0099] When bending is not added, the display input device (form change detection unit 30) shall be substantially in a flat state 30A. Then, a certain stress is added in a downward direction as shown by the arrow -a, a predetermined quantity of bending is added to form the state 30B. On the other hand, if a larger stress is added in a downward direction as shown by the arrow -b, a larger bending is added to form the state 30C. In the embodiment, analog-information can be input by using the deformation quantity of the bending, the area of the bending, of those products, for example.

[0100] On the other hand in the invention, analog input can also be possible according to the speed or acceleration of the bending, apart from the deformation quantity of the bending.

[0101] FIG. 4 is a schematic diagram showing the case where the bending is added to the initial state 30A to create the final state 30C. In this case, according to speed with which the bending is added, the amount of inputs of information can be changed. For example, when the bending is added slowly (arrow -b1), the amount of inputs can be made smaller and, when bending is added fast (arrow -b2), the amount of inputs can be made larger. Here, speed or acceleration of the bending can be determined by measuring the time dependence of the amount of the deformation.