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Harmonic Chime Design

Optimized beam and tube designs that produce true harmonic overtones for improved sound quality in instruments and clocks.

Current designs of grandfather clock chimes and musical chimes are tuned to a primary note that produces inharmonic frequencies. It is highly desirable for instruments to produce harmonics, because inharmonic tones in the spectrum of a chime are perceived as dissonant to the listener. Researchers at Purdue University have created a design that enables chimes to produce frequencies that are elements of a harmonic series. This technology utilized structural optimization to tune beams and tubes by treating it as an inverse spectral problem. An important secondary feature is that it allows the designer to select a desired fundamental frequency.

Technology Validation:

Accelerometer measurements of the frequencies of this bar when energized validated the expected frequencies, creating an octave harmonic series.

Advantages:

-Harmonic frequencies

-Able to select a desired fundamental frequency

-Application to different types of tubes and beams

Applications:

-Clock

-Musical instruments

-Sound quality

TRL: 4

Intellectual Property:

Technology ID
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Category
Digital Health &
Medtech/Assistive & Diagnostic
Audio Technologies

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