



Industrial Consultancy & Sponsored Research (IC&SR)

AUTOMATED COVERSLIPPER FOR LARGE FORMAT SLIDES WITH SWITCHABLE COMPATIBILITY TO HANDLE MULTI FORMAT SLIDES

IITM Technology Available for Licensing

PROBLEM STATEMENT

- **Coverslipping** is a process where protective glass sheets are applied to glass slides with tissue specimens.
- The goal is to **protect the specimen** from external impacts and improve visibility by straightening the tissue.
- Current automated coverslippers can only handle smaller slide sizes, typically **25 x 75 mm (1" X 3")** slides.
- There's a need for an efficient way to automate coverslipping of large format histology slides (**150 X 200mm**) while maintaining compatibility with medium and small slides.
- Current commercial products can only process **1 X 3 slides**.
- A device controlled by a **custom-defined protocol logic** is needed for error-free coverslipping of large format slides.
- The device should be **capable of handling stacks of large format slides** and continuously perform the process.
- An improved coverslipping and dispensing technique is needed to ensure **uniform distribution of mountant medium** and minimize air gaps.

TECHNOLOGY CATEGORY MARKET

Technology: Automated coverslipper to handle multi format slides

Category: Biotechnology & Genetic Engineering

Industry: Biomedical

Application: Tissue engineering

Market: The global market size was valued at **USD 184.5 Million in 2023** and is projected to reach **USD 259.2 Million by 2030**, growing at a **CAGR of 5.1%** during the forecast period **2024-2030**.

INTELLECTUAL PROPERTY

IITM IDF Ref. 2202 ,Patent No: IN 546396
PCT/IN2022/050598

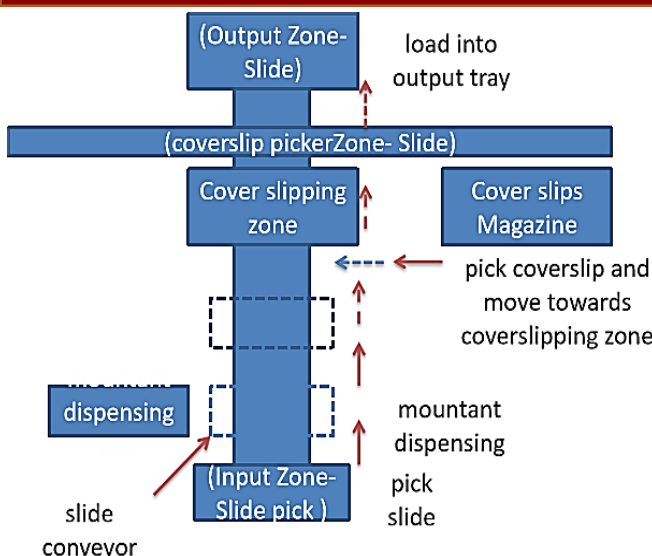
TRL (Technology Readiness Level)

TRL- 4, Experimentally validated in Lab;

Research Lab

Prof. Jayaraj Joseph & Prof. Mohanasankar sivaprakasam,
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TECHNOLOGY



1 • A coverslipping system consists of a coverslipper device on a frame that moves from one or more zones.

2 • The input zone has a slide tray with stained slides, which the coverslipper device picks up from a platform.

3 • The dispensation zone dispenses a mountant medium, and the slip pick-up zone picks up the coverslips from the tray.

4 • The coverslipping zone positions the platform in the coverslipping zone, and the picked coverslip is mounted over the slide.

5 • The output zone transports the processed cover slip slide and inserts it into a tray, which is moved up and down to accommodate the next processed slide.

CONTACT US

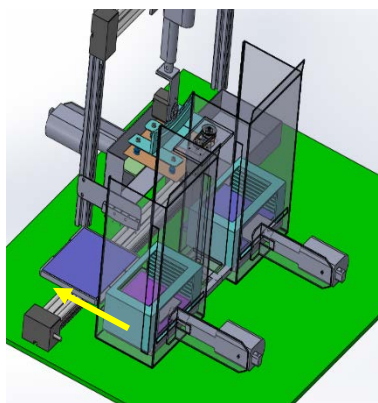
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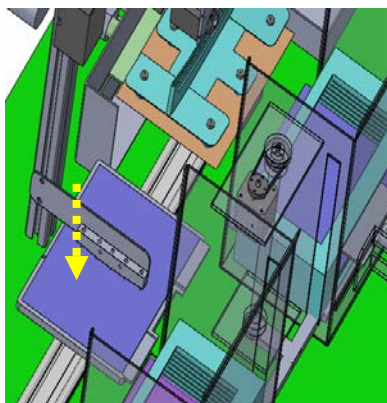
Email: headtto-icsr@icsrpis.iitm.ac.in
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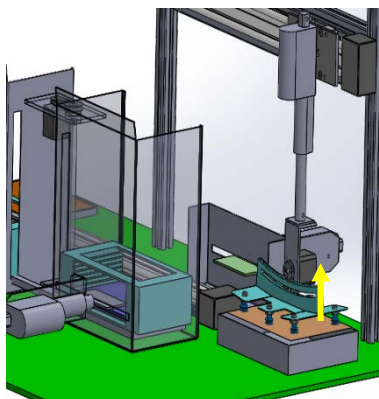
Fig 1 shows the sequence of operations using the slide transport system that is associated with the coverslipper



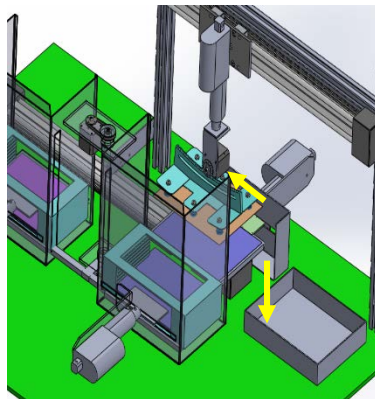
(1 a) Loading of glass slide on conveyor



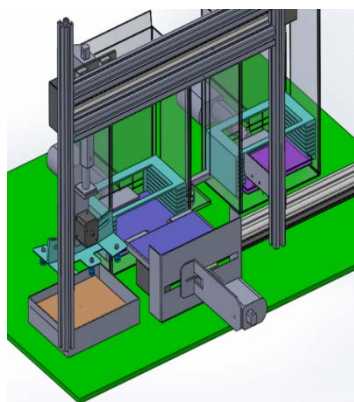
(1 b) Dispensing mountant on slide



(1 c) Picking up cover slip



(1 d) Positioning & cover slipping



(1 e) Unloading the slide into output tray

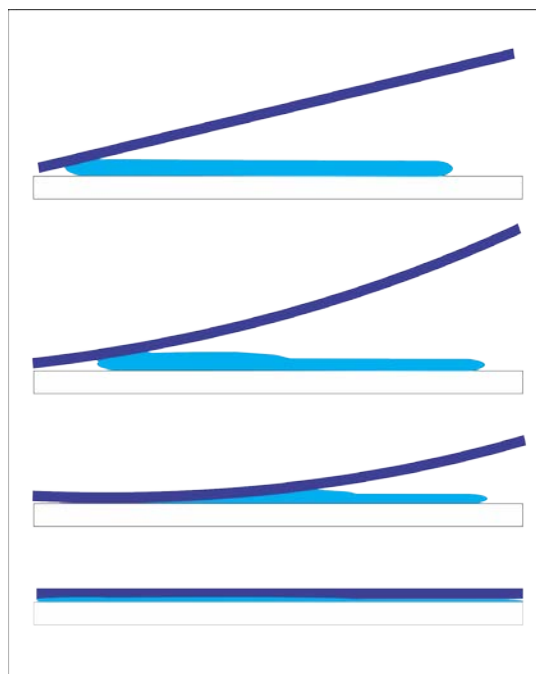


Fig 2 Cover-slip technique

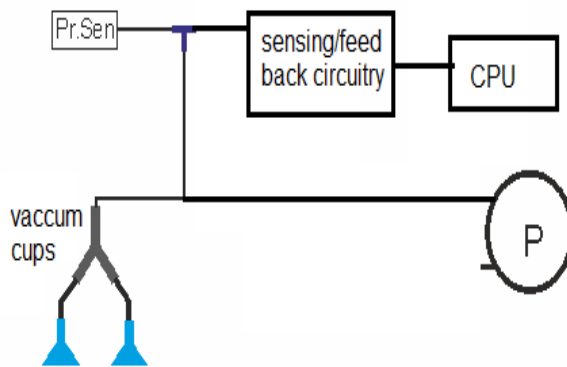


Fig 4: Pressure sensing circuitry

Fig 3: 60mm wedge nozzle

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Fig 5 illustrates an electromechanical system control unit associated with the system architecture of the coverslipper device

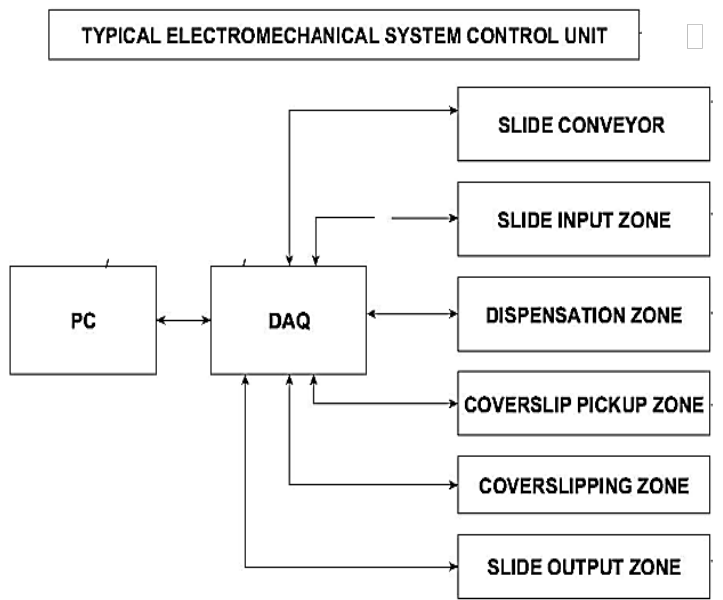


Fig 6: 1 stripe of each 8 to 9ml of mounting medium



Fig 7: Output after cover-slipping - no air bubbles

Key Features / Value Proposition

Coverslipper Device Overview

- Processes large format slides of 6" X 8" and 5" X 7", and can be customized to smaller sizes.
- Features a slide tray with stained slides inserted into grooves for easy pick-up. Uses a wedge-shaped nozzle to uniformly dispense mountant medium over the slide.
- Controlled by a dedicated algorithm for accurate and uniform placement and air bubble prevention.
- Composed of a vertical plate, a first curved plate, and a second curved plate.
- Rotates the second curved plate along a predefined path, allowing vacuum suction cups to lift the cover slip.
- Achieves a unique locus of motion to prevent air pockets and bubbles below the cover slip. The rack mimics human ankle motion between Dorsiflexion and Plantarflexion positions.

Uses and Applications:

- Prevents contact between the microscope's objective lens and the specimen.
- Provides an even thickness (in wet mounts) for viewing depth.
- Viewing enhancement as the specimen is flattened.
- Deceleration of evaporation from the sample, both in wet and dry mounted slides.
- Permanent affixation for long term and repeated use of Permanent Specimens.

Large Format Specimen Protection and Storage

- Enables long-term preservation and storage of large format specimens.
- Economizes cover-slipping process through indigenous algorithms
- Versatile, supporting multiple slide sizes, a unique feature not found anywhere else
- Supports cover-slipping of large quantities of slides, like adult human brain sections.
- Processes large format cover-slips, a unique feature not developed globally.

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