



Modified Newton's Cradle Demonstrating Mechanical Impedance

WiSys: T170047US02

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WiSys is seeking a strategic industry partner for further development, manufacturing, sales, and distribution of this device, which allows the user to visualize and better understand the physical concepts of mechanical impedance, momentum, and energy conservation.

Overview

While the classic device known as Newton's Cradle can often be found on office desks around the world, its practical uses go beyond that of imparting a calming effect on a stressed worker. In the classroom, this device can be used by educators to demonstrate the principles behind momentum and the conservation of energy. Traditionally, a user pulls back one of the metal spheres to a desired height before releasing it. As the sphere swings back to its starting position, it impacts the cradle (row of spheres) conserving and transferring the energy through the group and sending the opposite sphere to swing upwards matching the starting height where the original sphere was released. While useful in demonstrating these principles, the classic Newton's Cradle does not allow the instructor to show the effects of mechanical impedance.

The Invention

A Physics professor and inventor at the University of Wisconsin – Whitewater has developed a modified Newton's Cradle that allows the user to visualize and test the concept of mechanical impedance in addition to momentum and energy conservation. The traditional version of Newton's cradle has a cradle of identical metal spheres. In this modified and improved device, the user is able to interchange these spheres with ones of varying mass and material composition. By allowing the user to strategically align and create a unique cradle, they have the opportunity to visualize mechanical impedance. For example, a sphere with a small mass would have the ability to strike the cradle and lift a sphere of greater mass on the opposite side if the spheres in-between had a gradient of increasing mass themselves. The possibility of changing a sphere at any position in the cradle allows for an exceptionally large number of possible experiments and would overall lead to an enhanced understanding of the aforementioned physics concepts, something a traditional cradle device does not provide for.

Applications

Allows user to visually understand the concepts of mechanical impedance, momentum, and the conservation of energy.

Key Benefits

- Easily interchange the spheres at all hanging positions on the device.
- The attached spheres can have varying masses and/or be composed of different materials.
- Useful for students in middle school all the way through college.

Stage of Development

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The device has been prototyped and tested for use with spheres of different masses and material composition. Further development will optimize the design of this device.

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Tech Fields

- [Education & Training : Professional](#)

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