

ULTRASONIC MILLING MACHINE IITM Technology Available for Licensing

Problem Statement

- Conventional ultrasonic milling machine edges are expensive and time-consuming to manufacture, especially for small and thin-walled parts.
- Current machining edges require skilled operation and fragile tools to achieve sharp geometries.
- There is a need for a modular machining edge design to reduce manufacturing costs and time.

Technology Category/ Market

Category- Ultrasonic Machining, Advance Material & Manufacturing

Applications- Ceramic Component Manufacturing, Medical Device

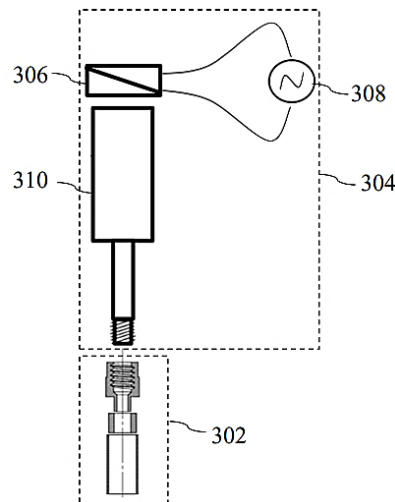
Industry- Precision Engineering, Medical Devices

Market - Ultrasonic Machining Services Market is projected to reach **USD 130.56 Billion by 2031**, growing at a **CAGR of 8.54%** during 2024-2031.

Intellectual Property

- IITM IDF Ref. 2453
- **IN 509345 - Patent Granted**

FIG. 1. illustrates a schematic diagram of an ultrasonic milling machine.



TRL (Technology Readiness Level)

TRL - 4: Technology validated in lab scale.

Research Lab

Prof. Ravi Kumar N V,
Dept. of Metallurgical and Materials Engineering

Technology

1

- The invention introduces a modular machining edge for ultrasonic milling machines, composed of at least two or three separate elements, making it easier to manufacture, assemble, and replace parts.

2

- The separate elements (threading, adapter, and profile) are made from various materials like aluminum, steel, and titanium, allowing for tailored properties depending on the cutting application.

3

- By separating the machining edge into smaller, easily producible components, the invention reduces manufacturing complexity, cost, and time compared to traditional single-piece machining edges.

CONTACT US

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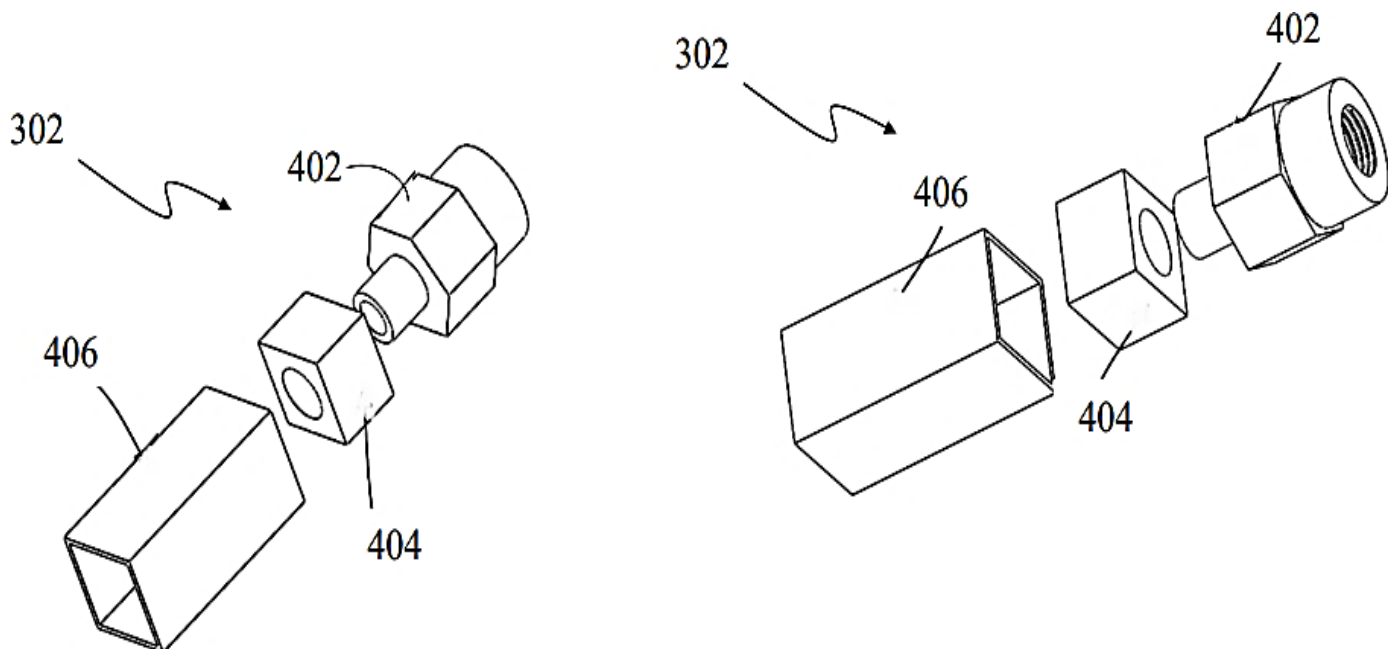


FIG. 2A and 2B illustrate exploded views of a machining edge.

Key Features / Value Proposition



1. Modular Design Efficiency:

Reduces production complexity and enables easy replacement of worn components, enhancing operational efficiency.



2. Material Customization

Allows for tailored machining edge materials (aluminum, steel, titanium) to suit specific cutting applications, improving performance and durability.



3. Cost Reduction

The integration of multiple smaller elements lowers manufacturing costs and simplifies the production process.



4. Enhanced Precision

Use of advanced machining techniques like EDM, laser cutting, and CNC ensures high precision in the production of complex profiles.



5. Versatile Application

Suitable for milling a wide range of brittle and hard-to-cut materials, including ceramics, with adaptability to various shapes and profiles.



6. Ease of Assembly

Modular components can be easily assembled using adhesives, soldering, or welding, reducing downtime and maintenance efforts.

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