DISHWASHER FOR CLEANING UTENSILS

IITM Technology Available for Licensing

Problem Statement

- **Dishwashers** are machines used for automatic dish cleaning, using hot water and scrubbing mechanisms.
- Manual dishwashing relies on **physical scrubbing**, while dishwashers use **hot water spray**.
- Dishwashers are not very popular in India due to **cost, space requirements,** & **pre-rinsing dishes**.
- Also, they are not efficient in removing tough stains from oil & spices of Indian cooking.
- By getting motivation for potential Time, Water, and Energy saving, an eco-friendly & efficient **automatic dishwasher is disclosed in this present patent**.

Technology Category/ Market

Category:, Robotics & Automation, Applied Mechanics & Mechanical Engineering

Industry: Appliance and Home Appliance Industry

Applications: Household Use, Restaurants, Cafeterias, School, Hostel & Industrial Kitchens, Military & Camp Facilities Catering & Food services, Hotels, Hospitals, Hospitality & Healthcare Facilities.

Market: The global dishwasher market size was valued at **$ 25,370.0 M in 2020**, and is estimated to reach **$ 54,293.4 M by 2030**, registering a **CAGR of 7.5% from 2021 to 2030.**

Technology

The instant invention discloses a **dishwasher for cleaning utensils comprising:**

a first cleaning assembly for cleaning one or more flat utensils arranged vertically in a horizontal plane of dishwasher,

a second cleaning assembly for cleaning one or more flat utensils arranged horizontally in a vertical plane of the dishwasher,

a third cleaning assembly for cleaning one or more curved utensils

Each of the first, second & third cleaning assembly comprises of a **pressure exerting member** for imparting pressure to the scrubbing member in a pre-determined direction. **Refer: Fig 1 & 2.**

Image

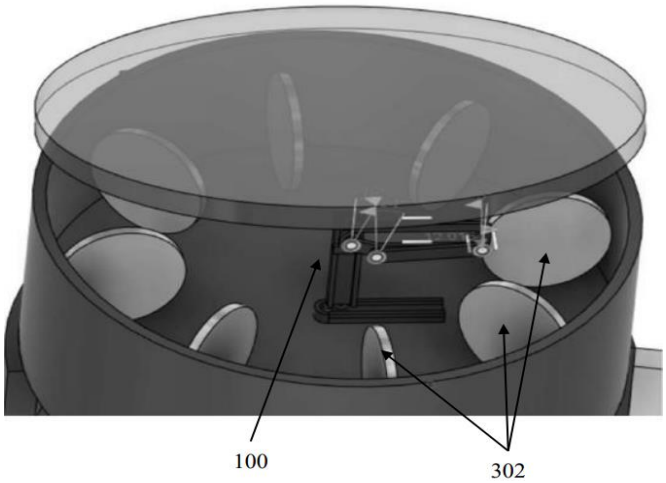

Fig. 1 illustrates a perspective view of the **first cleaning assembly** adapted to clean **flat utensils** arranged vertically in a horizontal plane of dishwasher.

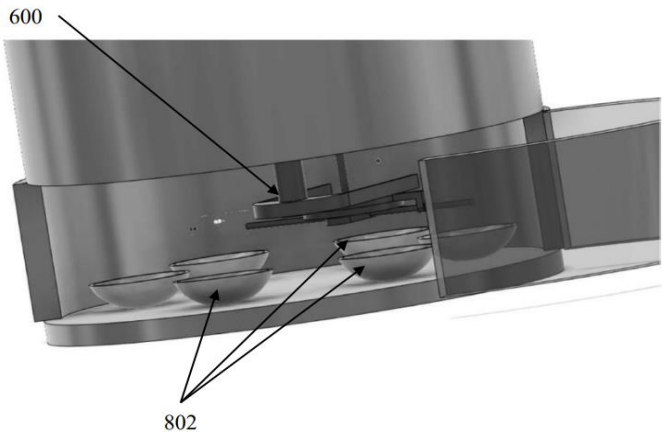

Fig. 2 illustrates a perspective view of the **third cleaning assembly** adapted to clean **curved utensils** placed in a chamber of the dishwasher.

TRL (Technology Readiness Level)

TRL – 3; Proof of Concept

Research Lab

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Intellectual Property

IITM IDF Number: 2409
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Key Features / Value Proposition

❖ **User Perspective:**

1. **Hassle-free** and **efficient** dish cleaning for various utensil types, with **Effective Stain Removal, ensuring spotless dishes**.
2. **Convenient, Easy operated, automated, and time-saving.**
3. **Suitable** for different kitchen needs and **utensil shapes, offering versatility.**
4. The proposed mechanism aims to **better remove tough stains from oil and spices** compared to existing dishwashers.

❖ **Industrial Perspective:**

1. **Enhanced Efficiency**: Boosts productivity in commercial settings by speeding up dishwashing.
2. **Expanded Market**: Addresses specific cleaning challenges, broadening its market appeal.
3. **Customizable**: Adaptable for diverse industrial kitchens, accommodating various setups.
4. **Hygiene Compliance**: Ensures compliance with strict hygiene standards in critical industries.
5. **Improved Product**: Represents an innovative and superior dishwasher for a broader market.

❖ **Technology Perspective:**

1. **Mechanical Innovation**: Incorporates advanced mechanical mechanisms for precision cleaning.
2. **Automation**: Streamlines dishwashing through automated processes, reducing manual labor.
3. **Versatile Application**: Adaptable technology suitable for various dishwasher models and sizes.
4. **Smart Sensors**: Utilizes sensors to optimize cleaning pressure based on food residue levels.
5. **Effective Stain Removal**: Employs technology to tackle challenging stains, including oil and spices.
6. It uses **Slider Crank and Scotch Yoke mechanisms** for flat plate and bowl cleaning.
7. **Different pressure levels** are applied to dishes based on food concentration.

FIG 3 illustrate perspective views of the **first cleaning assembly and the third cleaning assembly disposed in a chamber and a second chamber of the dishwasher,** respectively.

❖Model Design:

First Cleaning Assembly:

- This assembly has a horizontal link that can move side to side and rotate about one end.
- A frame moves up and down along a vertical path guided by a vertical link.
- There's a scrubbing member attached to the frame using a four-bar linkage (slider-crank mechanism) that allows it to move up and down for cleaning flat utensils.

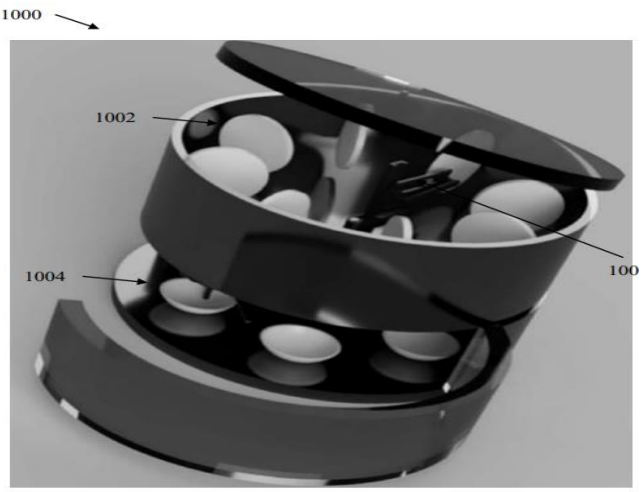
Second Cleaning Assembly:

- It consists of a frame that moves along a guided path provided by a rotatable link.
- A scrubbing member is part of this assembly.
- A vertical link is responsible for moving the frame and the four-bar linkage mechanism vertically.
- The scrubbing member, through the four-bar linkage, can move to clean flat utensils.

Third Cleaning Assembly:

- This assembly uses a scotch-yoke mechanism that moves within a frame's guideway.
- A scrubbing member is designed for cleaning curved utensils.
- The scrubbing member connects to a slider within the scotch-yoke mechanism, allowing it to move in a specific direction.
- The slider connects to a rotatable plate within the scotch-yoke mechanism to enable precise movement for cleaning the inner surface of curved utensils.

These cleaning assemblies use various mechanical mechanisms to move scrubbing members in different ways to effectively clean both flat and curved utensils.



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