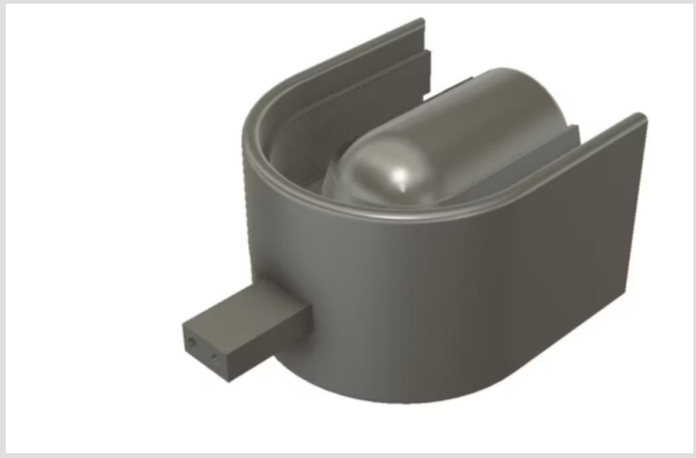
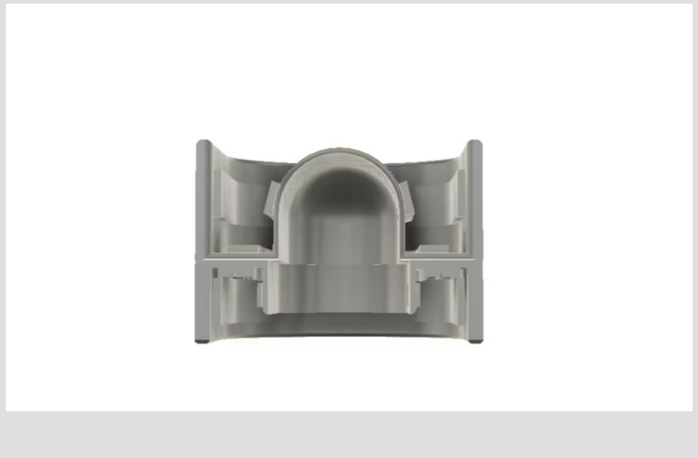
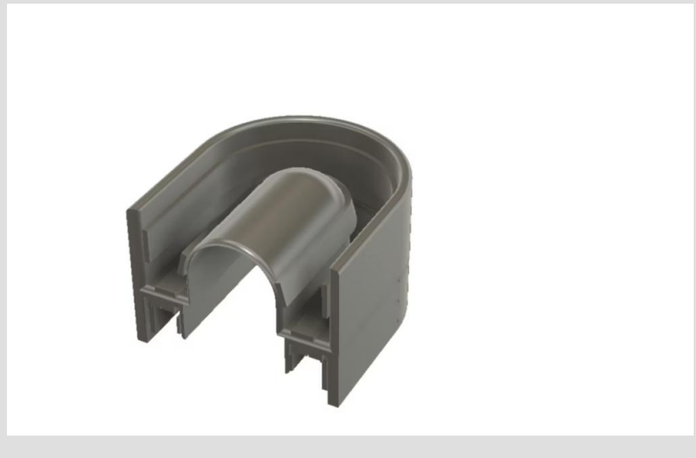
THREE-DIMENSIONAL ORAL IMAGING SYSTEM AND METHOD







1. Overview

Invention Name

THREE-DIMENSIONAL ORAL IMAGING SYSTEM AND METHOD

Patent Application No. & Filing Date

US Application No.: 17/324,980

Filing Date: May 19, 2021

Patent No. & Grant Date

US Patent No.: US 11,382,727 B1

Grant Date: July 12, 2022

Patent Type

Product + Method (System-Based Invention)

Industry

Dental Medical Devices / Digital Dentistry

2. Invention Introduction

This invention discloses a tray-based three-dimensional oral imaging system designed to capture accurate digital dental impressions inside the mouth. Unlike conventional handheld scanners, the system uses a fixed-position dental tray, enabling stable, full-mouth imaging in a single workflow.

It significantly improves scan accuracy, consistency, and patient comfort, making it highly relevant for next-generation digital dentistry platforms.

Abstract & Problem Statement

3. Abstract / Short Description

The invention provides a dental tray with integrated imaging sensors and illumination elements that simultaneously capture images of the teeth, gums, and lips. Built-in airflow or suction channels actively reduce moisture and fogging, a major limitation of existing systems. The system can use stacked trays to capture the entire mouth and bite position at once, generating high-quality 3D digital dental impressions for clinical and manufacturing workflows.

4. Problem Addressed by This Invention

Uncomfortable Traditional Impressions

Traditional dental impressions are uncomfortable, slow, and error-prone

Operator Dependency

Handheld intraoral scanners are highly dependent on operator skill

Quality Degradation

Motion, saliva, and fogging degrade scan quality

Alignment Errors

Upper and lower jaws are scanned separately, causing bite alignment errors

Incomplete Data Capture

Existing systems cannot reliably capture full-mouth data in one stable scan

These issues lead to rescans, longer chair time, and inconsistent results.

5. The Invention as the Solution

The invention replaces handheld scanning with a stationary dental tray that remains fixed inside the mouth while scanning.

How it works:

- Imaging and illumination strips are embedded along the tray contours
- Sensors capture oral data simultaneously from multiple angles
- Airflow/suction channels control moisture and condensation
- Optional stacked trays capture both jaws and bite alignment together

Key Benefits:

- **Stable, motion-free scanning**
- **Reduced operator dependency**
- **Clear imaging in moist oral conditions**
- **Single-session full-mouth scanning**
- Improved patient comfort and efficiency

Technical Features & Differentiation

6. Addressing a Major Gap in Prior Art

What existing solutions lacked:

- No fixed-position intraoral scanning system
- Poor moisture and fog control
- No reliable simultaneous jaw-position capture
- Limited or no extraoral (lip) imaging

How this invention fills the gap:

- Introduces a tray-based, stationary imaging platform
- Integrates active moisture management
- Enables full-mouth + bite capture in one workflow
- Supports extraoral lip imaging for advanced treatment planning

This represents a clear functional advancement over prior art.

7. Protected Features (Based on Claim 1)

U-shaped dental tray

Surrounding teeth and gums

Imaging strips

One or more integrated into the tray

Illumination elements

Built into each imaging strip

Multiple imaging sensors

Capturing data simultaneously

Protective cover layers

Enclosing imaging components

Handle structure

For positioning and operation

These elements form the core enforceable protection of the patent.

8. Key Unique Features (Differentiators)

- [ ] Dental tray–based scanning architecture (not handheld)
- [ ] Integrated sensors + illumination along tray contours
- [ ] Active airflow/suction for fog and moisture control
- [ ] Stacked tray configuration for full-mouth scanning
- [ ] Built-in ramp for accurate bite and jaw alignment
- [ ] Optional extraoral extension for lip imaging
- [ ] Direct generation of 3D digital dental impressions

Commercial Opportunity

9. Benefits to Manufacturers / Licensees

Product Differentiation

Enables strong product differentiation in a crowded scanner market

Reduced Training

Reduces training and skill dependency for end users

Improved Accuracy

Improves scan accuracy, repeatability, and reliability

OEM Integration

Ideal for OEM integration and next-generation scanner platforms

Expanded Offerings

Expands offerings into bite alignment and full-mouth scanning

Strategic Value

Attractive for strategic licensing, product bundling, or acquisition

10. Licensing Opportunity

Available for Exclusive License, Non-Exclusive License, or Outright Sale (USA)

- Flexible commercial terms based on production and go-to-market strategy
- Suitable for dental device manufacturers, digital dentistry platforms, and DSOs

11. About Patent Monetize

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Contact Details:

Name.: Sanaullah Ashrafi

Contact No.: +91 90313 07910

Plot No. C-116, Block C, Sector 2, Noida, Uttar Pradesh – 201301, India

ashrafi@patentmonetize.com

www.patentmonetize.com