

Prepared by: Robert Lovin

Date: 9/2/2026

Core Prior-Art Research

This section is a plain-language research summary based on public evidence. It is not legal advice, a patentability determination, a legal-review opinion, a likelihood of grant, or a go/no-go legal conclusion.

Plain-Language Research Summary

- The disclosed idea describes a consumer-focused smart medication storage system with multiple individually controlled compartments that include temperature and humidity sensors, weight or presence sensors, and electronic locks. A central controller monitors compartment-specific environmental conditions and occupancy, schedules and unlocks compartments at dose times, and attempts to detect whether medication was removed, supporting uses in private homes and assisted-living settings for medication organization, safe storage, and adherence support.
- In research and market context, numerous automated pill dispensers and smart pillboxes already combine scheduling, locking, and basic sensors; therefore moderate-to-high overlap with existing products and patents is likely. The primary technical interest lies in how sensors are fused and how removal/tampering is inferred; pure mechanical/electronic integration and reminder workflows align closely with known solutions, while novel sensing algorithms, failure modes, multi-user or assisted-living workflows, or specific compartment-level access-control schemes would materially affect differentiation.

Closest References and Source Links

- US20160022541A1 - System and method for secure medication dispensing. Source: <https://patents.google.com/patent/US20160022541A1/en> Context: Describes a dispenser/vial system and delivery mechanism relevant to per-compartment dispensing, controlled release, and secure access controls in your idea.
- US20210065866A1 - Smart medication container. Source: <https://patents.google.com/patent/US20210065866A1/en> Context: Covers filling and actuator-based dispensing tied to a patient prescription record, which overlaps with a central controller scheduling and dispensing doses to compartments.
- US11890258B2 - Smart pill box. Source: <https://patents.google.com/patent/US11890258B2/en> Context: Explicitly discloses compartments with access doors and sensors that detect door open/close and item placement, directly relevant to compartment-level sensing and access detection.

- CN103889390B - Pill boxes, medication management systems, and medication dispensing systems. Source: <https://patents.google.com/patent/CN103889390B/en> Context: Claims multi-compartment pillbox arrangements and management features that map to your device's compartmented storage and scheduling use cases.
- WO2021007353A1 - Devices and methods for security and tracking of items. Source: <https://patents.google.com/patent/WO2021007353A1/en> Context: Focuses on secure retrieval and tracking of contents within a container, relevant to electronic locks, tamper detection, and item tracking in your system.

Overlap Evidence

- [US20160022541A1 - System and method for secure medication dispensing](#) - Describes a dispenser/vial system and delivery mechanism relevant to per-compartment dispensing, controlled release, and secure access controls in your idea.
- [US20210065866A1 - Smart medication container](#) - Covers filling and actuator-based dispensing tied to a patient prescription record, which overlaps with a central controller scheduling and dispensing doses to compartments.
- [US11890258B2 - Smart pill box](#) - Explicitly discloses compartments with access doors and sensors that detect door open/close and item placement, directly relevant to compartment-level sensing and access detection.
- [CN103889390B - Pill boxes, medication management systems, and medication dispensing systems](#) - Claims multi-compartment pillbox arrangements and management features that map to your device's compartmented storage and scheduling use cases.
- [WO2021007353A1 - Devices and methods for security and tracking of items](#) - Focuses on secure retrieval and tracking of contents within a container, relevant to electronic locks, tamper detection, and item tracking in your system.
- [US9965594B2 - Digital dispenser system](#) - Describes a cartridge/dispenser with communication about stored medicament, which overlaps with device-to-cloud or cartridge-controller information flows in your design.
- A smart pill container for improved medication — (paper) Prototype work integrating weight sensing and embedded controller (Raspberry Pi) for pillbox adherence monitoring, matching your weight/presence sensing and removal inference features.
- IoT-Enabled Smart Medication System for Elderly Care with Bioengineering Integration — (paper/thesis) Presents an IoT medication system for elder care with sensing and connectivity, supporting your target deployment and remote-monitoring aspects.

- Design and development of automated dispensing machine as medical device-based application: A review — (paper) Reviews sensor and control choices for automated dispensers, useful prior-art context for selecting sensors (temp/humidity/weight) and actuator designs.

Confidence and Context

- Technical Novelty: multiple core features (per-compartment locking, scheduled unlocking, weight/presence sensing) map to existing patents and prototypes, indicating heavy technical overlap.
- Market Uniqueness: consumer products and research prototypes already target medication adherence with similar sensors and workflows, so commercial differentiation appears limited without unique UX or advanced analytics.
- Patent Risk: observed prior-art documents and granted patents show many similar mechanisms; this assessment describes observed overlap context (not a legal opinion) to guide further technical and patent research.

Differentiation Brief

This brief addresses the invention features to compare against the cited research evidence. It identifies research signals and questions to discuss with counsel; it does not draft claims or decide patentability.

Evidence-Linked Differentiators

Feature: Individually controlled compartments with selective electronic locks (per-compartment access control)

Overlap Strength

- High

Primary Impact

- Strong prior-art coverage reduces novelty for basic per-compartment electronic locking and selective access.

Patent Overlap

- [US11890258B2 - Smart pill box](#)
- [WO2021007353A1 - Devices and methods for security and tracking of items](#)
- [CN103889390B - Pill boxes, medication management systems, and medication dispensing systems](#)

Product / Research Overlap

- A smart pill container for improved medication (paper)

Score Impact

- Technical Novelty: Decrease
- Market Uniqueness: Decrease
- Patent Risk: High impact

Feature: Central controller that schedules doses and unlocks specific compartments (dose scheduling □ selective unlocking)

Overlap Strength

- High

Primary Impact

- Multiple filings cover controller-driven dispensing/scheduling, lowering novelty of basic scheduler□unlock behavior.

Patent Overlap

- [US20160022541A1 - System and method for secure medication dispensing](#)
- [US20210065866A1 - Smart medication container](#)
- [US9965594B2 - Digital dispenser system](#)

Product / Research Overlap

- Design and development of automated dispensing machine as medical device-based application: A review (paper)

Score Impact

- Technical Novelty: Decrease
 - Market Uniqueness: Decrease
 - Patent Risk: High impact
-

Feature: Weight/presence sensors per compartment to detect likely medication removal

Overlap Strength

- High

Primary Impact

- Strong coverage in both prototypes and patents for weight/presence detection means this feature is well represented in prior art.

Patent Overlap

- [US11890258B2 - Smart pill box](#)
- [CN103889390B - Pill boxes, medication management systems, and medication dispensing systems](#)

Product / Research Overlap

- A smart pill container for improved medication (paper)
- IoT-Enabled Smart Medication System for Elderly Care with Bioengineering Integration (paper)

Score Impact

- Technical Novelty: Decrease
 - Market Uniqueness: Decrease
 - Patent Risk: High impact
-

Feature: Compartment-level environmental monitoring (temperature and humidity sensing)

Overlap Strength

- Medium

Primary Impact

- Environmental monitoring in medication storage is discussed in reviews and some smart-container filings, creating moderate prior-art overlap for sensorized storage conditions.

Patent Overlap

- [US20210065866A1 - Smart medication container](#)
- [US9965594B2 - Digital dispenser system](#)

Product / Research Overlap

- Design and development of automated dispensing machine as medical device-based application: A review (paper)
- IoT-Enabled Smart Medication System for Elderly Care with Bioengineering Integration (paper)

Score Impact

- Technical Novelty: Decrease
 - Market Uniqueness: Decrease
 - Patent Risk: Medium impact
-

Feature: Tamper detection / inference of removal using fused sensor streams (sensor fusion to distinguish removal vs. tamper)

Overlap Strength

- Medium

Primary Impact

- Prior art addresses tracking and basic tamper/security; the specific sensor-fusion inference approach is less directly claimed in listed items, leaving room for algorithmic differentiation.

Patent Overlap

- [WO2021007353A1 - Devices and methods for security and tracking of items](#)
- [US11890258B2 - Smart pill box](#)
- [US20250329209A1 - Apparatus and method for an oral nicotine dispensing system](#)

Product / Research Overlap

- Digital Biomarkers Transforming Modern Healthcare through Continuous Monitoring (paper) [discusses inference from continuous streams]
- A smart pill container for improved medication (paper)

Score Impact

- Technical Novelty: Positive (Increase) if your fusion/algorithms are distinct
- Market Uniqueness: Positive (Increase) if inference accuracy/UX improve outcomes
- Patent Risk: Medium impact

Features to Investigate Further

- [Per-Compartment Environmental Sensing Granularity - Research question: Do the cited references disclose separate temperature and humidity sensors at the individual compartment level with stated accuracy/sampling rates, or are environmental measurements described only at the device/cabinet level? Evidence to compare: US20210065866A1 \(Smart medication container\); "Design and development of automated dispensing machine as medical device-based application: A review" \(paper\).](#)
- [Multi-Sensor Inference for Removal vs Tamper - Research question: Do the patents/papers disclose algorithms or multi-sensor decision rules that distinguish intentional medication removal from accidental movement or tampering using combined weight, door/open, and motion sensors, or do they rely on single-sensor triggers? Evidence to compare: US11890258B2 \(Smart pill box\); WO2021007353A1 \(Devices and methods for security and tracking of items\); "Digital Biomarkers Transforming Modern Healthcare through Continuous Monitoring" \(paper\).](#)

- [Partial-Dose \(Single-Unit\) Removal Detection - Research question: Do any references claim detection and reporting at single-pill or sub-compartment quantity resolution via weight/presence sensing, or do they report only compartment open/closed or full/empty events? Evidence to compare: "A smart pill container for improved medication" \(paper\); US9965594B2 \(Digital dispenser system\).](#)
- [Remote Access, Override, and Audit Trail Specifics - Research question: Do the cited documents describe authenticated remote unlocking/override mechanisms tied to secure audit logs or chain-of-custody records, or do they present only notification/monitoring without documented authenticated remote control and tamper-resistant logging? Evidence to compare: WO2021007353A1 \(Devices and methods for security and tracking of items\); BR102020009344A2 \(SYSTEM AND METHOD FOR REGISTRATION, ANALYSIS, STORAGE AND RECOVERY OF DIGITAL ...\).](#)

Unresolved Research Questions

- Which technical details most clearly differ from the named closest references?
- Which crowded feature areas need narrower targeted follow-up research?
- Which evidence items should be reviewed with counsel before deciding on legal work?

Next Steps Plan

Research Boundary: This plan is for research organization and preparation only, not legal advice or a patentability/legal-review opinion.

Observed Prior Art Context: Based on the patent and research evidence in the report, prior-art density is moderate-to-high for core mechanisms—per-compartment electronic locks, scheduler-driven selective unlocking, and weight/presence sensing are repeatedly disclosed in patents such as US11890258B2, US20210065866A1, US20160022541A1, US9965594B2, WO2021007353A1 and CN103889390B and in multiple research prototypes/papers (e.g., the IEEE smart-pill container and IoT medication system work); compartment-level temperature/humidity monitoring appears in some references but with less direct claim coverage, and explicit multi-sensor fusion algorithms to distinguish removal vs. tampering are less consistently described—Final Score 42.0 is a directional consumer-research signal reflecting substantial overlap in the core mechanical/sensing features and moderate opportunity around analytics and sensing specifics.

Prioritized Actions:

- Clarify the specific sensor models, measurement resolution/accuracy, sampling intervals, locking mechanism types, communication stack, and controller decision rules that materially affect how the invention maps to disclosed references.
- Compare the invention against US11890258B2, US20210065866A1, US20160022541A1, US9965594B2, WO2021007353A1, and CN103889390B by mapping each feature (compartment lock, scheduler, weight/presence sensing, temp/humidity monitoring, sensor-fusion inference, and remote/audit behaviors) to the closest claims, figures, and descriptions.
- Preserve development records, dated design notes, prototype schematics, sensor data samples, and source research citations in a secure, versioned repository for use in internal analysis and counsel briefings.
- Decide whether targeted follow-up research and counsel-preparation questions based on identified gaps (particularly sensor-fusion methods, per-compartment environmental sensing specs, and authenticated remote-access/audit details) are needed for specific features.
- Prepare concise questions and materials for counsel, including a one-page feature matrix, prioritized patent excerpts/figures, performance data, and exemplar prototype logs to focus legal and technical review.

Recommended follow-up analyses:

- Extract and summarize the closest claim language and figures from US11890258B2 and US20210065866A1 to support targeted comparisons.
- Collect representative sensor logs (weight, door, motion, temp/humidity) from prototypes to illustrate current detection accuracy and limits for removal vs. tamper inference.

Evidence Appendix

Top Patent References

Assignees Found

- Exactmed Ltd.
- Nathaniel Gerald Portney
- Tech Pharmacy Services, LLC

- Skyx Ip Holdings I Llc
- Enovate Medical, Llc
- □□□
- Midas Healthcare Solutions, Inc.
- VivA Life, Inc.

System and method for secure medication dispensing

US20160022541A1

- Inventor: Aliasgher Abbas Ali DALAL
- Assignee: Exactmed Ltd.
- Publication: 2016-01-28
- Filing: 2015-07-24
- Priority: 2014-07-24

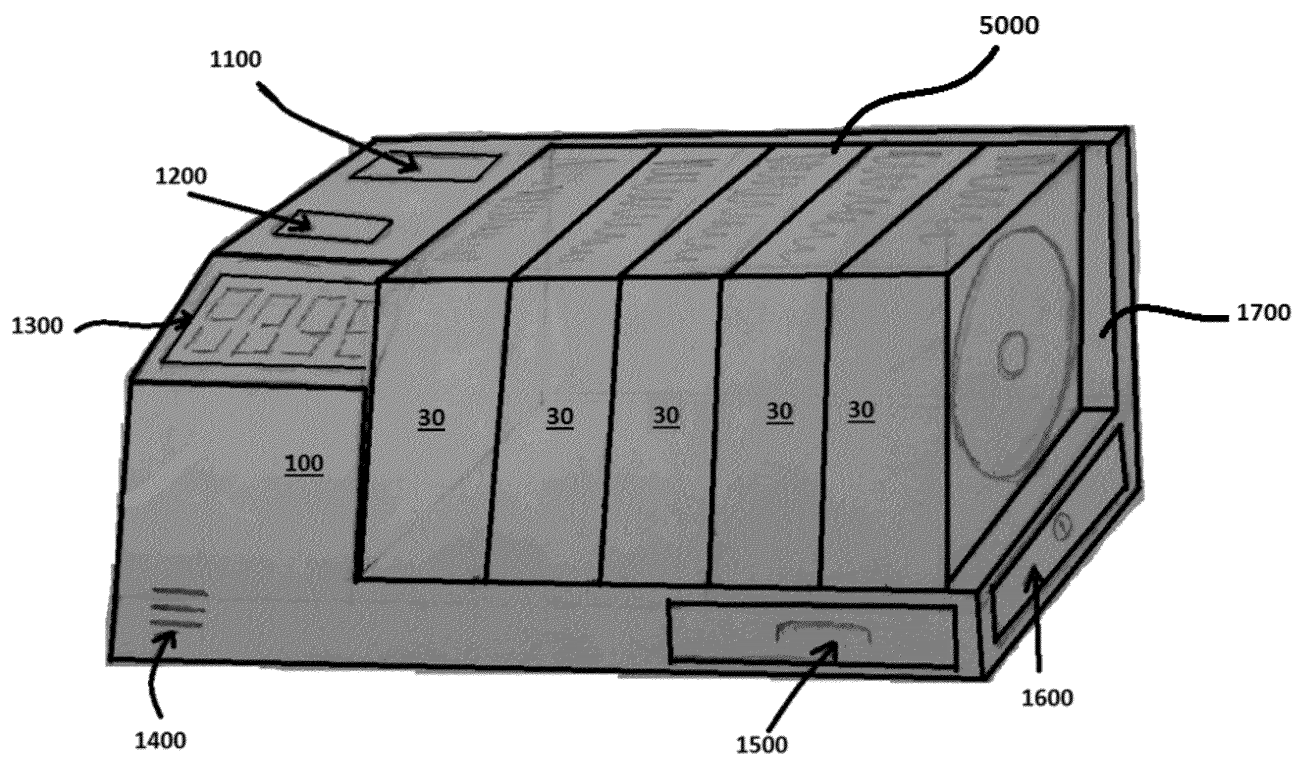
Summary

A dispenser and vial system is disclosed. At least one vial is loaded into a dispenser to automatically dispense dosages of medication made up of units of medication. The vial stores and releases the units of medication. The dispenser has a delivery mechanism configured to dispense a plurality of ...

Links

- Patent: <https://patents.google.com/patent/US20160022541A1/en>
- PDF: <https://patentimages.storage.googleapis.com/61/8d/62/4f7a2e0c88ee8e/US20160022541A1.pdf>

Figures



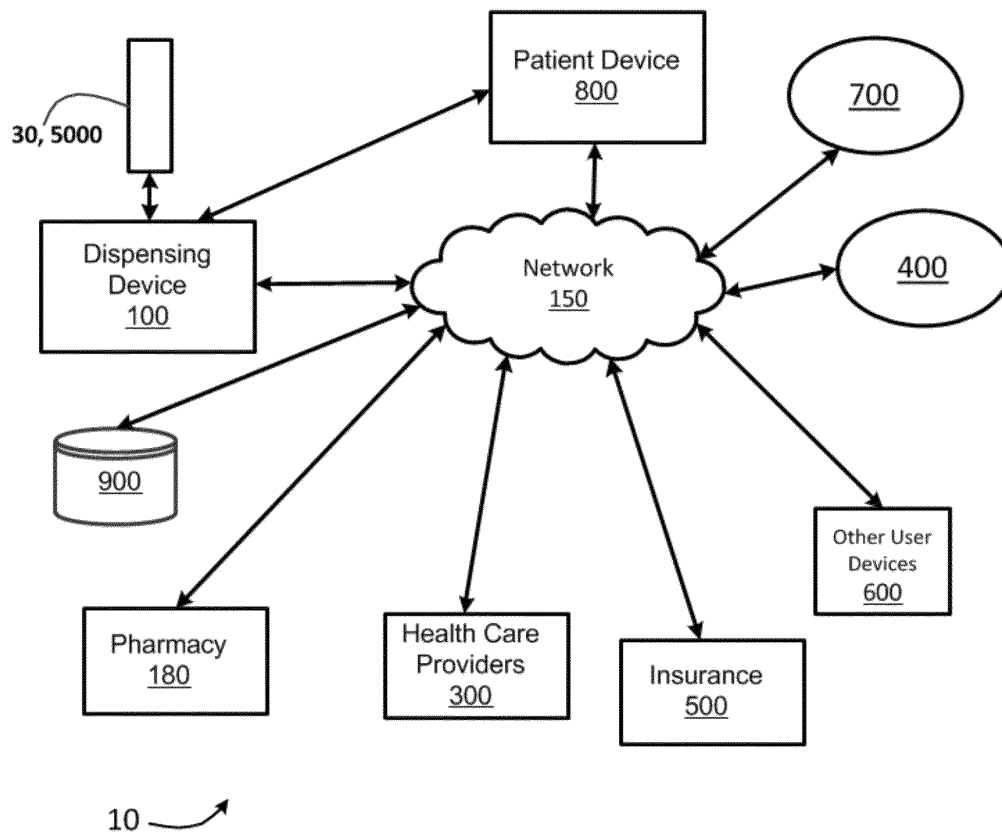


FIG. 1

Jurisdiction Status

- US: NOT_ACTIVE

Jurisdiction Status

- CA: NOT_ACTIVE

Digital dispenser system

US9965594B2

- Inventor: Nathaniel Gerald Portney
- Assignee: Nathaniel Gerald Portney
- Publication: 2018-05-08
- Filing: 2011-08-05

- Grant: 2018-05-08
- Priority: 2010-08-06

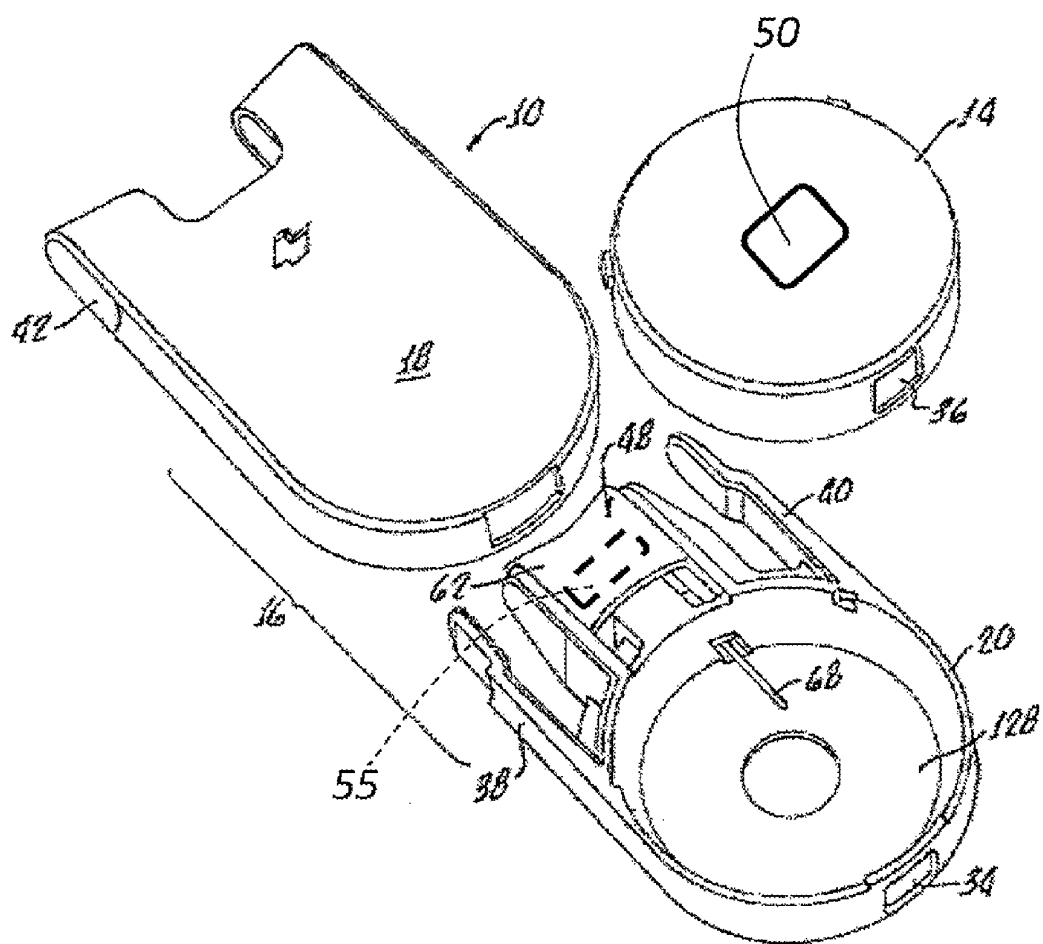
Summary

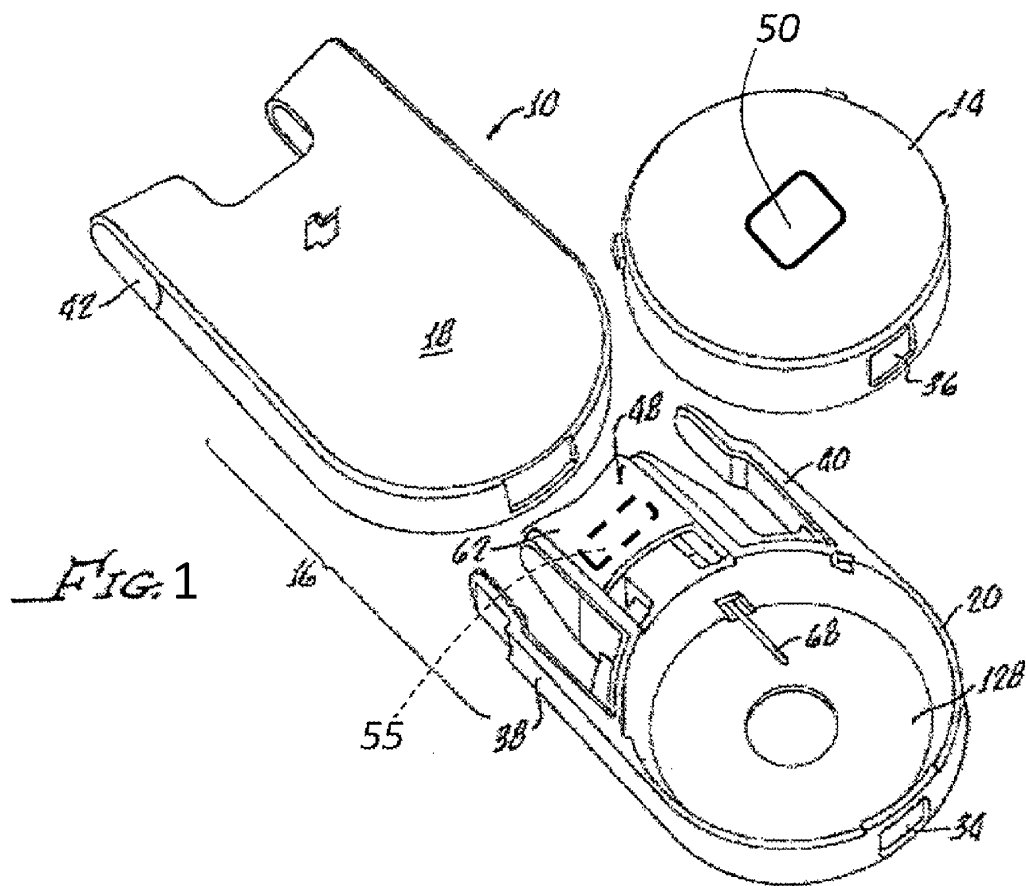
A digital dispenser system including a cartridge for storing a supply of medicament, a mechanical dispenser for metering medicament out of the cartridge, and a communication system established between the cartridge and the dispenser for relaying information about the medicament stored and ...

Links

- Patent: <https://patents.google.com/patent/US9965594B2/en>
- PDF: <https://patentimages.storage.googleapis.com/86/f5/eb/120179d046cc6e/US9965594.pdf>

Figures





Jurisdiction Status

- US: ACTIVE

Smart medication container

US20210065866A1

- Inventor: Omer Einav
- Assignee: Tech Pharmacy Services, LLC
- Publication: 2021-03-04
- Filing: 2020-09-02
- Priority: 2019-09-02

Summary

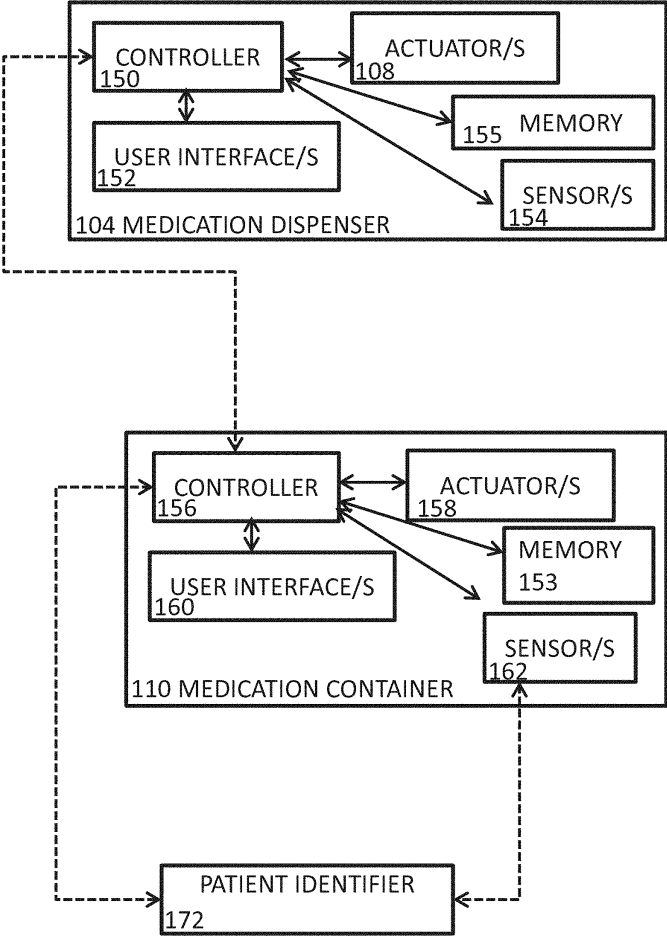
A method of dispensing medication including: filling a medication container with one or more medication dose, using one or more actuator of a medication dispenser device, according to a prescription for a specific patient, where the prescription is stored in a patient record for the specific ...

Links

- Patent: <https://patents.google.com/patent/US20210065866A1/en>
- PDF: <https://patentimages.storage.googleapis.com/89/66/1c/0a3748e3c3247b/US20210065866A1.pdf>

Figures

100



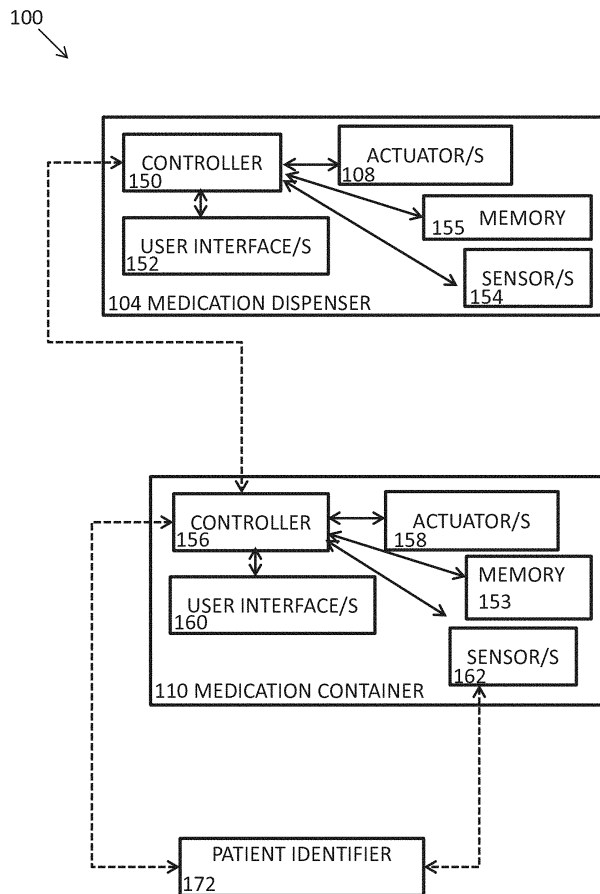


FIG. 1

Jurisdiction Status

- US: NOT_ACTIVE

Smart medication container

WO2022049499A1

- Inventor: Omer Einav
- Assignee: Tech Pharmacy Services, Llc
- Publication: 2022-03-10
- Filing: 2021-09-01
- Priority: 2020-09-02

Summary

A method of dispensing medication including: filling a medication container with one or more medication dose, using one or more actuator of a medication dispenser device, according to a prescription for a specific patient, where the prescription is stored in a patient record for the specific ...

Links

- Patent: <https://patents.google.com/patent/WO2022049499A1/en>
- PDF: <https://patentimages.storage.googleapis.com/4e/f6/3f/6afd262ffa9639/WO2022049499A1.pdf>

Jurisdiction Status

- WO: NOT_ACTIVE

Apparatus and method for an oral nicotine dispensing system

US20250329209A1

- Inventor: Martin STEINBAUER
- Assignee: Skyx Ip Holdings I Llc
- Publication: 2025-10-23
- Filing: 2024-12-02
- Priority: 2024-04-17

Summary

An apparatus and method for an oral nicotine dispensing system. The apparatus includes storing a plurality of a pods in a magazine within a body, receiving a fingerprint scan from a user via a fingerprint scanner coupled to the body, authenticating the fingerprint scan, deactivating a locking ...

Links

- Patent: <https://patents.google.com/patent/US20250329209A1/en>

Figures

Jurisdiction Status

- WO: ACTIVE

Jurisdiction Status

- US: ACTIVE

Medical cart for dispensing medication

US9367061B2

- Inventor: David R. Miller
- Assignee: Enovate Medical, Llc
- Publication: 2016-06-14
- Filing: 2014-02-07
- Grant: 2016-06-14
- Priority: 2014-02-07

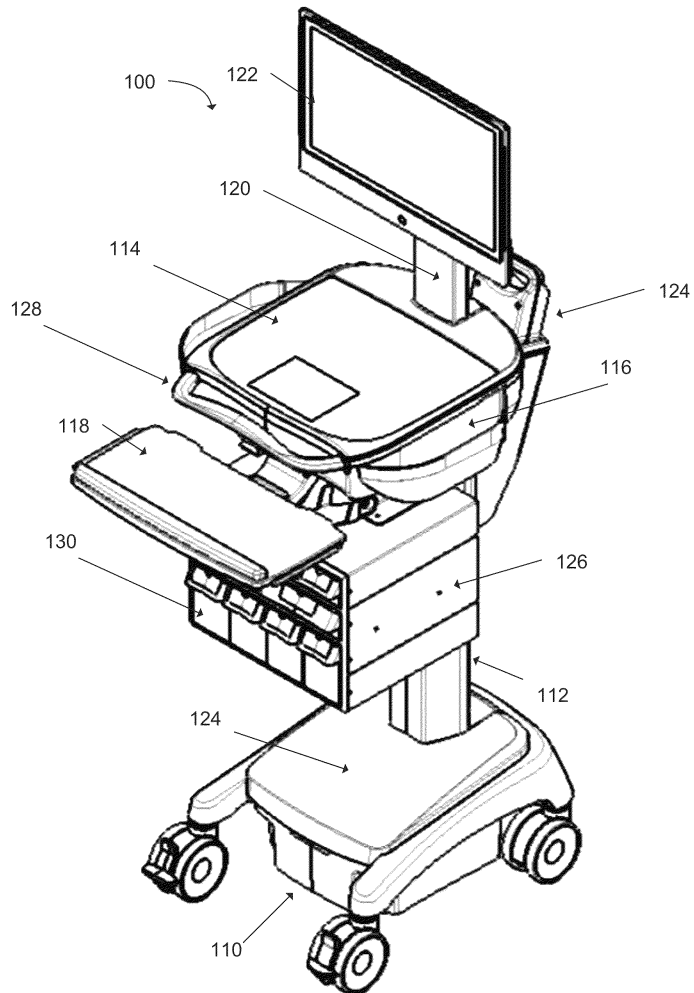
Summary

Technology for dispensing medication from a wheeled medical cart is disclosed. A method comprises placing the medication in a medication storage compartment of a storage container of the wheeled medical cart. A method can further comprise entering medication data into a computing device operating ...

Links

- Patent: <https://patents.google.com/patent/US9367061B2/en>
- PDF: <https://patentimages.storage.googleapis.com/cb/86/10/792433c5f6fd75/US9367061.pdf>

Figures



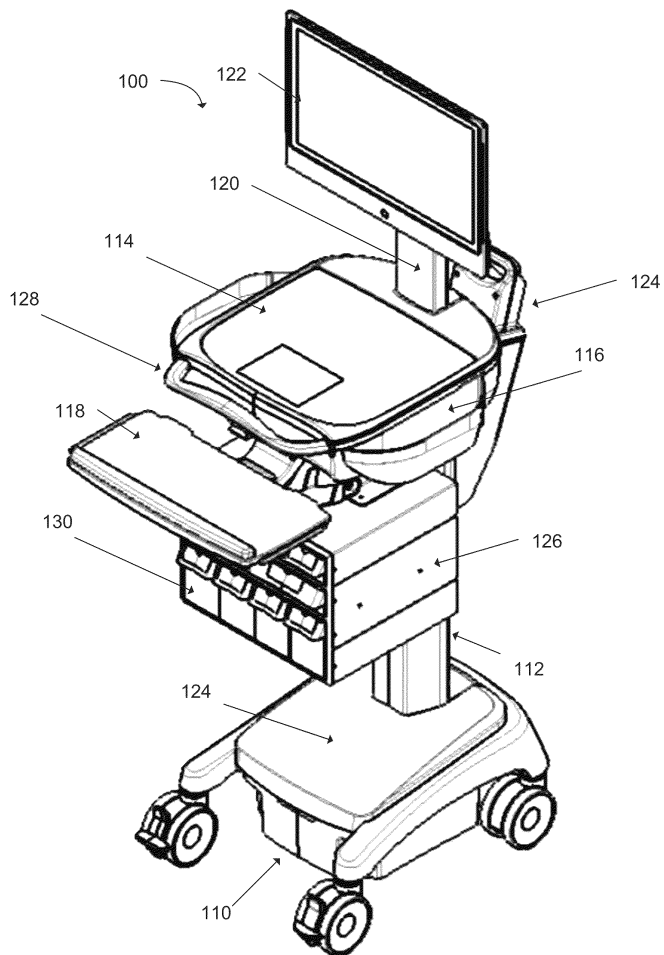


FIG. 1

Jurisdiction Status

- WO: NOT_ACTIVE

Jurisdiction Status

- US: ACTIVE

Pill boxes, medication management systems, and medication dispensing systems

CN103889390B

- Inventor: □□□
- Assignee: □□□
- Publication: 2016-05-11

- Filing: 2012-07-11
- Grant: 2016-05-11
- Priority: 2012-07-11

Summary

The present invention provides a pillbox comprising a plurality of pill containing compartments detachably connected to one another in side-by-side relation to form a unitary structure, each compartment being configured to store pills to be taken at a single predetermined time and having an ...

Links

- Patent: <https://patents.google.com/patent/CN103889390B/en>
- PDF: <https://patentimages.storage.googleapis.com/a8/3b/c2/f28ca251632868/CN103889390B.pdf>

Jurisdiction Status

- WO: NOT_ACTIVE

Jurisdiction Status

- US: ACTIVE

Jurisdiction Status

- CN: ACTIVE

Devices and methods for security and tracking of items

WO2021007353A1

- Inventor: Michael A. LAFAUCI
- Assignee: Midas Healthcare Solutions, Inc.
- Publication: 2021-01-14
- Filing: 2020-07-08

- Priority: 2019-07-09

Summary

The present disclosure provides systems and methods for secure retrieval, tracking, administration, and/or return of contents such as oral medications. In some cases, a system for securing and tracking contents within a container is provided. The system may comprise an adapter configured to couple ...

Links

- Patent: <https://patents.google.com/patent/WO2021007353A1/en>
- PDF: <https://patentimages.storage.googleapis.com/22/7f/ea/47ad498cc4e283/WO2021007353A1.pdf>

Jurisdiction Status

- WO: NOT_ACTIVE

Jurisdiction Status

- US: NOT_ACTIVE

Jurisdiction Status

- CA: ACTIVE

Smart pill box

US11890258B2

- Inventor: Harry L. Wingate, III
- Assignee: Viva Life, Inc.
- Publication: 2024-02-06
- Filing: 2022-12-04
- Grant: 2024-02-06
- Priority: 2019-05-21

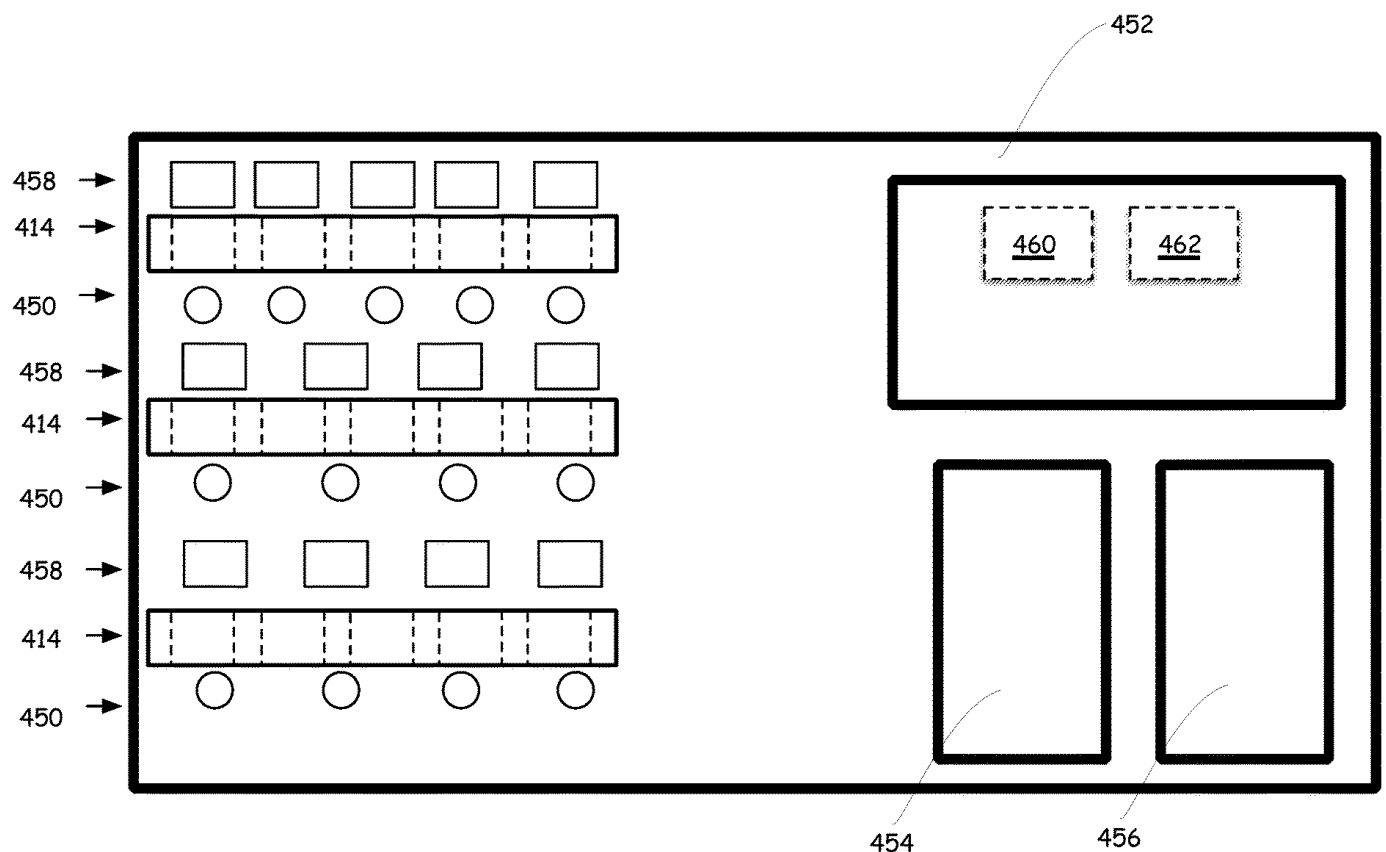
Summary

A device for organizing and tracking medication. The device includes compartments to contain medication, and each compartment includes an access door. A sensor element can detect if the device is moved, if the access door is opened and/or closed, and/or if medications have been placed into or ...

Links

- Patent: <https://patents.google.com/patent/US11890258B2/en>
- PDF: <https://patentimages.storage.googleapis.com/70/dd/7b/1202b96a46c902/US11890258.pdf>

Figures



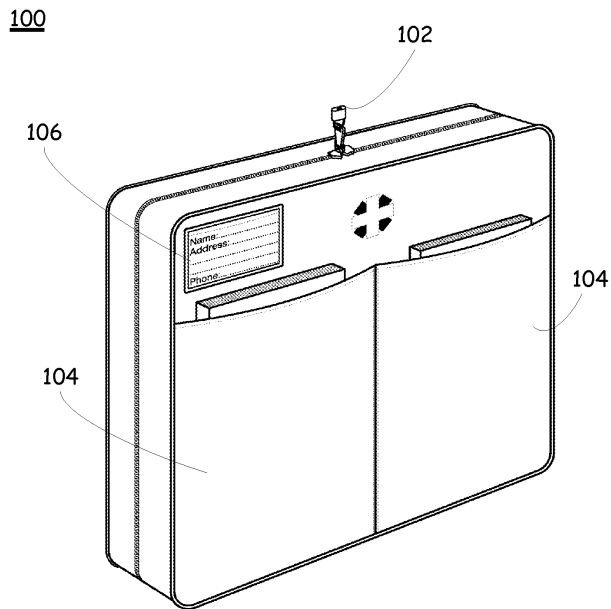


FIG. 1

Jurisdiction Status

- US: ACTIVE

Medication disposal systems and methods of use thereof

US12569893B1

- Inventor: Jonathan PINSKY
- Assignee: Midas Healthcare Solutions, Inc.
- Publication: 2026-03-10
- Filing: 2025-04-17
- Grant: 2026-03-10
- Priority: 2019-04-05

Summary

CROSS-REFERENCE TO RELATED APPLICATIONS This application is a continuation of U.S. patent application Ser. No. 17/492,058, filed Oct. 1, 2021, which is a continuation of International Application No. PCT/US20/26434, filed Apr. 2, 2020, which claims the benefit of U.S. Provisional Application Nos.

Links

- Patent: <https://patents.google.com/patent/US12569893B1/en>

Figures

Jurisdiction Status

- WO: NOT_ACTIVE

Jurisdiction Status

- EP: ACTIVE

Jurisdiction Status

- US: ACTIVE

Jurisdiction Status

- CN: ACTIVE

Jurisdiction Status

- CA: ACTIVE

Supporting Patent Classes (CPC)

CPC Suggestions

- A61J1/00 — Containers specially adapted for medical or pharmaceutical purposes
- G08B21/00 — Alarms responsive to a single specified undesired or abnormal condition and not otherwise provided for

CPC Search Results

- A61J1/00 — Containers specially adapted for medical or pharmaceutical purposes
- US20170075877A1 (2017-03-16)
<https://patents.google.com/patent/US20170075877A1/en>
Methods and systems of handling patent claims
- GB2530501A (2016-03-30)
<https://patents.google.com/patent/GB2530501A/en>
Methods and systems of handling patent claims
- BR102020009344A2 (2021-11-23)
<https://patents.google.com/patent/BR102020009344A2/en>
SYSTEM AND METHOD FOR REGISTRATION, ANALYSIS, STORAGE AND RECOVERY OF DIGITAL
...
- CN121786129A (2026-04-03)
<https://patents.google.com/patent/CN121786129A/en>
An intelligent system for improving the quality of patent classification
- US20160022541A1 (2016-01-28)
<https://patents.google.com/patent/US20160022541A1/en>
System and method for secure medication dispensing
- US9965594B2 (2018-05-08)
<https://patents.google.com/patent/US9965594B2/en>
Digital dispenser system
- US20210065866A1 (2021-03-04)
<https://patents.google.com/patent/US20210065866A1/en>
Smart medication container
- WO2022049499A1 (2022-03-10)
<https://patents.google.com/patent/WO2022049499A1/en>
Smart medication container
- US20250329209A1 (2025-10-23)
<https://patents.google.com/patent/US20250329209A1/en>
Apparatus and method for an oral nicotine dispensing system
- US9367061B2 (2016-06-14)
<https://patents.google.com/patent/US9367061B2/en>
Medical cart for dispensing medication

- CN103889390B (2016-05-11)
<https://patents.google.com/patent/CN103889390B/en>
Pill boxes, medication management systems, and medication dispensing systems
- WO2021007353A1 (2021-01-14)
<https://patents.google.com/patent/WO2021007353A1/en>
Devices and methods for security and tracking of items
- US11890258B2 (2024-02-06)
<https://patents.google.com/patent/US11890258B2/en>
Smart pill box
- US12569893B1 (2026-03-10)
<https://patents.google.com/patent/US12569893B1/en>
Medication disposal systems and methods of use thereof

Related Research

A smart pill container for improved medication

Source - paper

Summary - A paper describing a smart pill box prototype integrating components such as a Raspberry Pi and weight sensing to improve medication management.

Relevance - Directly relevant because it discusses a smart pill container and weight-based sensing for adherence monitoring, which aligns with compartment-level presence/weight sensing and adherence detection.

Link - <https://ieeexplore.ieee.org/abstract/document/10689822/>

IoT-Enabled Smart Medication System for Elderly Care with Bioengineering Integration

Source - paper

Summary - A document (thesis/report) presenting an IoT-enabled medication system for elderly care that integrates sensing and engineering solutions to support medication management.

Relevance - Relevant to the disclosed idea because it covers IoT-based medication systems for elderly care, which may include sensorized compartments, connectivity, and adherence workflows similar to the proposed device.

Link - <https://repositorio-aberto.up.pt/bitstream/10216/176109/2/787397.pdf>

Design and development of automated dispensing machine as medical device-based application: A review

Source - paper

Summary - A review of automated dispensing machines and related device design considerations, including sensors and control systems used in medication dispensing.

Relevance - Relevant as a technical overview of automated dispensers and sensor use, providing context for compartment control, sensing, and dispensing mechanisms in the proposed system.

Link - <https://journals.sagepub.com/doi/abs/10.1177/09544062221099163>

Evolution of smart homes for the elderly

Source - paper

Summary - A paper reviewing smart-home technologies for elderly care, including monitoring and smart-device interactions that support daily activities like medication-taking.

Relevance - Relevant because it situates medication-management devices within broader smart-home monitoring and interaction patterns, useful for multi-user or assisted-living deployments of the invention.

Link - <https://dl.acm.org/doi/abs/10.1145/3041021.3054928>

Digital Biomarkers Transforming Modern Healthcare through Continuous Monitoring

Source - paper

Summary - A paper discussing continuous monitoring technologies and digital biomarkers, including examples of how device data can be used to infer behaviors such as medication adherence.

Relevance - Relevant for sensing and inference aspects of the invention, since it addresses how continuous sensor streams can be used to detect health-related actions like medication removal or adherence patterns.

Link - <https://www.benthamdirect.com/content/journals/eng/10.2174/0118722121379711250618102932>

SMART HOME TECHNOLOGIES IN ELDERLY CARE HOMES

Source - paper

Summary - A report/paper surveying smart home technologies used in elderly care homes, likely covering medication reminders, RFID-enabled pillboxes, and monitoring systems.

Relevance - Relevant because it documents practical technologies and deployments for medication management in assisted-living settings, which overlap with the device's target environment and use cases.

Link - https://www.researchgate.net/profile/Anant-Agrawal-10/publication/398535761_SMART-HOME-TECHNOLOGIES-IN-ELDERLY-CARE-HOMES-AUTHOR-ANANT-AGRAWAL_COURSE_MSC_SUSTAINABLE_MEGA_BUILDINGS/links/6939a9dd27359023a00aaee2/SMART-HOME-TECHNOLOGIES-IN-ELDERLY-CARE-HOMES-AUTHOR-ANANT-AGRAWAL_COURSE_MSC_SUSTAINABLE-MEGA-BUILDINGS.pdf

The Role of Internet of Things (IoT) in Wearable Devices for Disabled Individuals

Source - paper

Summary - A book chapter examining IoT applications in assistive and wearable devices, including systems that report usage and adherence data to caregivers.

Relevance - Relevant to the invention's connectivity and caregiver/remote-monitoring aspects, as it addresses IoT-enabled reporting and monitoring of user interactions with assistive devices.

Link - https://link.springer.com/chapter/10.1007/978-3-031-98897-4_12

Real world strategies for user centered approach to functional assessment and design of age-in-place support for older adults

Source - paper

Summary - A study on user-centered design and evaluation strategies for devices supporting aging-in-place, including trials and sensor testing relevant to medication support devices.

Relevance - Relevant for human factors and validation considerations of the proposed system (e.g., how sensors and alerts are perceived and used by older adults), which affects practicality and adoption.

Link - <https://search.proquest.com/openview/4d57cce5b508c990e6bccb16d67cc35/1?pq-origsite=gscholar&cbl=18750>

Design and fabricate neckwear to improve the elderly patients' medical compliance

Source - paper

Summary - A conference chapter describing a wearable prototype intended to improve medication compliance, focusing on prototype design and evaluation.

Relevance - Relevant because it addresses design and prototyping approaches for devices aimed at improving medication adherence, offering insight into alternative form factors and compliance measurement techniques.

Link - https://link.springer.com/chapter/10.1007/978-3-319-20913-5_21

Idea: A smart medication storage system designed to help users safely store medications and maintain proper dosing schedules. The device contains multiple individually controlled compartments equipped with temperature and humidity sensors, weight or presence sensors, and electronic locks. A central controller monitors each compartment, determines when medication should be taken, unlocks the appropriate compartment, and detects whether medication was likely removed.

CPC-Based Overlap

- US20160022541A1 — System and method for secure medication dispensing — covers dispenser/vial loading and controlled dispensing mechanisms relevant to scheduled compartment release.
- US11890258B2 — Smart pill box — discloses compartments with sensors to detect door open/close and item placement, directly overlapping compartment-level sensing and access detection.
- US9965594B2 — Digital dispenser system — describes a cartridge/dispenser with communication about stored medicament, overlapping controller-cartridge information flows and automated dispensing.

Technical Novelty (30%)

Raw Score: 50

Weighted: $50 \times 0.30 = 15.0$

Explanation: Basic mechanisms (per-compartment locks, scheduler-driven unlocking, weight/presence sensing) are well-represented in prior art; any novelty is likely in specific sensor-fusion algorithms or unique actuator designs.

Market Uniqueness (30%)

Raw Score: 50

Weighted: $50 \times 0.30 = 15.0$

Explanation: Multiple commercial products and prototypes address medication adherence with similar feature sets; market differentiation will depend on measurable improvements in reliability, UX for caregivers/patients, or unique service integrations.

Patent Risk (40%)

Raw Score: 30

Weighted: $30 \times 0.40 = 12.0$

Explanation: Numerous published applications and granted patents disclose overlapping technical elements (locking compartments, scheduled dispensing, presence/weight sensing); this score describes observed overlap and prioritizes further targeted patent research rather than offering a legal conclusion.

Final Score

Technical Weighted: 15.0

Market Weighted: 15.0

Patent Risk Weighted: 12.0

Calculation:

$15.0 + 15.0 + 12.0 = 42.0$

Final Score: 42.0

Overall Summary: The idea shows substantial overlap with existing patents and published prototypes in core mechanical and sensing features; technical novelty is limited unless you can demonstrate distinctive sensor-fusion algorithms, improved tamper/removal inference, or differentiating service/UX elements. Given the number of directly relevant patents, targeted follow-up research is recommended before committing significant development resources.

Key Driver: Breadth and directness of prior-art coverage for per-compartment locking, scheduling, and weight/presence sensing.

If you want next steps, I can propose a short list of targeted follow-up research questions and specific patent documents/claims to analyze in detail.

Educational Appendix

This section provides general information about the U.S. patent process. It does not constitute legal advice.

The U.S. patent process is well documented, but difficult to navigate without context. For first-time inventors, the challenge is not understanding the rules - it is knowing **what decisions to make, and when**.

This paper explains the patent process in simple terms, highlights the points where inventors commonly make costly mistakes, and shows how Patntr.ai supports informed decision-making **before formal filing begins**.

1. What a Patent Actually Is (and Is Not)

A patent is a legal right that allows an inventor to exclude others from making, using, offering for sale, selling, or importing an invention for a limited period of time [1].

Critically:

- A patent protects **specific technical claims**, not general ideas [2]
- Two products can appear similar but have very different patent positions
- Small differences in claim wording can determine approval or rejection

Patent examiners do not evaluate ideas holistically. They evaluate **claims**, line by line, against existing public knowledge. This distinction is the source of much early confusion for first-time inventors [3].

2. The Core Patent Requirements (In Simple Terms)

For an invention to be patentable under U.S. law, it must meet three statutory requirements:

Novelty

The invention cannot already be publicly disclosed [4].

Public disclosure includes:

- Issued patents and published patent applications
- Academic or technical publications
- Public documentation, demonstrations, or product releases

Non-Obviousness

The invention cannot be an obvious modification of existing work, even if it is not identically disclosed [5].

Utility

The invention must have a specific, substantial, and credible practical use [6].

Novelty is evaluated first - and a significant portion of applications fail at this stage [7].

3. Why “Is My Idea Already Patented?” Is the Wrong Question

A common early question is:

“Is my idea already patented?”

The better question is:

“Which parts of my idea already exist - and which parts might be new?”

Patent examiners do not reject entire ideas. They reject **claims** that overlap with prior art.

As a result, an invention may be:

- Partially known
- Incrementally different
- Patentable only in a narrower or more specific form

Understanding this distinction early often determines whether an application should be filed at all - and if so, how narrowly it must be drafted.

4. Prior Art: The Foundation of Every Patent Decision

What Is Prior Art?

Prior art is any publicly available information that is relevant to an invention's technical concepts [8]. This includes:

- Patents and published patent applications
- Technical papers, standards, and manuals
- Public disclosures and documentation

Patent examiners rely on prior art to evaluate novelty and non-obviousness during examination [9].

If an inventor does not understand the relevant prior art **before filing**, it will surface later - often during examination - when revisions are limited and costs are higher [10].

5. Where Most Inventors Go Wrong (Early)

Without early analysis, inventors often:

- File applications that are too broad
- Miss key overlapping patents
- Spend heavily before understanding patentability risk
- Discover fatal issues only after filing

These problems typically surface during examination, when options are constrained and sunk costs are high.

The highest leverage point in the patent process is **before drafting begins**.

6. The Patent Process - Reframed as Decisions

The USPTO describes the patent process in five formal stages [11].
In practice, inventors face **three critical decision points**.

Decision Point 1: Before Filing Anything

(USPTO: “Get ready to apply”)

At this stage, inventors must determine:

- Whether similar inventions already exist
- Which features may already be publicly disclosed
- Whether the invention is likely patentable only in a narrow form

This is where Patntr.ai fits.

Patntr.ai is designed to operate **before formal patent drafting**. It helps inventors:

- Understand the existing patent landscape
- Identify overlap and differentiation
- Decide whether and how to proceed

Possible outcomes:

- Proceed to attorney drafting
 - Revise or refine the invention
 - Pause or abandon early (often the correct decision)
-

Decision Point 2: Filing Strategy

(USPTO: “File your application”)

Once filing begins, inventors must choose:

- Provisional vs nonprovisional filing
- Claim scope and technical emphasis
- Whether international protection may be required

After filing, **new technical material cannot be added** to an application [12].

While Patntr.ai does not file applications, its analysis:

- Helps scope claims more realistically
- Reduces trial-and-error during drafting
- Improves communication with patent counsel

Decision Point 3: Examination and Prosecution

(USPTO: “Application prosecution”)

Rejections are common and expected. Examiners conduct independent searches and apply statutory standards for:

- Novelty (35 U.S.C. §102)
- Non-obviousness (35 U.S.C. §103)
- Written description, enablement, and clarity (35 U.S.C. §112)

Most prosecution outcomes are shaped by **how well novelty and overlap were understood before filing**.

7. Step-by-Step: Using Patntr.ai

Step 1: Describe the Invention

Users describe their idea in plain language, including:

- The problem being solved
- How the solution works
- Key components or features
- Intended use

No legal or technical formatting is required.
Submissions are private by default.

Step 2: Technical Interpretation

Patntr.ai translates descriptions into:

- Technical concepts
- Functional components
- Patent-relevant abstractions

This mirrors how patent examiners abstract inventions for comparison during examination.

Step 3: Prior Art Comparison

The system compares interpreted concepts against:

- Global patent databases
- Published technical and scientific references

It identifies:

- Closest prior art
- Areas of overlap
- Potential points of differentiation

All sources are linked and cited.

Step 4: Novelty Scoring and Explanation

Each consumer report includes:

- A directional 0–100 consumer research score
- A written explanation grounded in cited references
- Clear context for reviewing cited evidence with an attorney

The score reflects:

- Published differentiation context
- Similar filing context
- Cited evidence that may warrant attorney review

The score is a research aid, not legal advice, a patentability opinion, or a legal clearance analysis. The explanation is designed to be understandable without legal training.

Step 5: Practical Recommendations

Rather than a binary result, reports include:

- Suggestions for narrowing scope
- Potential adjustments to improve novelty
- Areas that may require careful counsel-preparation questions

These insights help guide next steps.

Step 6: Structured Report Delivery

Results are delivered as a PDF suitable for:

- Personal evaluation
- Sharing with collaborators
- Attorney consultation

- Investor discussions

The report is structured to support downstream decision-making.

8. Working With a Patent Attorney Afterward

With a novelty report in hand, inventors are better positioned to:

- Ask informed questions
- Focus legal effort on viable paths
- Reduce exploratory legal costs

Patent attorneys still perform:

- Formal searches
- counsel-preparation questions
- Filing and prosecution

Patntr.ai ensures those steps are taken with context [13].

9. What Patntr.ai Is - and Is Not

Patntr.ai is:

- An early-stage analysis tool
- A decision-support system
- A way to understand patent risk sooner

Patntr.ai is not:

- A legal authority
- A replacement for counsel

10. Why Early Understanding Matters

Patent outcomes are shaped long before filing.

Inventors who understand:

- The landscape
- The overlaps
- The risks

are better equipped to:

- Improve their ideas
- Allocate resources wisely
- Decide whether to proceed at all

Patntr.ai is designed to support that understanding.

Conclusion

The patent system is complex, procedural, and difficult to navigate without context. Patntr.ai makes the earliest stages more transparent - so inventors can make informed decisions **before** committing time, money, and effort.

Sources & References

- [35 U.S.C. §154 - Contents and term of patent](#)
- [USPTO – Patent Claims Basics](#)
- [Manual of Patent Examining Procedure \(MPEP\) § 904 - Examination of claims](#)
- [35 U.S.C. §102 - Conditions for patentability; novelty](#)
- [35 U.S.C. §103 - Conditions for patentability; non-obvious subject matter](#)
- [35 U.S.C. §101 - Inventions patentable \(utility requirement\)](#)

- [USPTO Patent Examination Statistics - Data Visualization Center](#)
- [MPEP § 2121 - Definition of prior art](#)
- [USPTO – Prior Art and Patent Examination](#)
- [USPTO – Patent Process Overview](#)
- [USPTO – Patent Process: Five Stages](#)
- [MPEP § 2163 - Written description requirement](#)
- [USPTO – Using Legal Services \(Attorneys and Agents\)](#)