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(54) **LINEAR VIBRATION MODULES AND
LINEAR-RESONANT VIBRATION MODULES**

Publication Classification

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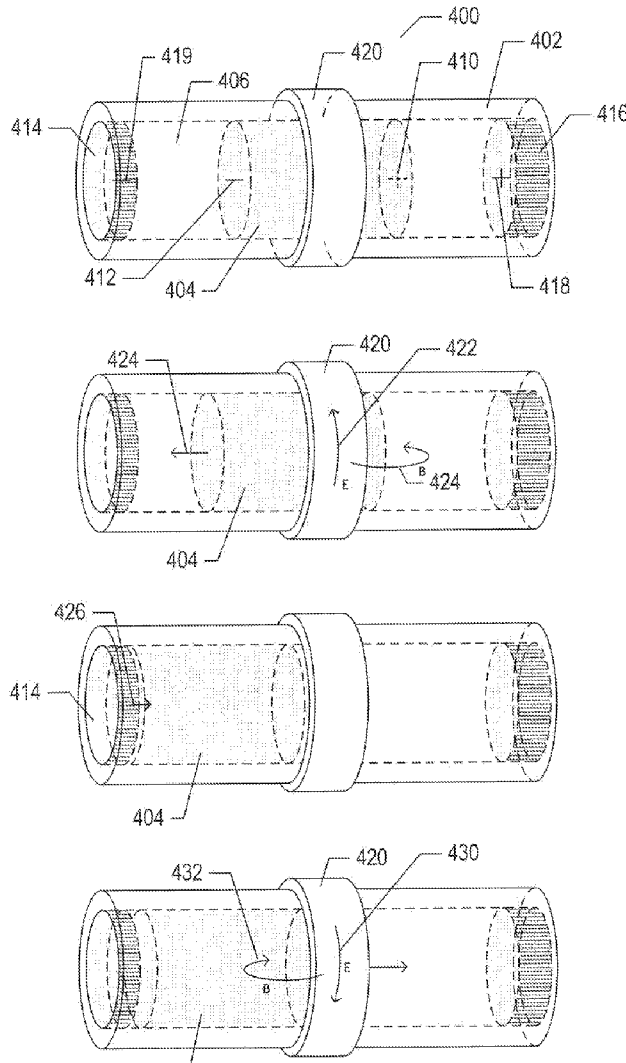
(57) **ABSTRACT**

The current application is directed to various types of linear vibrational modules, including linear-resonant vibration modules, that can be incorporated in a wide variety of appliances, devices, and systems to provide vibrational forces. The vibrational forces are produced by linear oscillation of a weight or member, in turn produced by rapidly alternating the polarity of one or more driving electromagnets. Feedback control is used to maintain the vibrational frequency of linear-resonant vibration module at or near the resonant frequency for the linear-resonant vibration module. Both linear vibration modules and linear-resonant vibration modules can be designed to produce vibrational amplitude/frequency combinations throughout a large region of amplitude/frequency space.

Related U.S. Application Data

(63) Continuation-in-part of application No. 12/782,697, filed on May 18, 2010, now Pat. No. 8,093,767.

(60) Provisional application No. 61/179,109, filed on May 18, 2009.



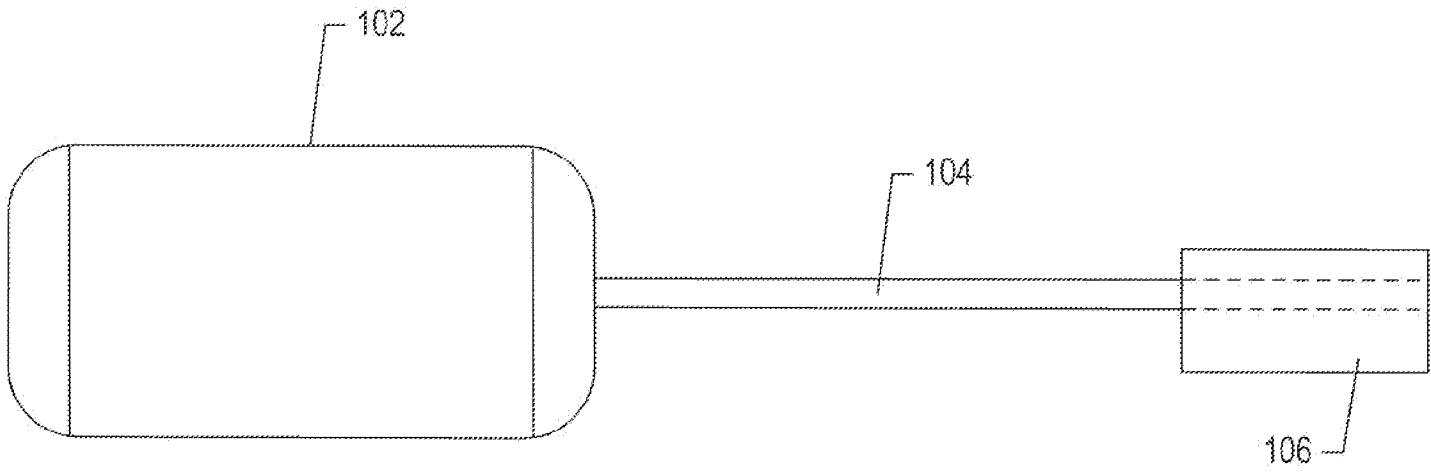


FIG. 1A
--Prior Art--

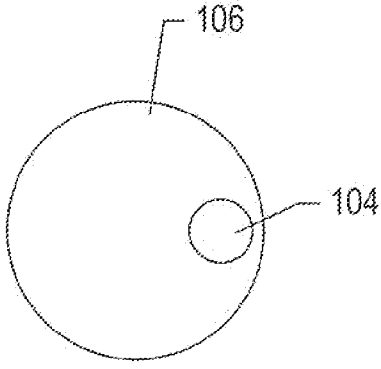


FIG. 1B
--Prior Art--

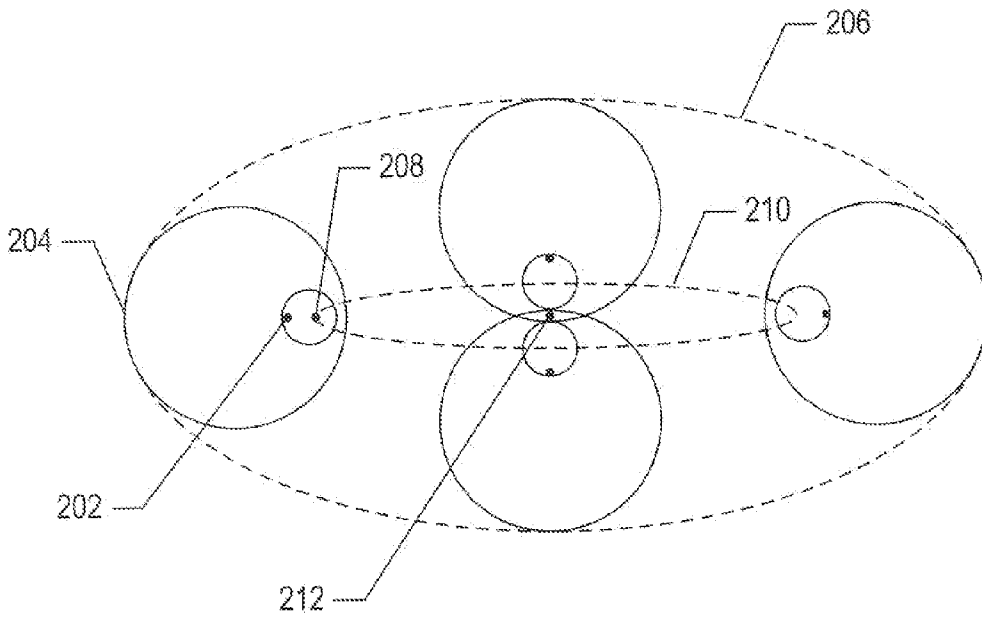


FIG. 2A

--Prior Art--

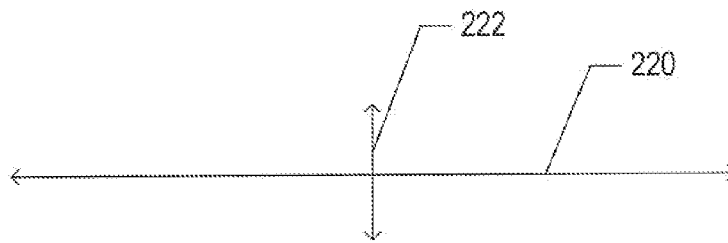


FIG. 2B

--Prior Art--

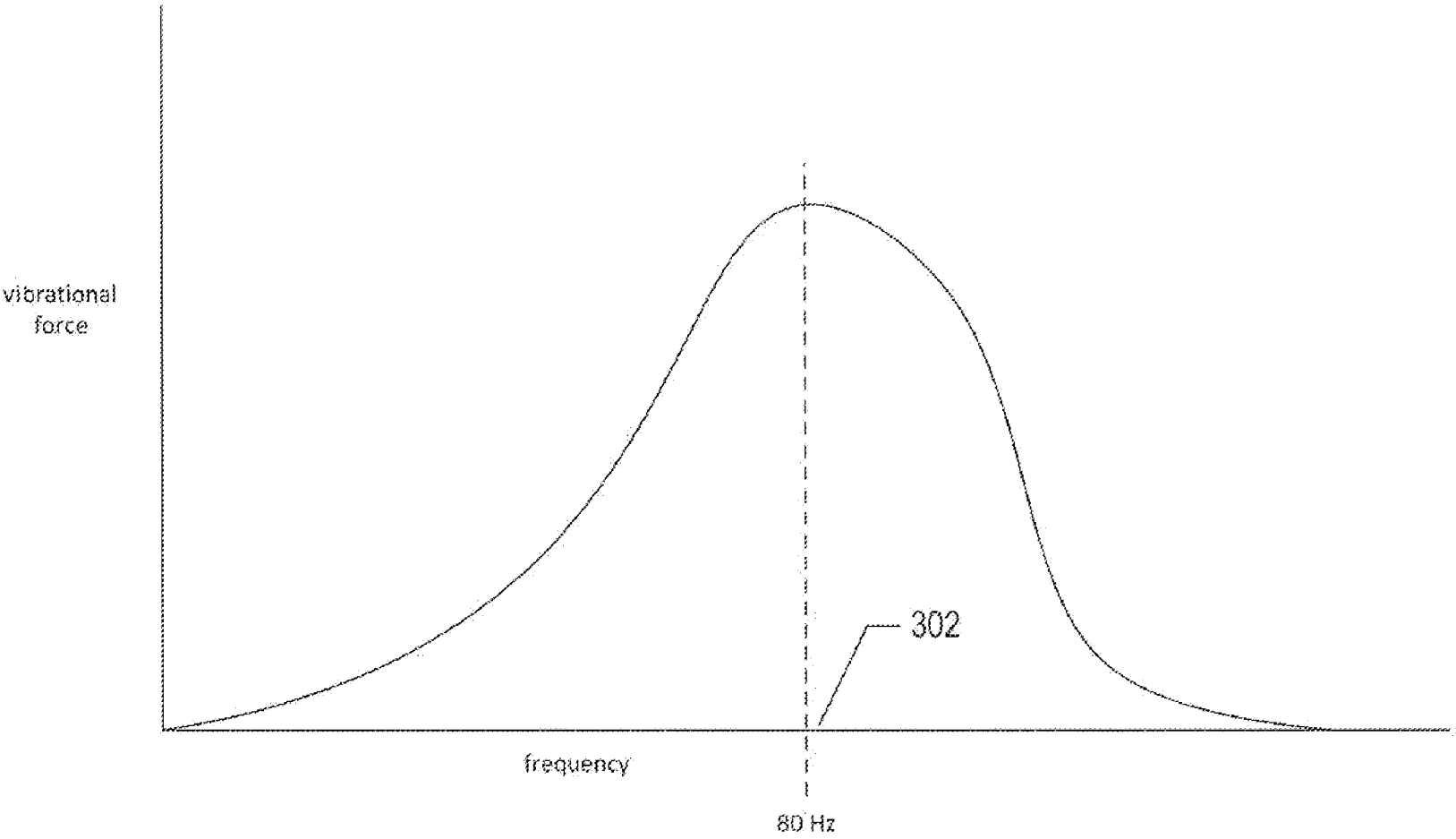
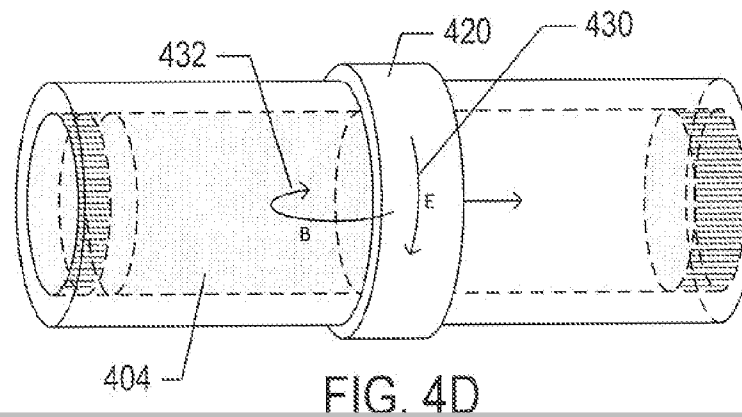
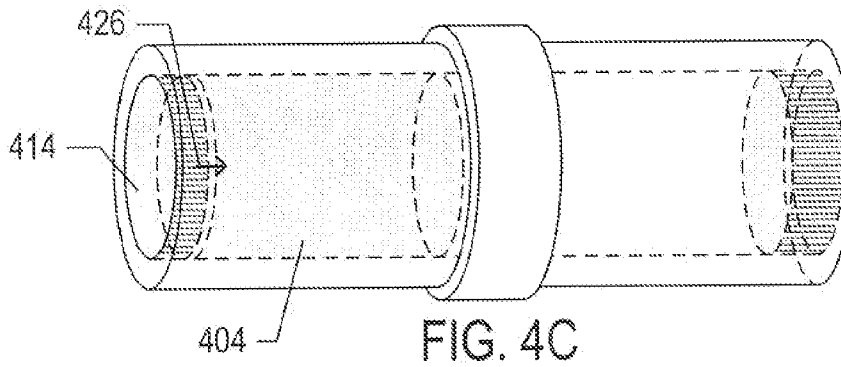
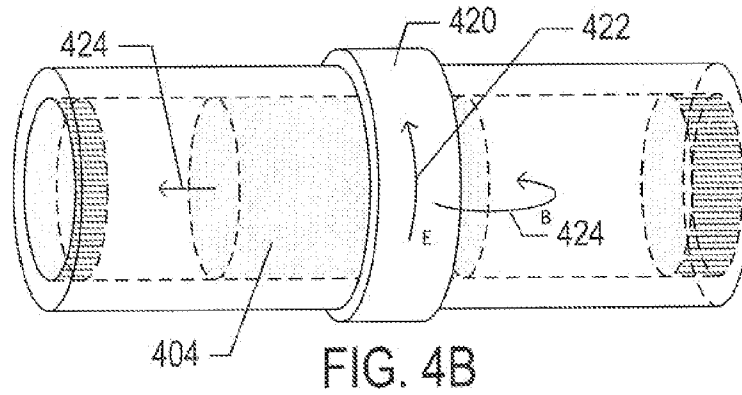
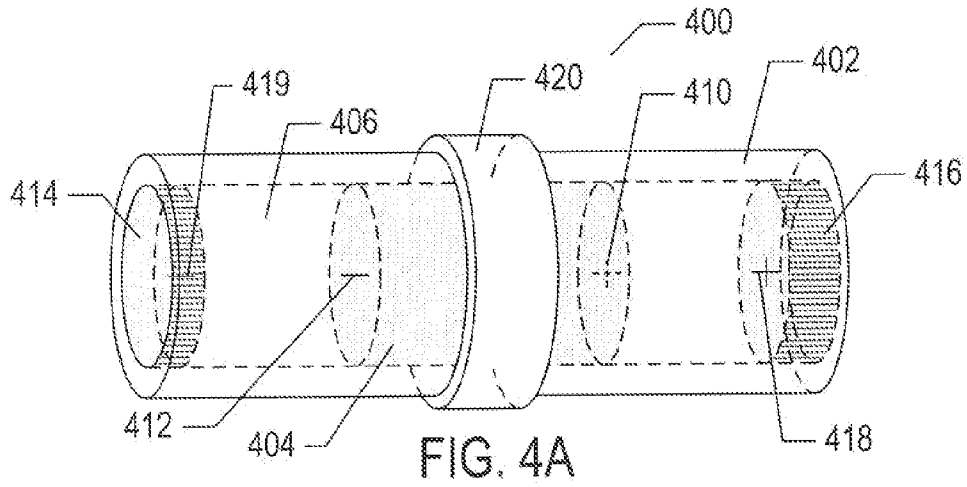


FIG. 3
--Prior Art--



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