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**Iizuka et al.**

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(54) **PIEZOELECTRIC VIBRATION DEVICE**

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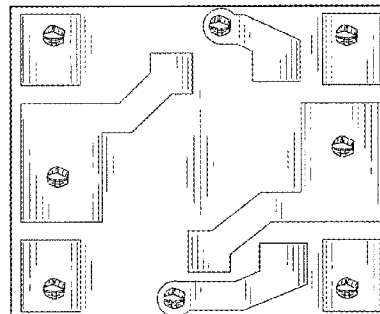
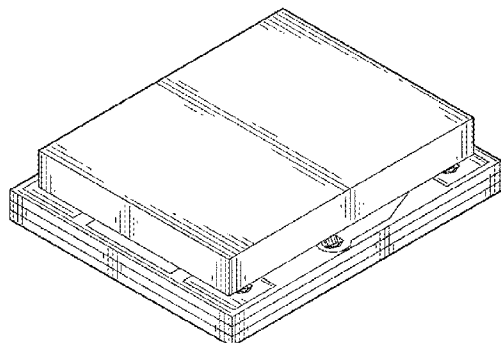
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(52) **U.S. Cl.**  
USPC ..... **D14/435**; D13/184

(58) **Field of Classification Search**  
USPC ..... 2/DIG. 6; 5/417, 419–420, 465, 5/632–634; 108/43; 248/118, 118.1, 248/118.3, 118.5, 205.2, 346, 346.01, 248/346.07, 346.1, 438, 633, 918; 273/338, 273/438, DIG. 30; 297/218.1, 228.12, 352, 297/377, 440.1, 440.11, 440.15, 452.1, 297/452.16; 312/208.1–208.4, 223.2, 322; 340/710; 345/163, 173; 360/69, 97.02; 361/679.33–679.45, 760–767, 361/777–785, 790; 400/412, 713–715; 428/137–138, 140, 304.4, 457; 442/9; D3/273; D6/201, 204, 429–431, 449, D6/474, 509–510; D9/432; D10/65, 75, D10/78; D13/103, 119, 162, 184, 199, 182; D14/110, 114, 125, 240, 242, 299–302, D14/314, 348–370, 435–438, 496, D14/478–480; D18/1, 7, 9, 11; 29/25.35, 29/594, 840, 860; 216/33; 310/344, 348, 310/370, 311–343, 349–369, 371; 331/68,

331/23, 26, 33, 34, 37–41, 44, 46–55, 60, 331/72, 73–77, 78, 88–90, 107 R, 109, 331/113 R, 116 R, 116 M, 139, 143–145, 331/154–165, 172, 175, 176, 187; 333/160, 333/203–212, 219, 219.1, 222, 223–240, 333/245–248  
CPC ..... G06K 19/06196; G06K 19/072; G06K 19/0721; G06K 19/0722; G06K 19/0723; G06K 19/0724; G06K 19/0725; G06K 19/0726; G06K 19/0727; G06K 19/0728; G06K 19/073; G06K 19/07309; G06K 19/077; G06K 19/07701; G06K 19/07715; G06K 19/0772; G06K 19/07724; G06K 19/07726; G06K 19/07728; G06F 21/77–21/80; G06F 21/85–21/88; G06F 21/00; G06Q 20/3229; G06Q 20/34; G06Q 20/341; G06Q 20/346; G06Q 20/349; G06Q 20/3563; G06Q 20/3567; G06Q 20/357; G06Q 20/3576; H05K 5/026; H05K 5/0256; H05K 5/0265; H05K 5/0269; H05K 5/0273; H05K 5/0278; H05K 5/0282; H05K 5/0286; H05K 5/0291; H05K 5/0295; H05K 5/03; H05K 5/04; H05K 5/06; H05K 5/061; H05K 5/062; H05K 5/063; H05K 5/064; H05K 5/065; H05K 5/066; H05K 5/067; H05K 5/068; H05K 5/069; H05K 7/00; H05K 7/005; H05K 7/02; H05K 7/023; H05K 7/026; H05K 7/04; H05K 7/10; H05K 7/1418; H05K 7/142; H05K 7/1427–7/1439; H05K 7/1461; H05K 7/1464–7/1474; H05K 7/1479; H05K 7/1481; H05K 7/1485–7/1488; H05K 2201/09745; H05K 2201/09754; H05K 2201/09763; H05K 2201/09772; H05K 2201/098; H05K 2201/09818; H05K 2201/10; H05K 2201/10007; H04N 2201/216; H01L 2924/09701; H01L 2924/00014; H01L 2924/3025; H01L 2924/00; H01L 2224/48091; H01L 2224/48227; H01L 2224/73265; H03H 9/1021; H03H 9/0547; H03H 9/21; H03H 9/215; H03H 9/1014; H03H 9/1035; H03H 9/19; H03H 9/0542; H03H 9/0552; H03H 9/17; H03H 9/0509; H03H 9/08; H03H 9/1071; H03H 9/059; H03H 9/02984; H03H 9/02897; H03H 9/15; H03H 9/172; H03H



9/173; H03H 3/02; H03B 5/04; H03B 5/32;  
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 H03D 1/22; H03D 1/2218; H03D 3/00;  
 H03D 3/001-3/005; H03D 3/12-3/16; H03D  
 3/34; H03D 5/00; H03D 7/005; H03D 7/02;  
 H03D 7/12; H03D 7/14; H03D 7/165; H03D  
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 19/02; H03K 19/084; H03K 19/195; H03K  
 21/00; H03K 21/16; H03K 2217/009; H03K  
 2217/94; H03K 2217/94005; H03K  
 2217/94078; H03K 2217/960775

See application file for complete search history.

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Primary Examiner — Susan Moon Lee  
(74) Attorney, Agent, or Firm — Brinks Gilson & Lione

(57) **CLAIM**  
We claim the ornamental design for a piezoelectric vibration device, as shown and described.

**DESCRIPTION**

FIG. 1 is a top perspective view of a first embodiment of a piezoelectric vibration device of the present invention;  
FIG. 2 is a top view thereof;  
FIG. 3 is a bottom view thereof;  
FIG. 4 is a front view thereof;  
FIG. 5 is a rear view thereof;  
FIG. 6 is a first side view thereof;  
FIG. 7 is a second side view thereof;  
FIG. 8 is a top view of the piezoelectric vibration device of FIG. 1, shown with the upper IC component and connecting bumps removed;  
FIG. 9 is a cross-section view of the piezoelectric vibration device taken along line 9-9 of FIG. 3;  
FIG. 10 is a cross-section view of the piezoelectric vibration device taken along line 10-10 of FIG. 3; and,  
FIG. 11 is a cross-section view of the piezoelectric vibration device taken along line 11-11 of FIG. 3.

**1 Claim, 6 Drawing Sheets**

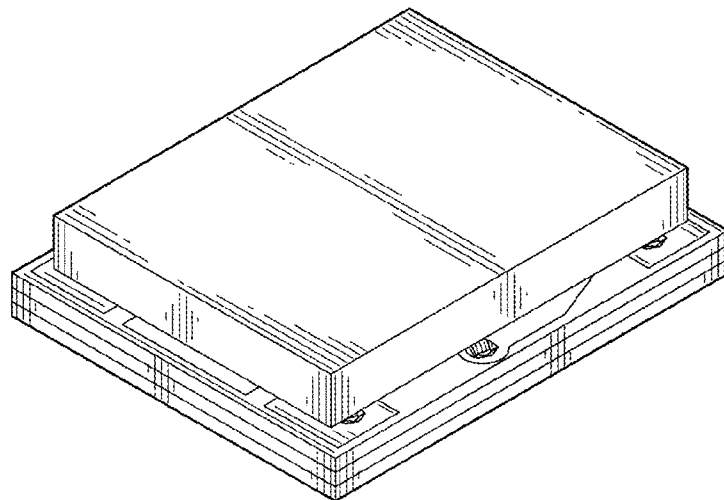


FIG. 1

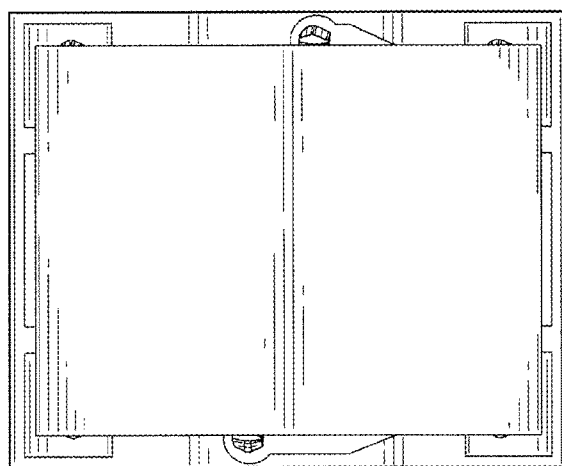


FIG. 2

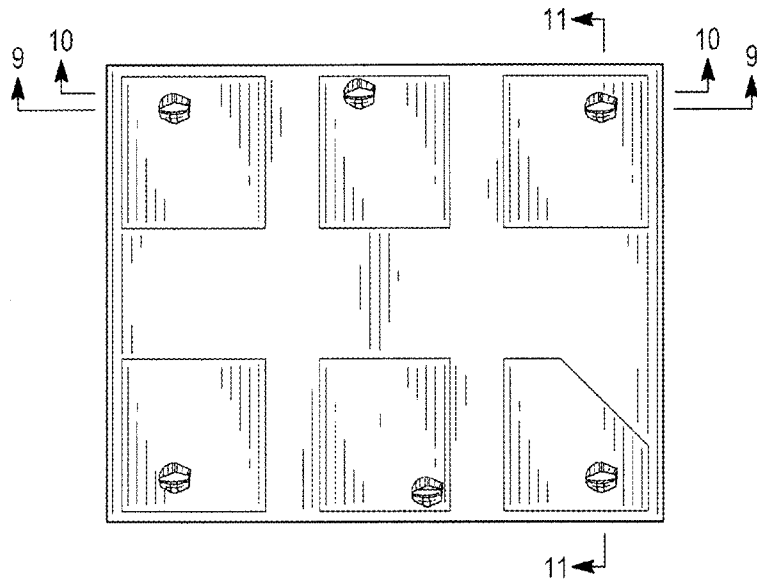


FIG. 3

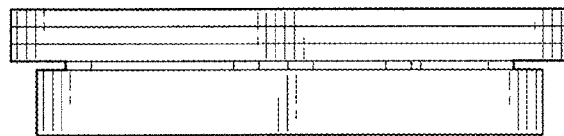


FIG. 4

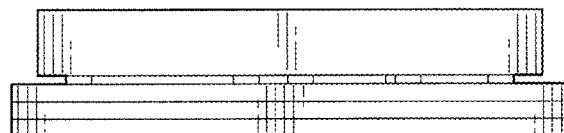


FIG. 5

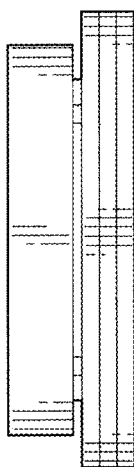


FIG. 6

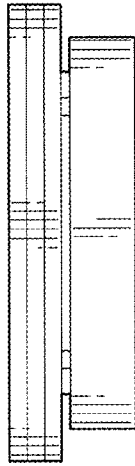


FIG. 7

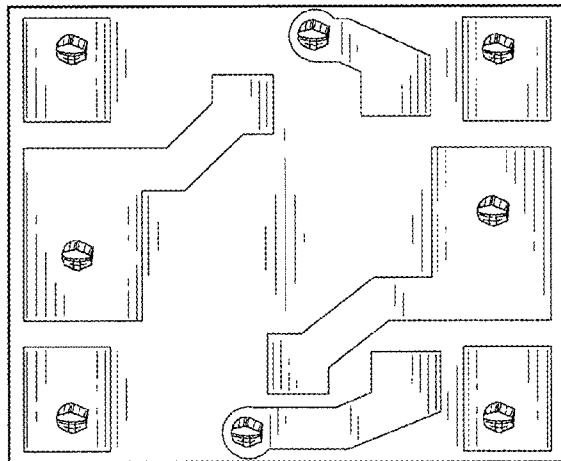


FIG. 8

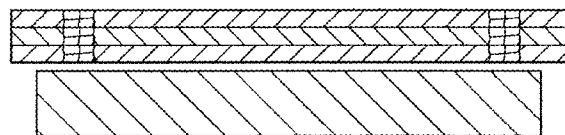


FIG. 9

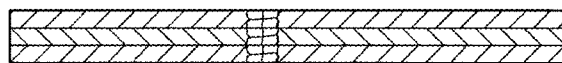


FIG. 10



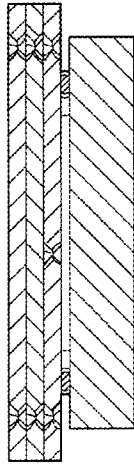


FIG. 11