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G.A.R.6
[See Rule 22(1)]
RECEIPT

Docket No 20701   **Date/Time 2025/09/09 22:41:16**

To   **UserId: SB2802**
Sudarshana Bandyopadhyay

Flat No. 91, Sector A, Pocket C, Vasant Kunj, New Delhi - 110070, India

CBR Detail:

Sr. No.	App. Number	Ref. No./Application No.	Amount Paid	C.B.R. No.	Form Name	Remarks
1	202531085743	TEMP/E-1/96135/2025-KOL	2880	11272	FORM 1	AI-ENABLED SMART GRINDER
2	E-106/2653/2025/KOL	202531085743	0	-----	FORM28	----
3	E-12/1764/2025/KOL	202531085743	2500	11272	FORM 9	----

TransactionID	Payment Mode	Challan Identification Number	Amount Paid	Head of A/C No
N-0001747463	Online Bank Transfer	0909250064111	5380.00	1475001020000001

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Amount in Words: Rupees Five Thousand Three Hundred Eighty Only

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(54) Title of the invention : AI-ENABLED SMART GRINDER

(51) International classification	:G06N0020000000, A61M0016000000, G06N0003080000, B01D0005000000, G05B0019418000	(71)**Name of Applicant :**
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(57) Abstract :
The present invention relates to an AI-based grinder for processing input materials includes a grinder unit with a material input hopper, a motor-driven grinding mechanism, and an output tray. Integrated sensors, including vibration, torque, and particle size sensors, monitor operational parameters in real time. An artificial intelligence (AI) module, configured with machine learning algorithms, dynamically adjusts grinding parameters such as motor speed, pressure, and duration based on sensor data and user preferences, ensuring consistent output and energy efficiency. A microcontroller unit actuates the grinding mechanism, while a user interface enables input of operational preferences and displays system status. The grinder features cloud connectivity for remote monitoring, predictive maintenance, and multi-device learning, alongside a modular design for versatile applications. Safety protocols and adaptive power regulation enhance reliability and sustainability, making the grinder suitable for domestic, commercial, and industrial use.

No. of Pages : 17 No. of Claims : 14

<table>
<tr><td colspan="1">

FORM 2

THE PATENTS ACT, 1970

(39 OF 1970)

AND

THE PATENTS RULES, 2003

COMPLETE SPECIFICATION

(*See* section 10; rule 13)

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</table>

1. TITLE OF THE INVENTION

AI-ENABLED SMART GRINDER

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3. PREAMBLE TO THE DESCRIPTION

The following specification particularly describes the invention and the manner in
which it is to be performed.

FIELD OF THE INVENTION

The present invention pertains to the field of kitchen and industrial grinding systems. The present invention more particularly to an artificial intelligence (AI)-enabled adaptive grinder integrated with smart sensors and real-time control algorithms for improved grinding efficiency, consistency and safety by enabling dynamic adjustment of operational parameters, predictive maintenance, and connectivity features for domestic, commercial, and industrial applications.

BACKGROUND OF THE INVENTION

In contemporary households and industrial setups, grinders have become indispensable appliances. However, conventional grinders, whether employed in domestic kitchens, cafés, or industrial plants, continue to suffer from fundamental limitations. Existing grinding machines predominantly rely on manual settings and pre-defined operating parameters that do not adapt to variations in raw material properties or surrounding environmental conditions. Such rigid operation results in inconsistent texture, suboptimal particle size distribution, excessive energy consumption, and accelerated wear of machine components.

A critical drawback of conventional grinders lies in their inability to dynamically respond to real-time variables such as motor load, hardness and moisture content of the material, vibration signatures, and particle output characteristics. Since grinding quality is heavily influenced by these parameters, traditional fixed-speed or time-based grinding operations frequently yield unsatisfactory results when input conditions deviate. In domestic or small-scale commercial applications, this causes inconsistency in flavour, texture, and quality. In industrial applications, such inefficiencies translate into higher operating costs, reduced throughput, and premature mechanical failure.

Although modern sensors and artificial intelligence technologies have become increasingly prevalent across sectors, their integration into grinding systems remains limited. Existing grinders generally operate as closed-loop, standalone devices, lacking algorithmic intelligence, historical learning, or

connectivity to cloud-based platforms. This results in a technological gap between state-of-the-art AI capabilities and their practical deployment in real-world grinding processes.

Drawbacks of the conventional prior arts:

1. **Lack of Real-Time Adaptability:** Traditional grinders operate on fixed-speed and fixed-time mechanisms without accounting for variations in hardness, size, or moisture content of the input material. This often results in under-grinding or over-grinding, producing inconsistent output quality. Such systems are unsuitable for applications requiring precision, including fine powder generation or texture-specific grinding.

2. **Manual Dependency and User Intervention**: Earlier grinders require users to manually adjust operational parameters such as speed, time, and pressure for each material type. This process is not only time-consuming and error-prone but also demands prior experience. In commercial environments handling multiple materials daily, this manual dependence reduces productivity and increases user workload.

3. **Energy Inefficiency**: Conventional grinders generally operate at maximum motor power regardless of actual load requirements. This leads to unnecessary energy consumption, increased operational costs, and accelerated wear of components due to sustained high stress.

4. **Inconsistent Output Quality**: Minor variations in input material properties can cause significant differences in output quality. Since prior art grinders lack feedback systems to assess grinding performance and adjust parameters dynamically, they fail to ensure batch-to-batch uniformity—an essential requirement in food processing, pharmaceuticals, and specialty powder industries.

5. **Absence of Predictive Maintenance**: Traditional grinders are reactive in nature; faults are detected only after breakdowns. This reactive approach leads to unexpected failures, costly repairs, and downtime. There is no integration of diagnostic tools, sensors, or AI-based predictive maintenance mechanisms.

6. **Lack of Sensor Integration**: Most existing grinders do not include smart sensors capable of monitoring parameters such as torque load, vibration frequency, particle size or motor temperature. Without sensor data, there is no means for performance evaluation or dynamic process optimization.

7. **Limited Customization and Learning Capability**: Conventional machines lack memory or learning algorithms to store user preferences or operational history. Users must repeatedly configure the machine for similar tasks, and the system shows no improvement over time. This is particularly limiting in high-throughput or multi-user environments.

8. **Safety Limitations**: Earlier grinders often lack automatic safety mechanisms such as auto-shutdown in case of overheating, abnormal vibration, or overload. Continued operation under such adverse conditions risks machine damage and endangers user safety.

9. **No Remote Monitoring or IoT Integration**: Conventional grinders operate as standalone appliances with no capability for remote monitoring, configuration, or software updates. In commercial and industrial setups, this lack of connectivity limits operational flexibility, scalability, and real-time oversight.

10. **Unsuitability for Multi-Material Operations**: Many prior designs are optimized for a single material type and require substantial manual adjustments or physical modifications to process another material. This makes them impractical for modern households, cafés, and industries where versatility is required.

Thus there is a need to for advancement in the field of grinding technology, by transforming a conventionally mechanical process into an intelligent, self-optimizing system, the present invention provides precise, consistent, and sustainable grinding performance across domestic, commercial, and industrial applications.

OBJECTS OF THE INVENTION

The primary object of the present invention is to provide an AI-based grinder capable of dynamically adjusting grinding parameters using real-time sensor data for optimized performance and consistent output.

Another objective of the invention is to integrate the grinder multiple sensors such as vibration, torque, particle size, temperature, and load sensors for comprehensive monitoring of grinder performance and safety.

Yet another objective of the inventio is to enable the grinder with an AI-driven closed feedback loop that ensures continuous optimization, energy efficiency, and adaptability to input material characteristics and user-defined requirements.

One other objective of the invention is to enhance operational safety of the grinder by detecting abnormal conditions including excessive vibration, overheating, or excessive load and triggering automatic safety protocols.

Yet another objective of the invention is to achieve intelligent load management of the grinder by using torque and vibration feedback to adjust motor speed and grinding pressure according to material hardness, density, or abnormal resistance.

One other objective of the invention is to maintain output particle size consistency of the grinder by employing real-time particle size detection and auto-recalibration of grinding settings.

Another objective of the invention is to provide self-learning capabilities of the AI module of the grinder through machine learning algorithms trained on historical operational data, user preferences, and environmental factors, enabling improved performance in successive grinding cycles.

Yet another objective of the invention is to create an adaptive learning database for the grinder that stores grinding outcomes and user feedback for continual self-improvement of grinding performance.

One other objective of the invention is to support predictive maintenance by analyzing real-time and historical sensor data of the grinder for early detection of performance degradation and generating alerts to minimize breakdowns and downtime.

The other objective of the invention is to incorporate cloud connectivity and IoT integration for remote monitoring of the grinder, over-the-air firmware

upgrades, synchronization, data analytics, and networked learning across multiple grinder units.

Yet another objective of the invention is to provide a user-friendly interface (touchscreen or mobile app) for real-time monitoring, operational inputs (batch size, fineness, etc.), and feedback alerts, enabling greater user control of the grinder.

One other objective of the invention is to reduce energy consumption by incorporating adaptive power regulation, allowing the grinder to intelligently switch to energy-saving modes during low-demand or idle conditions.

The other objective is to provide a modular and scalable design of the grinder, enabling interchangeable grinding assemblies tailored to different material types with automatic AI recognition and configuration.

The final objective of the invention is to ensure higher reliability and extended lifespan of the grinder by combining predictive diagnostics, anomaly detection, and intelligent power regulation.

SUMMARY OF THE INVENTION

The present invention discloses an AI-Based Grinder equipped with artificial intelligence algorithms and sensor-driven automation for delivering precise, consistent, and energy-efficient grinding performance. The grinder unit comprises a material input hopper, a grinding mechanism driven by an electric motor, and an output tray, integrated with a plurality of smart sensors including torque, vibration, particle size, temperature, and load sensors. An AI module operatively coupled with these sensors operates in a closed feedback loop to dynamically adjust grinding parameters such as motor speed, pressure, and duration in real time based on material characteristics and user-defined preferences. A microcontroller unit serves as the control hub between the AI module and grinder hardware, enabling execution of AI commands and interfacing with a user interface that provides system control and feedback. The invention further incorporates machine learning algorithms for self-learning of user preferences and material profiles, cloud

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connectivity for remote monitoring, firmware updates, predictive maintenance, and data analytics, as well as modular hardware design for interchangeable grinding assemblies. Safety protocols governed by the AI ensure automatic fault detection, hazard prevention, and user alerts. By integrating adaptive AI-driven control, multi-sensor feedback, cloud-enabled monitoring, and modular scalability, the invention provides significant advancements over conventional grinders in terms of precision, efficiency, reliability, and user convenience.

BRIEF DESCRIPTION OF DRAWINGS

Fig 1: Detailed flow chart of the invention

Fig 2: The architecture and working principle of the invetion

DETAILED DESCRIPTION OF INVENTION

The present invention relates to an AI-Based Grinder equipped with artificial intelligence and, more particularly, to an intelligent grinding machine that employs AI algorithms in conjunction with sensor-driven automation to deliver precise, consistent, and energy-efficient grinding performance. In one embodiment, the invention comprises a Grinder Unit forming the primary hardware body of the AI-Based Grinder. The grinder unit includes a material input hopper, a grinding mechanism driven by an electric motor, and an output tray. The grinder is embedded with multiple smart sensors that detect and monitor grinding activity while the input material—such as coffee beans, grains, or spices—is processed into the desired output form under automated system control.

The various sensors used in the system include:

1. A vibration sensor integrated into the grinder to continuously monitor vibration generated during operation. Abnormal vibration patterns may indicate overload, misalignment, or mechanical faults. The data from the vibration sensor is transmitted to the AI system, which analyzes the patterns to ensure stable and safe operation. If irregular vibration is detected, the AI may reduce motor speed or pause the grinding process until corrective measures are taken.

2. A torque sensor operatively connected to the motor to measure load conditions during grinding. The torque readings provide insights into the hardness or density of the material being processed. Based on this

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information, the AI system optimizes motor speed and grinding pressure to prevent motor strain, thereby improving energy efficiency and extending the operational life of the machine.

3. A particle size sensor positioned at the output of the grinding mechanism to measure the fineness or coarseness of the ground material. The AI system evaluates this feedback in real time, and if the measured particle size deviates from the desired range, the system recalibrates and readjusts grinding parameters to ensure consistent output texture.

At the core of the invention is an AI module configured with machine learning algorithms. The AI module receives and processes real-time inputs from multiple sensors integrated within the grinder, including but not limited to torque sensors, vibration sensors, particle size detectors, temperature sensors, and load sensors. Based on the processed data, the AI module determines the optimal grinding speed, motor power, and operation duration corresponding to the characteristics of the input material and user-defined requirements. This ensures uniformity in output texture, reduces energy consumption, and minimizes mechanical stress. By operating in a closed feedback loop with the sensors and grinder hardware, the AI continually optimizes grinding performance. The machine learning algorithms integrated into the AI system are trained on diverse grinding profiles, user preferences, and environmental conditions. These algorithms analyze both real-time and historical session data to detect patterns and optimize operational decisions. Over successive use cycles, the machine learning component ensures that the grinder continuously improves its accuracy and efficiency.

A microcontroller unit (MCU) is operatively coupled between the hardware components and the AI module and acts as the control hub of the grinder. The MCU interprets control signals generated by the AI and actuates motors, drives, and safety subsystems accordingly. The grinder further comprises a user interface allowing users to specify operational preferences, such as desired fineness or batch size, while simultaneously providing real-time system feedback, including temperature, grinding duration, and AI-recommended settings.

In a further embodiment, the system incorporates cloud connectivity for enabling remote monitoring, over-the-air firmware updates, predictive maintenance alerts, and usage analytics. This feature ensures reduced downtime and extended product lifecycle. Operational data, usage history, and learning models may be uploaded to cloud servers for storage and analysis. This facilitates remote access to grinder performance, firmware updates, predictive maintenance, and multi-device learning across multiple grinders in connected networks. The MCU also facilitates two-way

communication, relaying operational data from the hardware back to the AI system and accepting user commands via the user interface.

The invention also introduces an adaptive feedback loop, wherein the grinder evaluates the grinding outcome through sensor measurements and/or user feedback at the conclusion of each cycle. The results are stored in a learning database accessible to the AI module, thereby enabling continuous self-improvement of grinding performance over time.

In another embodiment, the grinder is equipped with safety and fault-tolerant features, including detection of overheating, abnormal vibration, and excessive load, upon which the system may automatically cease operation and alert the user. The system may further switch to an eco-mode under constrained energy conditions, wherein grinding parameters are adjusted to conserve power while maintaining acceptable output quality. Additionally, the grinder supports plug-and-play modularity, permitting attachment of specialized grinding assemblies for different applications, thereby enhancing its versatility across domestic, commercial, and industrial domains.

Accordingly, the present invention redefines conventional grinding systems by integrating AI-driven adaptive control, sensor-based automation, cloud-enabled monitoring, and user-friendly interfaces. Such user interface, which may be embodied as a touchscreen display or a mobile application connected via Wi-Fi or Bluetooth, allows users to select grind types such as fine, medium, or coarse; view real-time system status including motor load and temperature; and receive diagnostic alerts. The user interface communicates with both the microcontroller and AI system, ensuring synchronization between user inputs, ongoing system operations, and adaptive AI control.

The disclosed system provides significant technical advantages in terms of operational precision, reliability, sustainability, and reduced human intervention, rendering it suitable for deployment in smart kitchens, cafes, research laboratories, and manufacturing units. The present invention incorporates the following novel and inventive features which, either individually or in combination, provide a significant advancement over conventional grinding systems:

1. **AI-Driven Adaptive Grinding Mechanism**: A grinding mechanism operatively coupled with an AI module configured to dynamically adjust grinding parameters including, but not limited to, speed, pressure, and duration. Unlike traditional grinders employing fixed routines, the AI-driven mechanism adapts in real-time to the nature and characteristics of the input material, thereby ensuring consistent and optimal grinding outcomes across varying input conditions.

2. **Multi-Sensor Intelligent Feedback Loop**: An integrated sensor network comprising torque sensors, vibration sensors, temperature monitors, and particle size detectors for capturing real-time operational data. The data is processed by the AI module to effect micro-adjustments during ongoing grinding, thereby forming a closed-loop adaptive system. Such real-time feedback integration is absent in known grinders and constitutes a technological breakthrough in precision grinding.

3. **Self-Learning of User Preferences and Material Profiles**: A machine learning framework enabling the grinder to memorize user-specific grinding preferences and develop material response profiles. The system automatically generates and stores operational libraries which are subsequently utilized to auto-configure the machine, thereby reducing repetitive user inputs and enhancing personalization across domestic and industrial applications.

4. **Cloud Connectivity and Remote Access**: An Internet-of-Things (IoT)-enabled communication module that facilitates remote monitoring, firmware upgrades, diagnostic checks, and performance analytics. The feature allows users and service providers to access grinding logs, receive predictive maintenance alerts, and optimize system usage through mobile or web-based platforms.

5. **Predictive Maintenance and Fault Detection**: A predictive analytics module configured to analyze historical and real-time sensor data for identifying anomalies such as excessive vibration, overheating, or reduced motor efficiency. The system generates early warnings for maintenance, thereby reducing downtime and preventing abrupt mechanical failures.

6. **Intelligent Energy Optimization**: An adaptive power regulation feature wherein the AI module analyzes torque and load conditions to dynamically reduce motor speed or switch to an energy-saving mode under low-demand conditions. This results in significant energy efficiency improvements compared to traditional grinders.

7. **Modular and Scalable Design**: A modular hardware design enabling interchangeability of grinding chambers, blades, or functional modules for different applications, including but not limited to coffee, spices, grains, or small-scale industrial raw materials. The AI module automatically identifies the attached module and reconfigures operational parameters accordingly, thereby providing versatility and scalability.

8. **AI-Enabled Safety Intelligence**: Built-in safety protocols governed by the AI module, configured to detect and respond to hazardous operating conditions such as abnormal load, overheating, or blockages. Upon detection, the system halts operation and communicates the probable cause and corrective measures to the user via the interface or connected application, thereby enhancing user safety and equipment longevity.

We claim:

1. An AI-based grinder for processing input materials having a grinder unit having a material input hopper, a grinding mechanism driven by an electric motor and an output tray comprising:

a. a plurality of sensors operatively coupled to the grinder unit including a vibration sensor, a torque sensor and a particle size sensor;

b. an artificial intelligence (AI) module configured with machine learning algorithms, operatively coupled to the plurality of sensors, to receive real-time sensor data and dynamically adjust grinding parameters including motor speed, grinding pressure and operation duration based on characteristics of the input material and user-defined requirements;

c. a microcontroller unit (MCU) operatively coupled to the grinder unit and the AI module, configured to interpret control signals from the AI module and actuate the grinding mechanism; and

d. a user interface communicatively coupled to the MCU, configured to receive user inputs for operational preferences and display real-time system feedback,

    wherein the AI module operates in a closed feedback loop with the sensors and grinder unit to optimize grinding performance, ensure output consistency and enhance energy efficiency.

2. The grinder as claimed in claim 1, wherein the vibration sensor is configured to monitor operational vibrations and transmit vibration data to the AI module, the AI module being configured to detect abnormal vibration patterns and accordingly reduce motor speed or halt operation.

3. The grinder as claimed in claim 1, wherein the torque sensor is configured to measure load conditions during grinding, and the AI module adjusts motor speed and grinding pressure based on the hardness or density of the input material.

4. The grinder as claimed in claim 1, wherein the particle size sensor is positioned at the output of the grinding mechanism and is configured to detect the particle size of the ground material and wherein the AI module

recalibrates grinding parameters if the detected size deviates from a predefined range.

5. The grinder as claimed in claim 1, wherein the plurality of sensors further includes temperature sensors and load sensors for monitoring thermal and mechanical conditions of the grinder unit.

6. The grinder as claimed in claim 1, wherein the AI module is trained on historical grinding data, user preferences, and environmental conditions to generate operational libraries, enabling self-learning and automatic configuration of grinding parameters for subsequent grinding cycles.

7. The grinder as claimed in claim 1, wherein the AI module maintains a learning database to store grinding outcomes and user feedback from each grinding cycle, enabling continuous self-improvement of grinding performance.

8. The grinder as claimed in claim 1, comprising a communication module enabling cloud connectivity for remote monitoring, over-the-air firmware updates, predictive maintenance alerts, and storage of grinding data, wherein operational data is transmitted to a cloud server for analysis.

9. The grinder as claimed in claim 8, wherein the communication module facilitates two-way communication between the grinder and cloud servers, enabling synchronization and learning across multiple grinders in a connected network.

10. The grinder as claimed in claim 1, wherein the user interface is embodied as a touchscreen display or a mobile application connected via Wi-Fi or Bluetooth, configured to enable user inputs for grind fineness, batch size, or operational preferences, and to display real-time system status including temperature, motor load, and grinding duration.

11. The grinder as claimed in claim 1, wherein the AI module is configured to detect anomalies including overheating, excessive load, or abnormal vibration based on sensor data, and to trigger safety protocols including

automatic cessation of operation and user alerts via the user interface or connected application.

12. The grinder as claimed in claim 11, wherein the AI module is further configured to perform predictive maintenance by analyzing real-time and historical sensor data to detect anomalies including excessive vibration, overheating, or reduced motor efficiency, and to generate maintenance alerts to reduce downtime.

13. The grinder as claimed in claim 1, wherein the grinder unit comprises a modular and scalable design permitting attachment of interchangeable grinding assemblies for different materials, and wherein the AI module automatically identifies the attached module and reconfigures operational parameters accordingly.

14. The grinder as claimed in claim 1, wherein the AI module incorporates adaptive power regulation configured to reduce motor speed or switch to an energy-saving mode under low-demand conditions to enhance energy efficiency.

Dated this 9th day of September 2025

Sudarshana Bandyopadhyay

Regn. No.: IN/PA 2802
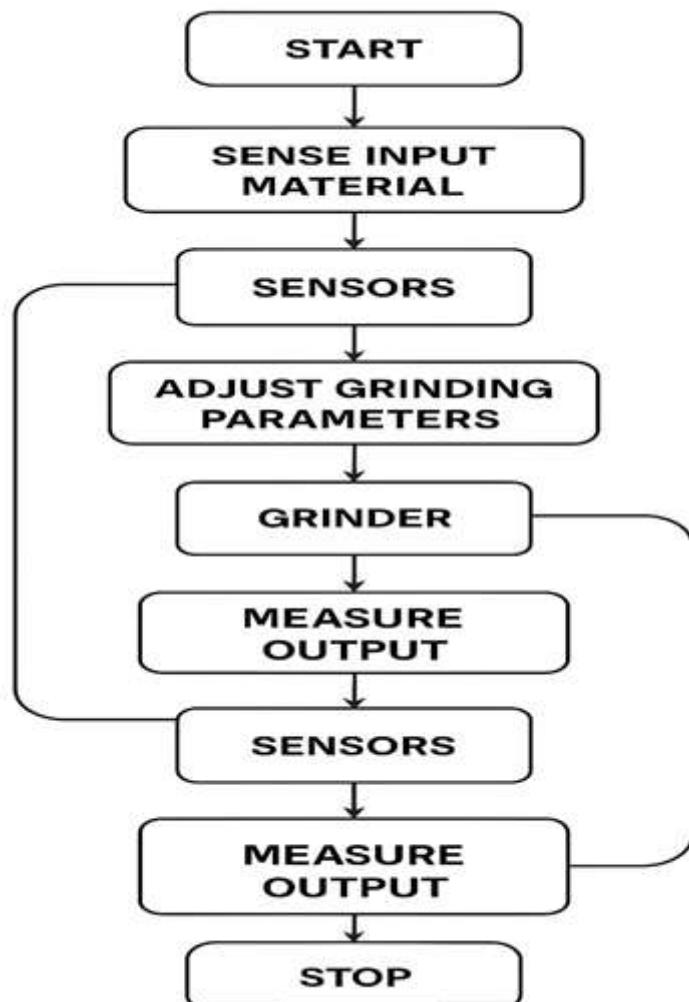Agent for the applicant
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ABSTRACT

AI-ENABLED SMART GRINDER

The present invention relates to an AI-based grinder for processing input materials includes a grinder unit with a material input hopper, a motor-driven grinding mechanism, and an output tray. Integrated sensors, including vibration, torque, and particle size sensors, monitor operational parameters in real time. An artificial intelligence (AI) module, configured with machine learning algorithms, dynamically adjusts grinding parameters such as motor speed, pressure, and duration based on sensor data and user preferences, ensuring consistent output and energy efficiency. A microcontroller unit actuates the grinding mechanism, while a user interface enables input of operational preferences and displays system status. The grinder features cloud connectivity for remote monitoring, predictive maintenance, and multi-device learning, alongside a modular design for versatile applications. Safety protocols and adaptive power regulation enhance reliability and sustainability, making the grinder suitable for domestic, commercial, and industrial use.
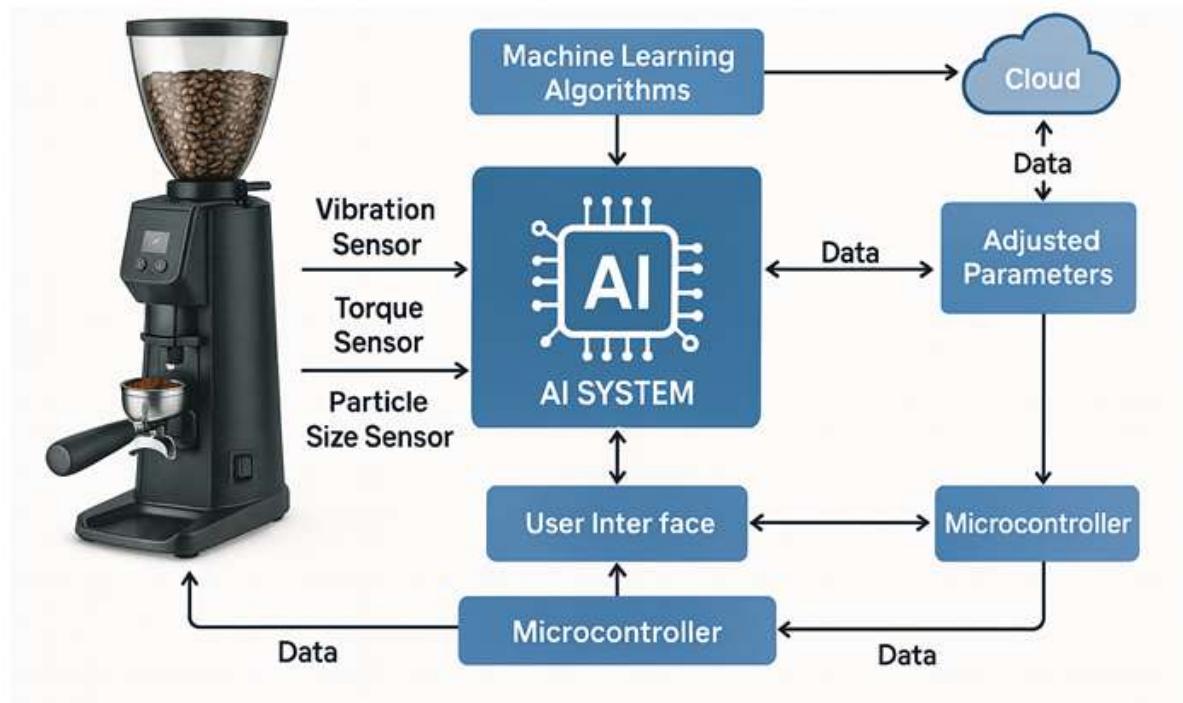
Fig 2

Sheet 1 of 2

Detailed Flowchart

Figure 1

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Figure 2 of 2

Detailed Architecture

Figure 2

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FORM 5
THE PATENTS ACT, 1970
(39 of 1970)
&
THE PATENTS RULES, 2003

Declaration as to Inventorship
[*See* section 10(6) and rule 13(6)]

1. **NAME OF APPLICANT**: SRJX RESEARCH AND INNOVATION LAB LLP,

hereby declare that the true and first inventor(s) of the invention disclosed in the complete specification filed in pursuance of our application numbered _____ dated 9 September 2025 are:

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Dated this 9th day of September 2025

Sudarshana

Name of the signatory:

Dated this 9th day of September 2025

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Phn No: 9748818235

To,
The Controller of Patents,
The Patent Office
At Kolkata

UDYAM REGISTRATION CERTIFICATE

UDYAM REGISTRATION NUMBER   **UDYAM-OD-07-0095836**

NAME OF ENTERPRISE   **SRJX RESEARCH AND INNOVATION LAB LLP**

TYPE OF ENTERPRISE *

SNo.	Classification Year	Enterprise Type	Classification Date
1	2025-26	Micro	16/08/2025

MAJOR ACTIVITY

SERVICES

SOCIAL CATEGORY OF ENTREPRENEUR   **GENERAL**

NAME OF UNIT(S)

S.No.	Name of Unit(s)
1	SRJX RESEARCH AND INNOVATION LAB LLP

OFFICAL ADDRESS OF ENTERPRISE

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DATE OF INCORPORATION / REGISTRATION OF ENTERPRISE   **05/05/2025**

DATE OF COMMENCEMENT OF PRODUCTION/BUSINESS   **05/05/2025**

NATIONAL INDUSTRY CLASSIFICATION CODE(S)

SNo.	NIC 2 Digit	NIC 4 Digit	NIC 5 Digit	Activity
1	72 – Scientific research and development	7210 – Research and experimental development on natural sciences and engineering	72100 – Research and experimental development on natural sciences and engineering	Services

DATE OF UDYAM REGISTRATION   **16/08/2025**

For any assistance, you may contact:

1. District Industries Centre: CUTTACK (ODISHA)

2. MSME-DFO: CUTTACK (ODISHA)

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Type of Enterprise	MICRO	**Major Activity**	Services
Type of Organisation	Limited Liability Partnership	**Name of Enterprise**	SRJX RESEARCH AND INNOVATION LAB LLP
Owner Name	SRJX RESEARCH AND INNOVATION LAB LLP	**PAN**	AFPFS4480L
Do you have GSTIN	No	**Mobile No.**	9090255155
Email Id	soumyajena1989@gmail.com	**Social Category**	General
Gender	Male	**Specially Abled(DIVYANG)**	No
Date of Incorporation	05/05/2025	**Date of Commencement of Production/Business**	05/05/2025

Bank Details

Bank Name	IFS Code	Bank Account Number
Punjab national bank	PUNB0787800	7878002100002490

Employment Details

Male	Female	Other	Total
3	2	0	5

Investment in Plant and Machinery OR Equipment (in Rs.)

S.No.	Financial Year	Enterprise Type	Written Down Value (WDV)	Exclusion of cost of Pollution Control, Research & Development and Industrial Safety Devices	Net Investment in Plant and Machinery OR Equipment[(A)-(B)]	Total Turnover (A)	Export Turnover (B)	Net Turnover [(A)-(B)]	Is ITR Filled?	ITR Type
1	2023-24	Micro	0.00	0.00	0.00	0.00	0.00	0.00	No	NA

Unit(s) Details

SN	Unit Name	Flat	Building	Village/Town	Block	Road	City	Pin	State	District
1	SRJX RESEARCH AND INNOVATION LAB LLP	PLOT NO-3E/474	SECTOR-9	CDA CUTTACK	NA	Avinab Bidanasi	Cuttack Sadar	753014	ODISHA	CUTTACK

Official address of Enterprise

Flat/Door/Block No.	PLOT NO-3E/474	**Name of Premises/ Building**	SECTOR-9
Village/Town	CDA CUTTACK	**Block**	NA
Road/Street/Lane	Avinab Bidanasi	**City**	Cuttack Sadar
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Latitude	20.5021859203546	**Longitude:**	85.88860428847029

National Industry Classification Code(S)

SNo.	Nic 2 Digit	Nic 4 Digit	Nic 5 Digit	Activity
1	72 - Scientific research and development	7210 - Research and experimental development on natural sciences and engineering	72100 - Research and experimental development on natural sciences and engineering	Services

Are you interested to get registered on Government e-Market (GeM) Portal	No
Are you interested to get registered on TReDS Portals(one or more)	No
Are you interested to get registered on National Career Service(NCS) Portal	No
Are you interested to get registered on NSIC B2B Portal	No
Are you interested in availing Free .IN Domain and a business email ID	N/A
Are you interested in getting registered on Skill India Digital Portal	No
District Industries Centre	CUTTACK (ODISHA)
MSME-DFO	CUTTACK (ODISHA)
Date of Udyam Registration	16/08/2025
Date of Printing	16/08/2025

IEC Details

IEC Number	
IEC Status	Inactive
IEC Registration Date	
IEC Modiffication Date	

"**FORM 1** THE PATENTS ACT 1970 (39 of 1970) and THE PATENTS RULES, 2003 **APPLICATION FOR GRANT OF PATENT** (See section 7, 54 and 135 and sub-rule (1) of rule 20)	(FOR OFFICE USE ONLY)	
	Application No.	
	Filing date:	
	Amount of Fee paid:	
	CBR No:	
	Signature:	

1. APPLICANT'S REFERENCE / IDENTIFICATION NO. (AS ALLOTTED BY OFFICE)	

2. TYPE OF APPLICATION [Please tick (✓) at the appropriate category]

Ordinary (✔)		Convention ( )		PCT-NP ( )	
Divisional ( )	Patent of Addition ( )	Divisional ( )	Patent of Addition ( )	Divisional ( )	Patent of Addition ( )

3A. APPLICANT(S)

Name in Full	Nationality	Country of Residence	Address of the Applicant
SRJX RESEARCH AND INNOVATION LAB LLP	Indian	India	SRJX RESEARCH AND INNOVATION LAB LLP, Plot No - 3E/474, Sector-9, CDA, Post- Markat Nagar, Cuttack-753014, Odisha, India

3B. CATEGORY OF APPLICANT [Please tick (✓) at the appropriate category]

Natural Person ( )	Other than Natural Person		
	Small Entity (✔)	Startup ( )	Others ()

4. INVENTOR(S) [Please tick (✓) at the appropriate category]

Are all the inventor(s) same as the applicant(s) named above?	Yes ( )	No (✔)

1

If **"No"**, furnish the details of the inventor(s)			
Name in Full	Nationality	Country of Residence	Address of the Inventor
DR SOUMYA RANJAN JENA	Indian	India	Plot No - 3E/474, Sector-9, CDA, Post-Markat Nagar, Cuttack-753014, Odisha, India
MR SANJOY SAHA	Indian	India	63/1, Thakur Para Road, P.O.- Naihati, North 24 Parganas, West Bengal-743165, India
DR SOHIT AGARWAL	Indian	India	D 388, Sarvanand Marg, Malviya Nagar, Jaipur-302017, Rajasthan, India

5. TITLE OF THE INVENTION

AI-ENABLED SMART GRINDER

6. AUTHORISED REGISTERED PATENT AGENT(S)	IN/PA No.	2802
	Name	Sudarshana Bandyopadhyay
	Mobile No.	9748818235
7. ADDRESS FOR SERVICE OF APPLICANT IN INDIA	Name	**SUDARSHANA BANDYOPADHYAY**
	Postal Address	Ground Floor, S-456, LGF, Greater Kailash – II, New Delhi – 110048, India
	Telephone No.	NA
	Mobile No.	97488 18235
	Fax No.	NA
	E-mail ID	bandyopadhyay.sudarshana@gmail.com

8. IN CASE OF APPLICATION CLAIMING PRIORITY OF APPLICATION FILED IN CONVENTION COUNTRY, PARTICULARS OF CONVENTION APPLICATION

Country	Application Number	Filing date	Name of the applicant	Title of the invention	IPC (as classified in the convention country)

N.A.					

9. IN CASE OF PCT NATIONAL PHASE APPLICATION, PARTICULARS OF INTERNATIONAL APPLICATION FILED UNDER PATENT CO-OPERATION TREATY (PCT)

International application number	International filing date

10. IN CASE OF DIVISIONAL APPLICATION FILED UNDER SECTION 16, PARTICULARS OF ORIGINAL (FIRST) APPLICATION

Original (first) application No.	Date of filing of original (first) application
N.A.	

11. IN CASE OF PATENT OF ADDITION FILED UNDER SECTION 54, PARTICULARS OF MAIN

Main application/patent No.	Date of filing of main application
N.A.	N.A.

12. DECLARATIONS

(i) Declaration by the inventor(s)

(**In case the applicant is an assignee**: the inventor(s) may sign herein below or the applicant may upload the assignment or enclose the assignment with this application for patent or send the assignment by post/electronic transmission duly authenticated within the prescribed period).

We, the above-named inventor(s) is/are the true & first inventor(s) for this Invention and declare that the applicant(s) herein is/are my/our assignee or legal representative.

(a)   Date:
(b)   Signature:
(c)   Name: **Dr Soumya Ranjan Jena**

(a)   Date
(b)   Signature(s):
(c)   Name: **Mr Sanjoy Saha**

(a)   Date:
(b)   Signature:
(c)   Name: **Dr Sohit Agarwal**

(ii) Declaration by the applicant(s) in the convention country

(In case the applicant in India is different than the applicant in the convention country: the applicant in the convention country may sign herein below or applicant in India may upload the assignment from the applicant in the convention country or enclose the said assignment with this application for patent or send the assignment by post/electronic transmission duly authenticated within the prescribed period)

I/We, the applicant(s) in the convention country declare that the applicant(s) herein is/are my/our assignee or legal representative. – **N.A.**

    (a) Date
    (b) Signature(s)
    (c) Name(s) of the signatory

(iii) Declaration by the applicant

We the applicant hereby declare that: -

[✔] We are in possession of the above-mentioned invention.

[✔] The complete specification relating to the invention is filed with this application.

[x] The invention as disclosed in the specification uses the biological material from India and the necessary permission from the competent authority shall be submitted by me/us before the grant of patent to me/us.

[✔] There is no lawful ground of objection(s) to the grant of the Patent to us.

[x] We are the true & first inventor(s).

[✔] We are the assignee or legal representative of true & first inventor(s).

[x] The application or each of the applications, particulars of which are given in Paragraph-8, was the first application in convention country in respect of my invention(s).

[x] We claim the priority from the above mentioned application(s) filed in convention country/countries and state that no application for protection in respect of the invention had been made in a convention country before that date by us or by any person from which I derive the title.

[x] Our application in India is based on international application under Patent Cooperation Treaty (PCT) as mentioned in Paragraph-9.

[x] The application is divided out of my /our application particulars of which is given in Paragraph-10 and pray that this application may be treated as deemed to have been filed on DD/MM/YYYY under section 16 of the Act.

[x] The said invention is an improvement in or modification of the invention particulars of which are given in Paragraph-11.

13. FOLLOWING ARE THE ATTACHMENTS WITH THE APPLICATION

   (a) Form 2

Item	Details	Fee	Remarks
Complete/ provisional specification	No. of pages: 11	1600	Including Form 2, description,
No. of Claim(s)	No. of Claims = 14 No. of Pages = 3	-	Claim pages
Abstract	1		Abstract page
No. of Drawing(s)	No. of drawings = 2 and No. of pages = 2		Drawing sheets

In case of a complete specification, if the applicant desires to adopt the drawings filed with his provisional specification as the drawings or part of the drawings for the complete specification under rule 13(4), the number of such pages filed with the provisional specification are required to be mentioned here.

    b. Form 3: Statement and Undertaking
    c. Form 5: Declaration as to inventorship
    d. Power of Attorney
    e. Form 28
    f. Form 9

Total fee ₹ 5380/- is being paid online through electronic portal

We hereby declare that to the best of our knowledge, information and belief the fact and matters stated herein are correct and we request that a patent may be granted to us for the said invention.

Dated this 9th day of September 2025.

Signature:

Name: Sudarshana Bandyopadhyay
(Regn No: IN/PA 2802)
Agent for the Applicant
Phn no.: 97488 18235
email: bandyopadhyay.sudarshana@gmail.com

To,
The Controller of Patents
The Patent Office,
at Kolkata

FORM 28

THE PATENTS ACT,

1970 (39 of 1970)

AND

THE PATENTS RULES, 2003

TO BE SUBMITTED BY A SMALL ENTITY /STARTUP/EDUCATIONAL INSTITUTION

[See rules 2 (fa), 2(fb), 2(ca) and 7]

1	Name, address and nationality.	We, SRJX RESEARCH AND INNOVATION LAB LLP, of the address Plot No - 3E/474, Sector-9, CDA, Post- Markat Nagar, Cuttack-753014, Odisha, India, applicant in respect of the patent application no. _____ dated 9 September 2025 hereby declare that we are a micro entity in accordance with rule 2(fa) and submit the following document as a proof :
2	Documents to be submitted	
	i. For claiming the status of a **micro** entity:	
	A. For an Indian applicant: Evidence of registration under the Micro, Small and Medium Enterprises Act, 2006 (27 of 2006).	
3	To be signed by the applicant(s) / patentee (s) / authorised registered patent agent.	The information provided herein is correct to the best of my/our knowledge and belief. Dated this 9th day of September 2025
4	Name of the natural person who has signed.	Signature:

	Designation and official seal, if any, of the person who has signed.	Sudarshana Bandyopadhyay Regn. No.: IN/PA 2802 Agent for the applicant Phn No. 9748818235 Email: bandyopadhyay.sudarshana@gmail.com To The Controller of Patents, The Patent Office, At Kolkata

FORM 9

THE PATENTS ACT, 1970

(39 of 1970)

&

THE PATENTS RULES, 2003

REQUEST FOR PUBLICATION

[See Section 11A(2); Rule 24A]

We, SRJX RESEARCH AND INNOVATION LAB LLP, of the address Plot No - 3E/474, Sector-9, CDA, Post- Markat Nagar, Cuttack-753014, Odisha, India, hereby request for an early publication of our Patent Application No. _____ filed on 9 September 2025 under Section 11A(2) of the Act.

Dated this 9th day of September 2025

Sudarshana

Sudarshana Bandyopadhyay
Regn No.: IN/PA 2802
Agent for the Applicants
Email: bandyopadhyay.sudarshana@gmail.com
Phn No: 9748818235

Government of National Capital Territory of Delhi

e-Stamp

Certificate No.	:	IN-DL35961746213944X
Certificate Issued Date	:	16-Aug-2025 11:10 AM
Account Reference	:	IMPACC (IV)/ dl962703/ DELHI/ DL-ESD
Unique Doc. Reference	:	SUBIN-DLDL96270305293890128756X
Purchased by	:	SRJX RESEARCH AND INNOVATION LAB LLP
Description of Document	:	Article 48(c) Power of attorney - GPA
Property Description	:	Not Applicable
Consideration Price (Rs.)	:	0 (Zero)
First Party	:	SRJX RESEARCH AND INNOVATION LAB LLP
Second Party	:	ZAINAB SYED AND ASSOCIATES
Stamp Duty Paid By	:	SRJX RESEARCH AND INNOVATION LAB LLP
Stamp Duty Amount(Rs.)	:	100 (One Hundred only)
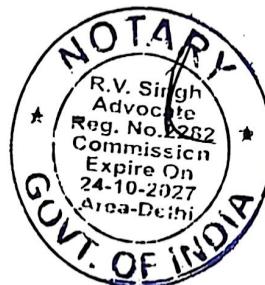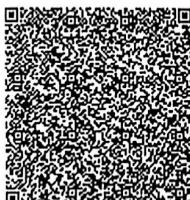
Please write or type below this line   IN-DL35961746213944X

Signature Not Verified

Digitally Signed.
Name: Sudarshana
Bandyopadhyay
Date: 09-Sep-2025 22:31:53
Reason: Patent Filing

FORM FOR AUTHORIZATION OF A PATENT AGENT/OR ANY PERSON IN A
MATTER OR PROCEEDING UNDER THE ACT
[See Sections 127 and 132; Rule 135]

I, **SRJX RESEARCH AND INNOVATION LAB LLP**, Indian, of the address SRJX RESEARCH AND INNOVATION LAB LLP, Plot No - 3E/474, Sector-9, CDA, Post- Markat Nagar, Cuttack-753014, Odisha, India, hereby authorize **Zainab Syed & Associates** having address 3E, Nawab Bhagwanpora, Lal Bazar, Srinagar, Jammu & Kashmir, 190023, India **(Mobile No.: +91 9748818235, Email: bandyopadhyay.sudarshana@gmail.com)** through **Ms. Sudarshana Bandyopadhyay (IN/PA 2802)** and **Ms. Meenu Sharma (IN/PA-2856)**, registered Indian Patent Agents, to act on our behalf and to further appoint attorney(s)/agent(s) in connection with the filing and prosecution of our patent applications for grant of Letters Patent, filing of request for examination, filing request for amendment, recordal of change of name and address, ownership, change of address of service in India, renewal of patent, recordal of assignments, filing and defending oppositions and infringement actions, restoration of patents, registration of documents and such other actions and all proceedings under the Patents Act, 1970 and the Patent Rules, 2003 and all such proceedings before the Patent Office or the Government of India or any Court in India and all acts and things as the said attorney may deem necessary or expedient in connection therewith or incidental thereto.

We further request that all notices, requisitions and communication relating thereto may be sent to such person/s at the corresponding address mentioned below:

Ground Floor, S-456, LGF, Greater Kailash – II, New Delhi – 110048, India,

(Contact No.: +91 9748818235; Email: bandyopadhyay.sudarshana@gmail.com)

We, hereby, revoke all previous authorizations, if any, in respect of the proceedings.

We, hereby, assent to the action already taken by the said person/s in the above matter.

Dated this **14th day of August, 2025**

<div align="right">

SRJX RESEARCH AND INNOVATION LAB LLP
Through:

Signature: *Soumya Ranjan Jena*

Name: Dr. Soumya Ranjan Jena
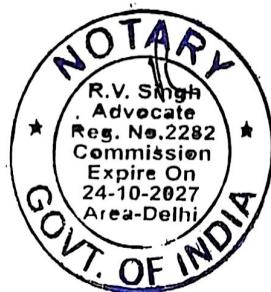
Company
Seal:

</div>

SRJX Research and Innovation Lab LLP
LLPIN ACO-1435

To,
The Controller of Patents,
The Patent Office,
Kolkata

ATTESTED

Notary Public Delhi

1 6 AUG 2025

FORM 9

THE PATENTS ACT, 1970

(39 of 1970)

&

THE PATENTS RULES, 2003

REQUEST FOR PUBLICATION

[See Section 11A(2); Rule 24A]

We, SRJX RESEARCH AND INNOVATION LAB LLP, of the address Plot No - 3E/474, Sector-9, CDA, Post- Markat Nagar, Cuttack-753014, Odisha, India, hereby request for an early publication of our Patent Application No. _____ filed on 9 September 2025 under Section 11A(2) of the Act.

Dated this 9th day of September 2025

Sudarshana

Sudarshana Bandyopadhyay
Regn No.: IN/PA 2802
Agent for the Applicants
Email: bandyopadhyay.sudarshana@gmail.com
Phn No: 9748818235

FORM 3

THE PATENTS ACT,

1970 (39 of 1970)

and

THE PATENTS RULES,
2003

STATEMENT AND UNDERTAKING UNDER SECTION 8

(See section 8; Rule 12)

1. Name of the applicant(s).	We, SRJX RESEARCH AND INNOVATION LAB LLP, Plot No - 3E/474, Sector-9, CDA, Post-Markat Nagar, Cuttack-753014, Odisha, India hereby declare:
2. Name, address and nationality of the joint applicant.	(i) that we have not made any application for the same/substantially the same invention outside India Or (ii) that we who have made this application No date 9th September 2025 alone/~~jointly~~ ~~with~~ ...., made for the same/ substantially same invention, application(s) for patent in the other countries, the particulars of which are given below:

Name of the country	Date of application	Application No.	Status of the application	Date of publication	Date of grant
N.A.					

3. Name and address of the assignee	(iii) that the rights in the application(s) have been assigned to SRJX RESEARCH AND INNOVATION LAB LLP, Plot No - 3E/474, Sector-9, CDA, Post-Markat Nagar, Cuttack-753014, Odisha, India

	that we undertake that upto the date of grant of the patent by the Controller, we would keep him informed in writing the details regarding corresponding applications for patents filed outside India within six months from the date of filing of such application. Dated this 9th day of September 2025
4. To be signed by the applicant or his authorized registered patent agent.	Sudarshana Signature. ....
5. Name of the natural person who has signed.	Sudarshana Bandyopadhyay Regn. No.: IN/PA 2802 Agent for the applicant Phn No. 9748818235 Email: bandyopadhyay.sudarshana@gmail.com
	To The Controller of Patents, The Patent Office, at Kolkata
Note.- Strike out whichever is not applicable;	