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(54) **REFRESHABLE BRAILLE DISPLAY SYSTEM WITH A FLEXIBLE SURFACE**

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(58) **Field of Search** 434/112, 113, 434/114, 115, 116, 117; 340/407.1, 407.2

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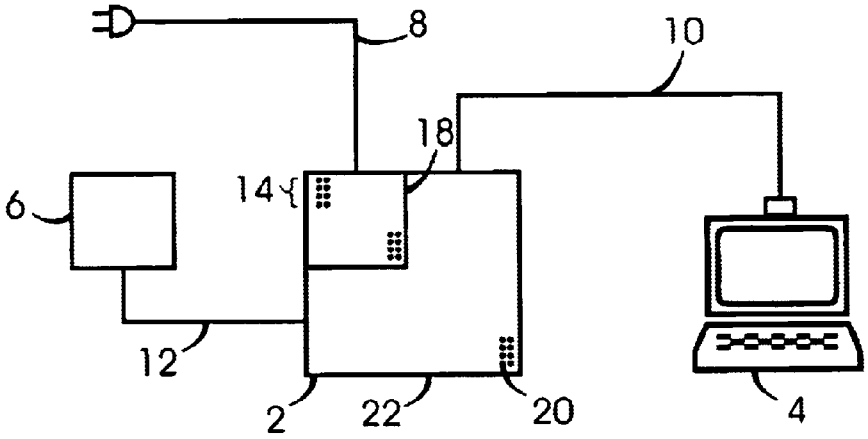
(57) **ABSTRACT**

The present invention is further directed to a refreshable display system with a flexible surface, with one application being a refreshable Braille display systems for use as a monitor for computer systems.

In one embodiment, the present invention is a refreshable Braille display system or a module from such a system comprising a) a plurality of microelectromechanical valves having a top surface and a bottom surface, each microelectromechanical valves having an opening or positioned in line with an opening, each of which represents a Braille dot and each opening arranged in a pattern of Braille cells with the Braille cells forming a Braille display; and b) an elastomeric polymer having a upper and a lower surface, the lower surface of the elastomeric polymer being sealed about each openings which represent the Braille dots; wherein during operation of the display system the upper surface of the elastomeric polymer forms a plurality of Braille dots which are extended and retracted based upon the operation of each of the electromechanical valves. In other embodiments, the refreshable Braille display system uses microelectromechanical piezoelectric devices or microelectromechanical shape memory alloy actuated devices in place of the microelectromechanical valves.

16 Claims, 12 Drawing Sheets