

**18.** A haptic display apparatus having a vibration isolating structure, comprising:

- a display part;
- a housing supporting the display part at an upper position and defining an appearance;
- a support portion protruding towards an interior of the housing; and
- a piezoelectric beam vibrator taking a shape of a long rectangular plate, supported at an end thereof by the support portion, and disposed such that an upper surface of the piezoelectric beam vibrator is spaced apart from a lower surface of the display part, a predetermined portion of the piezoelectric beam vibrator being connected to the lower surface of the display part.

**19.** The haptic display apparatus as set forth in claim **18**, wherein

- the display part takes a shape of a rectangle that is long in a vertical length, and
- the support portion is disposed under a corner of the display part.

**20.** The haptic display apparatus as set forth in claim **19**, wherein

- the piezoelectric beam vibrator comprises four piezoelectric beam vibrators that are parallelly arranged on respective edges of the display part.

**21.** The haptic display apparatus as set forth in claim **18**, wherein one end of the piezoelectric beam vibrator is fixedly supported on the support portion, and the other end is connected to an edge of the display part.

**22.** The haptic display apparatus as set forth in claim **18**, wherein both ends of the piezoelectric beam vibrator are fixedly supported on the support portion, and a central portion is connected to an edge of the display part.

**23.** The haptic display apparatus as set forth in claim **21**, further comprising:

- a connection member connecting a lower surface of the edge of the display to an upper surface of the piezoelectric beam vibrator, and transmitting vertical vibration from the piezoelectric beam vibrator to the display part.

**24.** The haptic display apparatus as set forth in claim **18**, wherein a side of the vibrator is spaced apart from an inner wall of the housing.

**25.** The haptic display apparatus as set forth in claim **18**, further comprising:

- an isolating material provided on a contact portion between the support portion and an end of the piezoelectric beam vibrator, thus preventing vibration from being transmitted to the housing of the piezoelectric beam vibrator.

**26.** The haptic display apparatus as set forth in claim **20**, wherein

- the support portion is disposed under each of corners of the display part, and
- a vertical length of the support portion is greater than a lateral length thereof.

**27.** The haptic display apparatus as set forth in claim **26**, wherein the piezoelectric beam vibrators have the same length.

**28.** The haptic display apparatus as set forth in claim **21**, wherein a vibrating position may be controlled from a portion having the piezoelectric beam vibrator to a central portion of the display part, by adjusting a frequency of voltage applied to the piezoelectric beam vibrator in a domain less than a primary resonant frequency of the display part.

**29.** A haptic display apparatus having a vibration isolating structure, comprising:

- a display part;
- a plurality of piezoelectric beam vibrators disposed under edges of the vibration display part; and
- a housing supporting ends of the piezoelectric beam vibrators, each of the piezoelectric beam vibrators being adjacent to an inner wall of the housing to be parallel to the inner wall,

wherein each of the piezoelectric beam vibrators is spaced apart from the inner wall of the housing.

**30.** The haptic display apparatus as set forth in claim **29**, wherein both ends of each of the piezoelectric beam vibrators are supported on corners of the inner wall of the housing.

**31.** The haptic display apparatus as set forth in claim **30**, wherein an upper surface of each of the piezoelectric beam vibrators is disposed to be spaced apart from a lower surface of the display part, and

the haptic display apparatus further comprising a connection member for connecting a central portion of each of the piezoelectric beam vibrators to a central portion of each of the edges of the display part.

**32.** The haptic display apparatus as set forth in claim **30**, further comprising:

- an isolating material disposed on a contact portion between each of both ends of each of the piezoelectric beam vibrators and each of the corners, thus preventing vibration from being transmitted from each of the piezoelectric beam vibrators to the housing.

**33.** The haptic display apparatus as set forth in claim **30**, wherein the piezoelectric beam vibrators have the same length.

**34.** A haptic display apparatus having a plurality of excitation points, comprising:

- a housing;
- a display part defining an upper surface of the housing, forming an image, and receiving input through touch; and
- a plurality of piezoelectric beam vibrators, each of the piezoelectric beam vibrators taking a shape of a long rectangular plate and being connected at a predetermined portion to a lower surface of each of edges of the display part.

**35.** The haptic display apparatus as set forth in claim **34**, wherein each of the piezoelectric beam vibrators is disposed on a lower surface of the display part to be parallel to each of the edges.

**36.** The haptic display apparatus as set forth in claim **35**, wherein the piezoelectric beam vibrators include three or more piezoelectric beam vibrators arranged along the edges of the display part.

**37.** The haptic display apparatus as set forth in claim **34**, wherein

the display part takes a shape of a rectangular flat plate, and the piezoelectric beam vibrators comprise four piezoelectric beam vibrators arranged along the edges of the display part.

**38.** The haptic display apparatus as set forth in claim **37**, wherein

the display part and the piezoelectric beam vibrators are connected to each other at centers of the respective edges.

**39.** The haptic display apparatus as set forth in claim **34**, further comprising: