

METHOD OF DEVELOPING DIAMOND DRESSER TOOLS HAVING GRITS IN PATTERNED ARRAY

IITM Technology Available for Licensing

Problem Statement

- **Inefficient Filler Alloy Use:** Current methods waste filler alloy, which is costly.
- Diamond particles **do not bond well** in some filler alloy areas, **leading to material inefficiency**.
- Existing techniques result in **uneven diamond grit distribution**, affecting tool performance.
- **Grit Accumulation:** Imprecise placement causes grits to cluster in spots, reducing tool uniformity.
- Current methods struggle with Lack in the precise positioning of **Small abrasive Particles**.
- **Template Dependency:** Some techniques rely on templates, limiting flexibility in grit patterns.
- **Adhesive Weakness:** Using adhesive can weaken joint strength, risking tool durability.
- **Wasted Filler Alloy:** Some processes waste filler alloy, inefficiency in material use.
- **Controlled Grit Protrusion Challenge:** Achieving consistent grit height is difficult.

Hence, there is a need for Flexible Grit Arrangement, which is disclosed in the present patent allowing versatile grit placement without template/adhesive.

Technology Category/ Market

Categories: Applied Mechanics & Mechanical Engineering, Other Technologies

Industry: Precision Grinding, Tool & Die making, Metalworking, Aerospace, Automotive, Electronics, Jewelry, Medical Devices, Stone & Glass Processing.

Applications: Metalworking, precise tool fabrication, Automotive, High-quality parts manufacturing, Improving electronic component quality, Creating intricate jewelry pieces, Precision medical instrument making, Stone & Glass, Tool Manufacturing Services.

Market: The Global Diamond Dressers Market size was valued at **\$184.9 M in 2021**, and it is expected to reach **\$269.5 M in 2030**, expanding at a **CAGR of 4.1%** during the forecasted period of **2021-2030**.

Technology

The present patent discloses a novel **Method of Developing Diamond Dresser Tools having Grits in Patterned Array**. This method is used for **precise patterned** dresser tool creation. It uses a **T-shaped** design with **micro-holes**, **synthetic diamond grits**, placed using **vacuum-operated** technology, dipped in a **specialized alloy**, & **positioned accurately**. **Consistent grit height** is ensured through force measurement, offering **customization & versatility**.

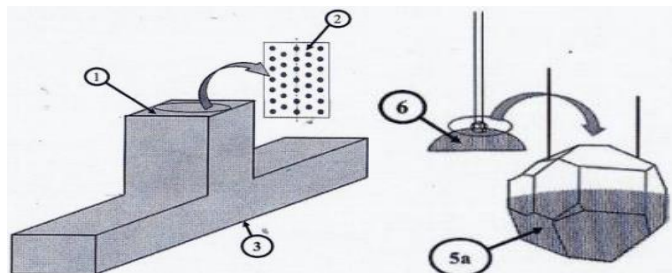


FIG. 1

FIG. 2

FIG. 1 illustrates a schematic view of the extended portion of a **T type dresser surface** where the diamond grits are to be placed; and

FIG. 2 shows a magnified view of thin & uniform layer of alloy sticks over grit surface.

Key Features / Value Proposition

❖ **User Perspective:**

- Users get **precise control over grit placement & ability of pattern customization**.
- **Durability:** Tools made using this method may have enhanced durability, reducing replacements need.

❖ **Technology Perspective:**

- **Efficient Grit Transfer:** Vacuum-operated gripping ensures efficient and controlled grit transfer.
- **Innovative Filler Application:** A unique method of partially dipping grits in filler alloy enhances bonding.
- **High Precision:** Incorporating a high-resolution linear stage drive allows for precise grit positioning.

❖ **Industrial Perspective:**

- **Enhanced Tool Performance:** The technology improves the efficiency and reliability of abrasive tools, benefiting various industries.
- **Reduced filler alloy consumption** and improved tool durability can lead to **cost-efficiency** for industries.
- **Versatility:** Customizable grit patterns make the technology adaptable to different industrial applications.
- **Waste Reduction:** Reduced material consumption contributes to sustainability efforts by minimizing waste.

TRL (Technology Readiness Level)

TRL - 4, Experimentally validated in lab.

Intellectual Property

IITM IDF No: 1708;
Patent Grant Number: 448989

Research Lab

Prof. Amitava Ghosh
Department of Mechanical Engineering

CONTACT US

Dr. Dara Ajay, Head
Technology Transfer Office,
IPM Cell- IC&SR, IIT Madras

IITM TTO Website:
<https://ipm.icsr.in/ipm/>

Email: smipm-icsr@icsrpis.iitm.ac.in
sm-marketing@imail.iitm.ac.in

Phone: +91-44-2257 9756/ 9719