

A SYSTEM AND METHOD FOR A HYDRAULIC FLOW DIVIDER

IITM Technology Available for Licensing

Problem Statement

- Hydraulic systems face challenges in synchronizing the extension of different loads, such as piston rods, when subjected to varying pressures.
- Flow dividers are commonly used to split hydraulic flow into two circuits, typically with a 50:50 flow ratio, but there are limitations in achieving different flow ratios.
- Existing systems have used uniform auxetic structures for suction and discharge strokes in positive displacement pumps, but they may not address the flow division issue.
- Therefore, there is a need for a **reliable system and method that utilizes graded auxetic structures** to create dissimilar suction volumes on both sides of the structure.

Intellectual Property

- IITM IDF Ref. 2406
- IN 438019 - Patent Granted

Technology Category/ Market

Category-Hydraulic Systems & Fluid Control Applications- Hydraulic Machinery

Industry- Heavy Machinery & Construction, Industrial Automation.

Market - Global hydraulic equipment market industry is projected to grow from USD 48 Billion in 2023 to USD 97 Billion by 2032 with a CAGR of 9.1%.

TRL (Technology Readiness Level)

TRL - 4: Technology validated in lab scale.

Research Lab

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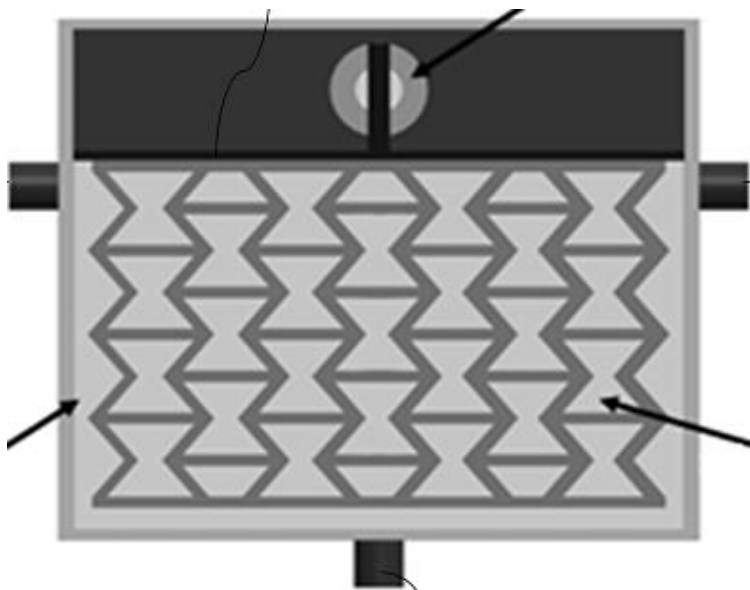


FIG. 1. Depicts/illustrates a front view of the hydraulic flow divider.

Technology

- The present invention relates to a **system and method for hydraulic flow dividers** with graded auxetic structures to create dissimilar suction and discharge volumes.
- System Components:** The system comprises a housing with suction and discharge valves, a graded auxetic structure, a motor, a loading plate, a crank, and a hub.
- Functional Innovation:** The motor compresses the graded auxetic structure to create suction and then decompresses it to achieve dissimilar fluid flow through multiple discharge valves.
- Variable Flow Control:** The graded auxetic structure is designed to expand during a tensile stroke and contract during a compression stroke, allowing for precise control of fluid flow.

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Technology Contd.

- **Multi-Purpose Use:** This system serves multiple functions as a pump, flow divider, and mixer, enhancing its versatility in hydraulic applications.
- **Material Flexibility:** The graded auxetic structure can be made from materials like thermoplastic polyurethane or rubber, providing flexibility in material selection for specific needs.

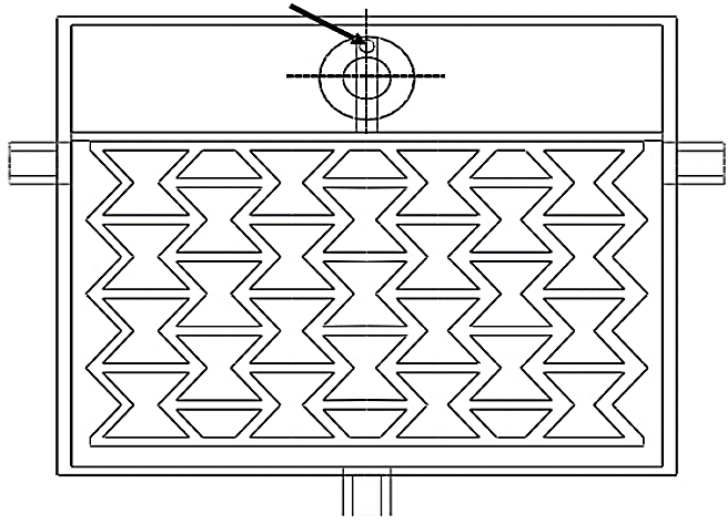


FIG. 2. Depicts/illustrates front view of the loading pin.

Key Features / Value Proposition

1. Market Advantage

- **Enhanced Flow Control:** Variable thickness graded auxetic structure provides precise control over suction and discharge volumes, improving synchronization in hydraulic systems.

2. Key Features

- **Dual Functionality:** Combines the roles of a pump and a flow divider, optimizing system efficiency.

3. Cost-Effective Solution

- **Affordable Manufacturing:** Enables the production of cost-effective hydraulic flow dividers suitable for low-pressure and low-flow applications.

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