Multi Axial Motion Unifying Gear Arrangement to Capture Wave and Other Random Run Away Energy

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Wave energy conversion devices absorb the forces associated with surge, roll, heave, pitch, sway and yaw motions of the ocean. Globally there are few devices that are being tested: point absorbers, attenuators, overtopping devices and the oscillating water columns. None of these can absorb all the wave motions in all directions. When a wave attempts to move the float or buoy of a device in a direction that cannot be absorbed, the device has to hold the float stationary and withstand the force with its structural strength. This shortcoming reduces energy conversion efficiency and requires a design with superior structural strength. This project, involving a novel concept for a wave energy conversion device, eliminates this shortcoming by a. allowing the capture and conversion of all wave motions that occur in all directions into unidirectional rotation b. eliminating the need to hold the float or buoy stationary with its structural strength as there are no un-captured motions. This feature allows a reduced size and strength requirement resulting in a more compact and cost effective design. A prototype gear arrangement was fabricated to prove the veracity of the concept. Sea trials were conducted to convert wave energy to electrical energy. In addition to wave energy conversion, this device has potential for other applications wherever chaotic or irregular multidimensional motions are involved. For example the vibrations of a railway track or a bridge, the relative motion between adjacent railway compartments and the motion of a suspended mass in a moving vehicle or in a bobbing boat can be effectively converted to a unidirectional rotation of a shaft.

Awards Won:

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