

### Hydrocyclone apparatus for separation of mixture of fluids of varying density and solid particles

#### IITM Technology Available for Licensing

#### PROBLEM STATEMENT

- In the Conventional design of the hydrocyclone apparatus experienced **erosion effect** after **long period** of **service operations**.
- Further, said hydrocyclones after a long period of operation, are found to **fail** due to **leakage**.
- Moreover, this demands continuous **maintenance/replacement** of the hydrocyclone causing operation interruption and significant in **costlier manner**.
- Further, a few solution has discussed herein may prolong the failure of the hydrocyclone, but failure is **inevitable**. Hence, there is a need to address said issues.

#### INTELLECTUAL PROPERTY

IITM IDF Ref. 1748; IN Patent No: 391373

#### TECHNOLOGY CATEGORY/MARKET

**Technology:** Hydrocyclone apparatus;

**Industry & Application:** Petroleum, Chemical Bio-medical & mechanical Industries ;

**Market:** The global hydrocyclone apparatus market is projected to grow at a **CAGR** of **6.5%** during **2024-2034**.

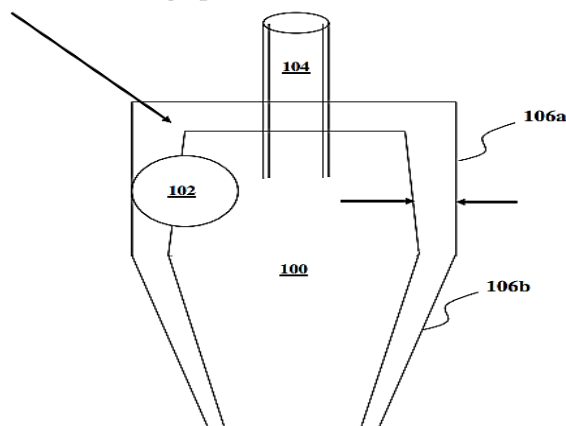
#### TRL (TECHNOLOGY READINESS LEVEL)

**TRL-4**, Proof of Concept ready, tested in lab.

#### TECHNOLOGY

- The present invention describes a **hydrocyclone apparatus** for **separation of fluids** from **solid particles** or **dense fluids** from lighter fluids with **enhanced service life & separation efficiency**.
- The hydrocyclone apparatus includes a **cyclone chamber** with an **upper wall portion & bottom wall portion**. Further said hydrocyclone apparatus comprising an **upper portion wall** with **increased thickness** compared to a **lower portion wall** of said hydrocyclone apparatus.

Increased thickness at the top region



**Fig.1: Illustrates the claimed hydrocyclone chamber with an increased thickness of an upper wall portion of the cyclone chamber;**

- The **hydrocyclone apparatus** includes an **inlet port** arranged to introduce a **fluid** comprising a **solid particles** or **mixture of fluids** of different density into the **cyclone chamber**.
- The fluid and the solid particles or mixture of fluids are **separated** based on **centrifugal forces** within a vortex formed by a spin of the fluid and the solid particles within the cyclone chamber.
- The hydrocyclone apparatus includes an **outlet port** for **removing** the fluid flow from the cyclone chamber.
- A **port** is provided to the **hydrocyclone apparatus** in which the port is positioned tangential to the formed vortex in **upper wall portion**.
- Said **cover plate** is **positioned** in upper wall portion to **avoid direct contact** of cyclone chamber with solid particles.

#### RESEARCH LAB

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### KEY FEATURES / VALUE PROPOSITION

#### ❖ Technical Perspective:

- Said invention can be used **standalone unit** or **add-on** unit.
- Said hydrocyclone apparatus comprising a **port** positioned tangential to the formed vortex in the upper wall portion, wherein **an angle of the port** with outer wall from top of a surface of said apparatus is ranges from **0 to 90 degree**.
- The **port** is connected to a closed settling tank & **shape of the port** may be, **circular, elliptical square triangular & hexagonal**.
- Said hydrocyclone apparatus comprising a **cover plate** which is made of **high-quality anti-corrosive & anti-abrasive material**.
- The **fluids** are dispensed from the **hydrocyclone apparatus** having a **non-substantial effect** on a vortex strength.

#### ❖ Industrial Perspective:

- Facilitates **sustainable** standalone unit in **cost effective** manner.
- **Improved design configuration** of the Hydrocyclone.
- Provides **enhanced service life** of the hydrocyclone (**present configuration**) & separation **efficiency**.
- Applicable in the area of **petroleum, chemical, bio-medical & mechanical industries**.

### IMAGE

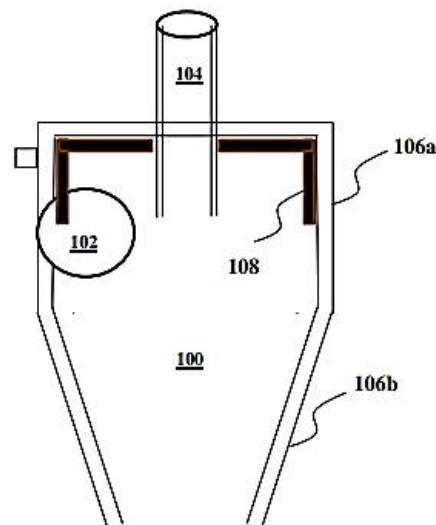


FIG. 2a

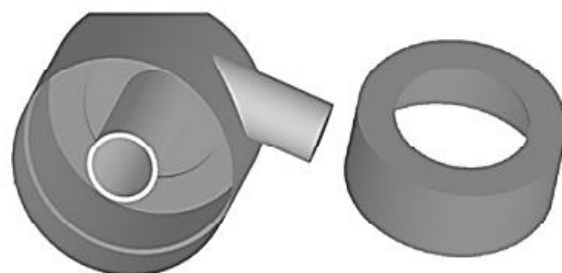


FIG. 2b

FIG. 2c

**FIG. 2a** Illustrates the hydrocyclone apparatus includes a cover plate, positioned in the upper wall portion 106a.

**Fig. 2b & Fig. 2c** Illustrates a cross sectional view of the cover plate in the hydrocyclone apparatus.

#### Reference Nos:

100- Hydrocyclone apparatus; 108-Cover plate; 106a- Cover plate positioned in the upper wall portion.

102, 104- Inlet and Outlet port.

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