

### ARTIFICIAL HAND FOR PROSTHETIC APPLICATIONS

### IITM Technology Available for Licensing

#### Problem Statement

- Designing prosthetic hands to mimic human dexterity is complex and requires balancing mechanical simplicity with functionality.
- Reducing the number of motors in prosthetic hands is challenging, as fewer motors increase control complexity and affect power requirements and battery size.
- Prosthetic hands need to be lightweight for user comfort but often face challenges in weight due to motors and batteries, which complicates design and increases costs.

#### Intellectual Property

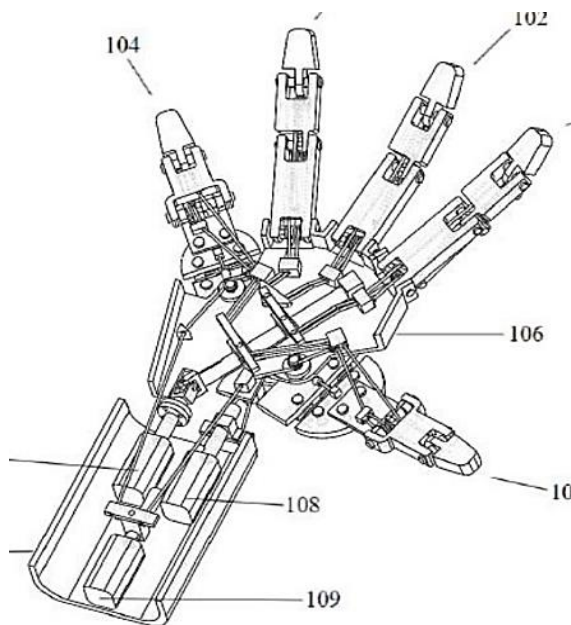
- IITM IDF Ref. **2497**
- **IN 508507 - Patent Granted**

#### Technology

**Modular Finger Movement:** The artificial hand features a base with multiple digits, each having a proximal, middle, and distal segment, with tendons and linkage mechanisms enabling precise control and movement of each segment.

**Dual Lever Assemblies:** The hand incorporates two lever assemblies connected to nuts on a leadscrew system, allowing differential motion and tension adjustment for specific finger sets - one for index, middle, and ring fingers, and another for thumb and little finger.

**Advanced Actuation:** The transmission unit includes multiple motors for controlling flexion, rotation out of the base plane, and in-plane movement of the fingers, with hinged platforms for adjusting the positioning of the thumb and little finger.



**FIG. 1. illustrates a three-dimensional view of an artificial hand with five digits.**

#### Technology Category/ Market

**Category - Advanced Prosthetics, Assistive, Test Equipment & Design Manufacturing**

**Applications - Rehabilitation and Physical Therapy, Assistive Devices**

**Industry - Medical Devices and Prosthetics**

**Market - Limb Prosthetics Market size is projected to reach USD 2754.8 Million by 2030, growing at a CAGR of 5.7%**

#### TRL (Technology Readiness Level)

**TRL - 5: Technology validated in relevant environment.**

#### Research Lab

**Prof. Asokan T.,**  
Dept. of Engineering Design, IITM

#### CONTACT US

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

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

**Email:** [smipm-icsr@icsrpiis.iitm.ac.in](mailto:smipm-icsr@icsrpiis.iitm.ac.in)  
[sm-marketing@imail.iitm.ac.in](mailto:sm-marketing@imail.iitm.ac.in)

**Phone:** +91-44-2257 9756/ 9719



### Key Features / Value Proposition

- Provides complex movement by actuating multiple finger segments, mimicking human hand functionality.

#### 1. Enhanced Dexterity



- Integrates distinct lever assemblies and motors for differential control of finger sets, accommodating various hand

#### 2. Flexible Finger Control



- Utilizes multiple motors for precise movement in multiple planes, enhancing the overall functionality and flexibility of the

#### 3. Versatile Motor Integration



- Allows rotation and adjustment of fingers for a natural hand orientation, improving user comfort and effectiveness.

#### 4. Adjustable Hinged Platforms



- Employs a leadscrew and nuts system to minimize the number of motors while ensuring effective tendon tensioning

#### 5. Efficient Transmission Unit



- Achieves complex movements with coordinated motor actions for dynamic and accurate finger positioning.

#### 6. Multi-Motor Coordination



### CONTACT US

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

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

Email: [smipm-icsr@icsrpis.iitm.ac.in](mailto:smipm-icsr@icsrpis.iitm.ac.in)

[sm-marketing@iimail.iitm.ac.in](mailto:sm-marketing@iimail.iitm.ac.in)

Phone: +91-44-2257 9756/ 9719