

Industrial Consultancy & Sponsored Research (IC&SR)

Unified Versa Fracking Device For Enhanced Recovery From Conventional Reservoirs, Hydrates and Shales

IITM Technology Available for Licensing

Problem Statement

- Conventional fracking methods **may not effectively maximize the recovery of oil & gas from depleted wells**, limiting the efficiency of the extraction process.
- Existing techniques might struggle to **sufficiently elongate perforations** or create new cracks within the well bore, **restricting the productivity potential of the well**.
- The inability to access & release the remaining trapped oil and gas from reservoirs, hydrates, or shales using current fracking methods poses a **significant challenge in maximizing resource extraction**.
- Hence, present invention is needed to optimize and enhance the recovery of oil and gas from depleted or low-producing well bores.

Technology Category/ Market

Energy, Energy Storage & Renewable Energy | Chemistry & Chemical Analysis

Industry: Energy, Oil & Gas Extraction, Oil and Gas Extraction Technology

Applications: Enhanced oil & gas recovery from depleted wells, Oil and gas exploration and production companies seeking improved extraction methods for depleted reserves

Market: The global Enhanced Oil Recovery Market was valued at **USD 15.77 Bn in 2019**, it is expected to reach **USD 20.06 Bn by 2027**, Exhibiting **7.5% CAGR** in forecast period.

Technology

The instant patented technology discloses a **system designed to generate shock waves** in a well bore, **primarily for enhancing oil and gas recovery**.

This technology innovatively uses a **dual-layer diaphragm design and controlled explosions** to generate focused shock waves, **effectively enhancing oil and gas recovery** in well bores while **ensuring safety and cost-effectiveness**.

Fig. 1 shows a system implemented in a well bore for generating shock waves

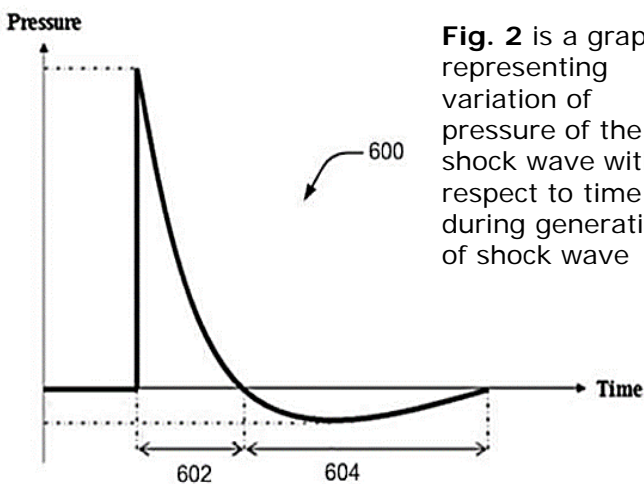
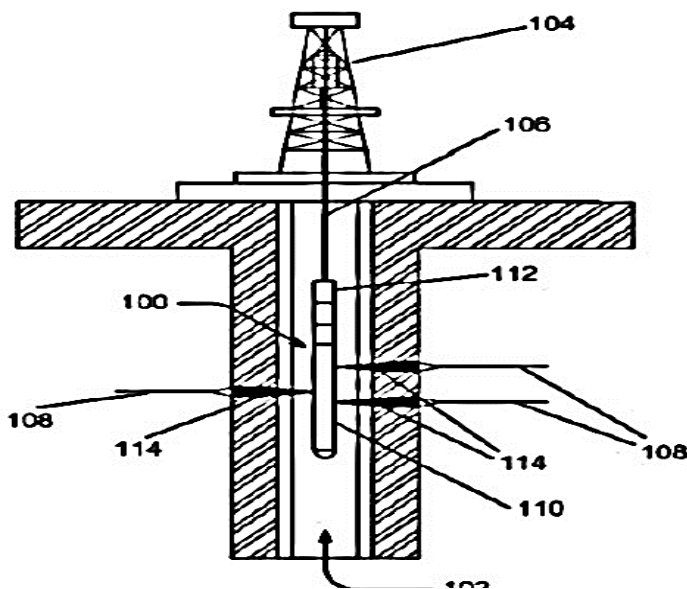


Fig. 2 is a graph representing variation of pressure of the shock wave with respect to time during generation of shock wave

Intellectual Property

IITM IDF No.: 1462 | IP No.: 457966 (Granted)

TRL (Technology Readiness Level)

TRL-4: Validated in Laboratory

Research Lab

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Key Features / Value Proposition

User perspective:-

- Improved recovery rates from depleted wells, potentially increasing overall oil & gas yields.
- Enhanced extraction without the need for drilling new wells, reducing operational costs.

Industrial perspective:-

- Maximized extraction from existing wells, boosting overall production output.
- Optimized resource utilization and prolonged lifespan of existing wells, reducing the need for new investments.

Technology perspective:-

- Unique shock wave technology for targeted fracture creation, optimizing reservoir access.
- Coupler design ensuring wire line isolation, enhancing safety and control during operations.

Components:

- Versa Fracking Gun: Cartridge, Gas-Filled Cylinder, Explosive Pods and Charges, Detonator, Valves
- Coupler: Connects the versa fracking gun to an external unit via a wire line. Isolates the wire line to protect it during explosive

Innovative Features:

- Dual-Layer High-Stress Concentration:
 - The cartridge and gas-filled cylinder have specific regions designed for high stress concentration.
 - Overlapping these regions creates a dual-layer diaphragm for focused and unidirectional shock wave generation.
- Explosion and Shock Wave Generation:
 - Controlled explosions within the gas-filled cylinder result in immediate pressure differences between the cylinder and the well bore.
 - Rupturing the dual-layer diaphragm generates shock waves directed towards existing perforations or to create new fractures, followed by negative blast waves.
- Wire Line Isolation and Safety: The coupler prevents damage to the wire line during explosions by isolating it from the fracking gun.

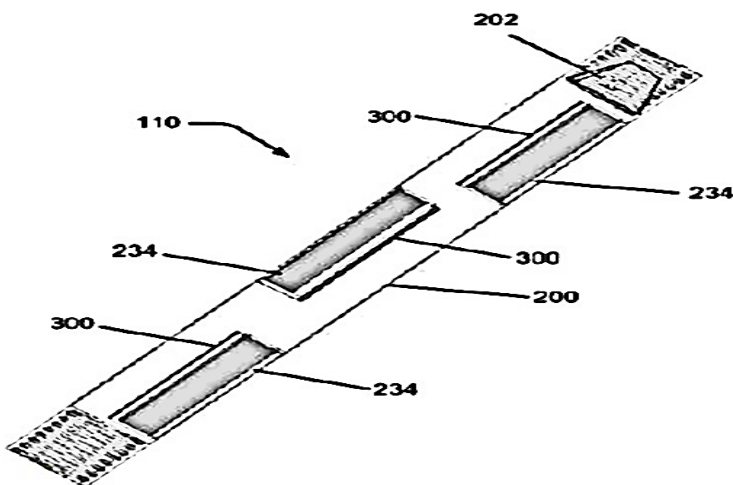


Fig. 3 shows an assembly of a cartridge with gas filled cylinder installed concentrically inside cartridge.

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