

What is claimed is:

1. A braille graphics cell module comprising:

- a unit substrate;
- a braille graphics display section which is extended along an upper edge of the unit substrate and holds a plurality of tactile pins movably in a vertical direction, the plurality of tactile pins displaying braille graphics;
- a plurality of piezoelectric element pieces each having a fixed end and a free end and arranged on a surface of the unit substrate in association with the plurality of tactile pins, the plurality of piezoelectric element pieces moving the corresponding tactile pins in the vertical direction at the free end by bending action; and

wiring means arranged at a lower end of the unit substrate so that an upper edge of the wiring means is located close to a node portion of each piezoelectric element piece for a bending operation and a lower edge of the wiring means is located close to the fixed end of the piezoelectric element piece, and having an electric circuit in which the fixed ends of the plurality of piezoelectric element pieces are electrically connected to the wiring means.

2. The braille graphics cell module according to claim 1, wherein the unit substrate has at least one concave portion and at least one convex portion provided corresponding to the concave portion, the concave and convex portions being used to position a plurality of unit substrates when bases thereof are connected together.

3. The braille graphics cell module according to claim 1, wherein the unit substrate comprises a plurality of unit substrates, and the plurality of unit substrates are connected together to constitute a braille graphics apparatus.

4. A braille graphics cell module comprising:

- a unit substrate;
- a braille graphics display section which is extended along an upper edge of the unit substrate and holds a plurality of tactile pins movably in a vertical direction, the plurality of tactile pins displaying braille graphics;
- a plurality of piezoelectric element pieces each having a fixed end and a free end and arranged on a surface of the unit substrate in association with the plurality of

tactile pins, the plurality of piezoelectric element pieces being bent; and

pushup cams each provided pivotably between the corresponding piezoelectric element piece and tactile pin and each having a first action piece which contacts against the free end of the piezoelectric element and a second action piece having a placement surface on which a lower end of the tactile pin is placed, the pushup cams each being formed to have an obtuse angle between the first action piece and the second action piece, the pushup cams each being pivoted when the first action piece is pushed by the free end of the bent piezoelectric element piece, to push up the tactile pin placed on the second action piece.

5. The braille graphics cell module according to claim 4, further comprising wiring means arranged at a lower end of the unit substrate so that an upper edge of the wiring means is located close to a node portion of each piezoelectric element piece for a bending operation and a lower edge of the wiring means is located close to the fixed end of the piezoelectric element piece, and having an electric circuit in which the fixed ends of the plurality of piezoelectric element pieces are electrically connected to the wiring means.

6. The braille graphics cell module according to claim 4, wherein the unit substrate has at least one concave portion and at least one convex portion provided corresponding to the concave portion, the concave and convex portions being used to position a plurality of unit substrates when bases thereof are connected together.

7. The braille graphics cell module according to claim 4, wherein the unit substrate comprises a plurality of unit substrates, and the plurality of unit substrates are connected together to constitute a braille graphics apparatus.

8. A braille graphics apparatus comprising a plurality of braille graphics cell modules according to claim 1, wherein a display screen of a predetermined size is formed to display graphical information.

9. A braille graphics apparatus comprising a plurality of braille graphics cell modules according to claim 4, wherein a display screen of a predetermined size is formed to display graphical information.

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