BRAILLE MOUSE HAVING CHARACTER CODE MEMBER ACTUATED BY SINGLE SOLENOID

FIELD OF THE INVENTION

This invention relates to a mouse-like computer accessory which enables visually handicapped operators to read text on a computer screen in Braille format, and more particularly to a novel Braille displaying mechanism for such a device.

BACKGROUND OF THE INVENTION

Various method have been proposed for translating text on a computer screen into Braille symbols capable of being perceived by visually handicapped persons. Among such methods is the use of a mouse which can be used to move a cursor along text lines on a screen, and which contains a set of raisable pins that spell out in Braille the character at the cursor position. A problem with such mice is that they require a plurality of solenoids (usually six) to operate the Braille pins. As a result, such devices are cumbersome and expensive, consume substantial power, generate considerable heat in prolonged use, and present maintenance problems. Consequently, there is a need for a simple, inexpensive, compact and reliable mechanism for actuating the pins of a Braille mouse.

SUMMARY OF THE INVENTION

The invention fills the above-stated need by providing a movable character element bearing character indicia which, when pressed into engagement with appropriately configured Braille pins, cause a selected pin combination to be raised above the surface of the device under the control of a single solenoid. In one preferred embodiment of the invention, the character element may take the shape of a character disc with axial flexibility but radial integrity, using a coded wheel mechanism to circumferentially position the rim of the disc under the Braille pins, and using a single solenoid to push the disc into engagement with the pin.

In another preferred embodiment, the character element is a flexible endless belt carrying the character indicia. The single solenoid presses a selected section of the belt into engagement with the Braille pins.

In a third preferred embodiment of the invention, the character element is a hard wheel which carries the character indicia on its rim. The wheel is normally spring-biased against the Braille pins but is retracted away from them by the single solenoid while the wheel is rotated to another character position.

In a second aspect of the invention common to all three preferred embodiments, the size of the character element is minimized without loss of characters by encoding the character indicia in a linear pattern, and translating that pattern into the box pattern of the Braille alphabet by using eccentrically actuated push pins or fingers.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective outside view of the device of this invention;

FIG. **2** is a vertical section through a first embodiment of the device of FIG. **1** illustrating a disc-type actuating mechanism in accordance with this invention;

FIG. **3** is a generalized plan view of the character disc of FIG. **2**;

FIG. **3A** is a detail plan view of a portion of the character disc;

FIG. B is a detail sction along line **3B,C—3B,C** of FIG. **3A** illustrating a sub-embodiment in which the character indicia raise all except selected pins;

FIG. **3C** is a detail section along line **3B,C—3B,C** of FIG. **3A** illustrating another sub-embodiment in which the character indicia raise only selected pins;

FIG. **4** is a perspective view of a push pin used in the mouse of FIG. **1**;

FIG. **5** is an enlarged partial plan view of the Braille pin pad;

FIG. **6** is an enlarged assembled vertical section of the pin mechanism of FIG. **1**;

FIG. **6A** is an exploded detail view of the pin mechanism;

FIG. **7** is a side elevational view of a second embodiment illustrating a belt-type actuating mechanism;

FIG. **8** is an end elevational view of the embodiment of FIG. **7**;

FIG. **8A** is a section along line **8A** of FIG. **7**;

FIG. **9** is a side elevational view of a third embodiment illustrating a wheel-type actuating mechanism; and

FIG. **10** is an end elevational view of the embodiment of FIG. **9**.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In the following discussion, the device of this invention is described as a mouse, i.e. a device which conventionally uses a track ball to electronically move a cursor on a computer screen. It should be understood, however, that the invention may equally be embodied, with the same advantages, in a stationary mouse-like accessory used in connjunction with a keyboard or other apparatus which allows moving the cursor position independently of the inventive device.

FIG. **1** illustrates the Braille mouse **10** of this invention from the user's perspective. Preferably, the mouse **10** is grasped between the thumb and little finger, with the index finger resting on the line-up button **16**, the middle finger resting on the Braille pad **14**, and the ring finger resting on the line-down button **12** (as explained below, the mouse **10** can move the cursor only horizontally). As the mouse **10** is moved from side to side to scan a line of text on a computer screen (not shown), the pins **18** on the Braille pad **14** at any given time spell out the character which appears at the cursor location at that time.

A first preferred mechanism which accomplishes the foregoing objective is shown in FIG. **2**. The movement of the mouse **10** is conventionally sensed by the track ball **20** and is translated by conventional sensor electronics **22** into cursor positioning coordinate changes which are transmitted to the computer. To prevent unintended line changes, the vertical motion sensor in electronics **22** is physically or electronically disables in the mouse **10** when the mouse **10** is used as a Braille mouse. In that mode, buttons **12** and **16** are used to convey vertical positioning information to the computer. Alternatively, in a track ball-less embodiment of the invention, the cursor position coordinates may be changed by, e.g., keystrokes on a keyboard.

The identity of the character at the cursor position is conveyed to the mouse **10** by conventionally designed electronics in the computer (not shown), whose nature depends upon the type of computer involved and is not