

A SYSTEM FOR HARNESSING WAVE ENERGY

IITM Technology Available for Licensing

Problem Statement

- Conventional wave energy converters face challenges in efficiently harnessing wave energy due to sensitivity to wave direction and irregular wave conditions, requiring a robust and flexible technology.
- A directional, insensitive, and mobile wave energy converter system that can effectively harness wave energy irrespective of wave direction, while being easy to fabricate, install, maintain, and transmit electricity with minimal loss.

Technology Category/ Market

Category – Renewable Energy Technology

Applications -Sustainable Energy, Electricity Generation

Industry - Renewable Energy, Marine Energy Sector, Offshore Engineering

Market – Renewable Energy Market size was valued at USD 769.9 Billion in 2021 and is poised to grow from USD 899.24 Billion in 2022 to USD 3114.73 Billion by 2030, at a CAGR of 16.8% during the forecast period (2023-2030).

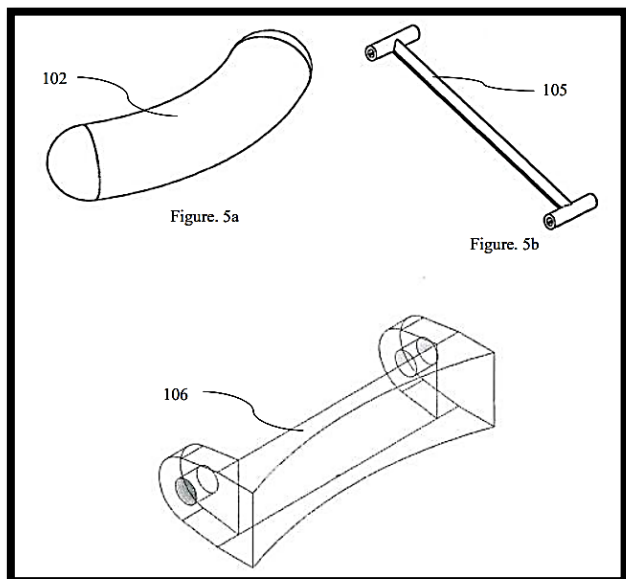


FIG. 5a, 5b, and 5c respectively depict the float, frame, and hinge joint used to connect floats with the buoy in the described embodiment.

Technology

Bean-shaped floats:

Designed to oscillate in response to incident waves, enabling efficient energy capture.

Hinge-joint connections:

Facilitate free movement of floats around the buoy, ensuring adaptability to wave direction.

Hydraulic piston-cylinder arrangement:

Converts mechanical motion of floats into pressurized hydraulic fluid.

Gearbox arrangement:

Transforms hydraulic pressure into rotational motion to drive an electric generator.

Heave plate:

Enhances system stability and efficiency by mitigating the effects of wave motion on the buoy.

Intellectual Property

- IITM IDF Ref. 1975
- IN 480184 (Patent Granted)
- PCT/IB2021/050992

TRL (Technology Readiness Level)

TRL- 4, Technology validated in lab

Research Lab

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Key Features / Value Proposition

User Perspective:

- Provides a **reliable and sustainable source of electricity generation** by harnessing abundant ocean wave energy.
- Offers a solution that is **environmentally friendly, economically viable, and adaptable to varying sea conditions.**

Technical Perspective:

- Utilizes a **novel design with bean-shaped floats and hinge-joint connections** to ensure efficient energy capture from waves.
- Implements **hydraulic and gearbox systems** to efficiently convert **mechanical wave motion into electrical power**, overcoming traditional limitations of wave energy converters.

Image

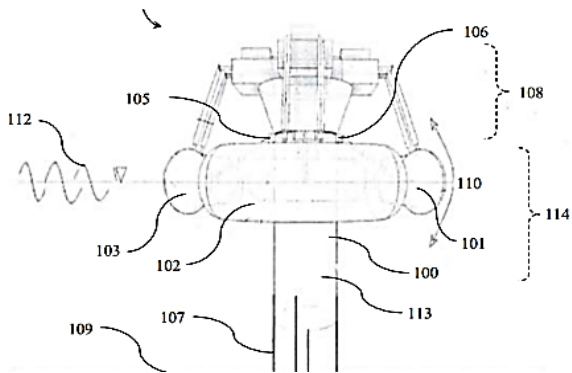


FIG. 1 depicts a schematic front view of a wave energy harnessing system comprising a buoy, multiple floats, and a power take-off unit.

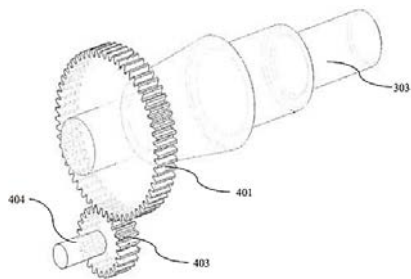


Figure. 4

FIG. 4 shows a perspective view of the gearbox arrangement within the power take-off unit as per the described embodiment.

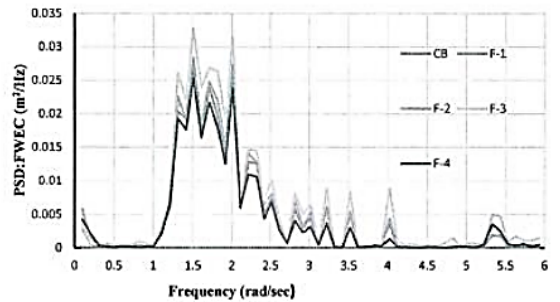


Figure. 6a

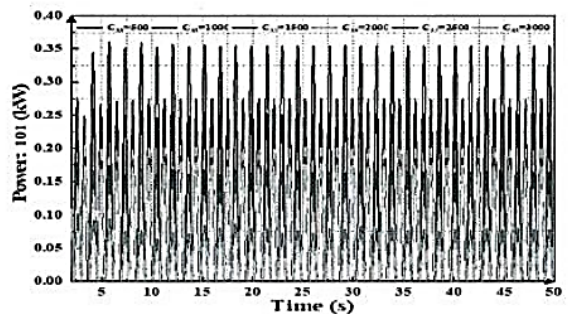


Figure. 6b

FIG. 6a and 6b display performance curves numerically computed to represent the energy trapping capabilities of the system in the described embodiment.

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