## PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1 Stylesheet Version v1.2 Assignment ID: PATI508034

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT

### **CONVEYING PARTY DATA**

Name	Execution Date
KALI CARE, INC.	05/19/2022

### **RECEIVING PARTY DATA**

Company Name:	TWENTY TWENTY THERAPEUTICS LLC		
Street Address:	259 East Grand Avenue		
City:	South San Francisco		
State/Country:	CALIFORNIA		
Postal Code:	94080		

### **PROPERTY NUMBERS Total: 36**

Property Type	Number
Patent Number:	8998861
Patent Number:	10152867
Patent Number:	10537468
Application Number:	16714411
Patent Number:	10366207
Application Number:	16439559
Patent Number:	10441214
Application Number:	16567907
Patent Number:	10319473
Application Number:	16392482
Patent Number:	10231615
Patent Number:	10251544
Patent Number:	10786149
Patent Number:	9775780
Patent Number:	10026296
Patent Number:	10325479
Patent Number:	10304314
Patent Number:	10535248
Application Number:	16694927
Application Number:	14686319

PATENT REEL: 069013 FRAME: 0301

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Property Type	Number
Application Number:	16392502
Patent Number:	10548765
Application Number:	16719470
Application Number:	16137270
Patent Number:	10617605
Patent Number:	10515720
Patent Number:	10811128
Application Number:	16137369
Application Number:	10377543
Patent Number:	10723529
Patent Number:	10497225
Application Number:	16691314
Patent Number:	10565849
Application Number:	16739419
PCT Number:	US1958826
Application Number:	16402067

#### **CORRESPONDENCE DATA**

Fax Number:

Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.

**Phone:** (650)741-0956

Email: docketing@aikingallant.com
Correspondent Name: Marisabel Garcia Linares
Address Line 1: 445 S. SAN ANTONIO ROAD

Address Line 2: SUITE 202

Address Line 4: LOS ALTOS, CALIFORNIA 94022

NAME OF SUBMITTER:	Marisabel Garcia Linares
SIGNATURE:	Marisabel Garcia Linares
DATE SIGNED:	09/20/2024

#### **Total Attachments: 34**

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## **ACQUISITION AGREEMENT**

This ACQUISITION AGREEMENT (this "<u>Agreement</u>"), dated as of May 19, 2022, by and among KALI CARE, INC. ("<u>Kali</u>") and TWENTY TWENTY THERAPEUTICS, LLC ("<u>Twenty Twenty</u>"). Individually, each of Twenty Twenty and Kali may be referred to herein as a "<u>Party</u>" and together they may be referred to as the "<u>Parties</u>."

WHEREAS, each of the Parties is engaged in the medical device and digital healthcare industry; and

WHEREAS, Twenty Twenty desires to acquire from Kali, and Kali desires to transfer to Twenty Twenty, all intellectual property and other assets excluding cash and without assuming liabilities, to enable Twenty Twenty to further develop, manufacture and distribute in the Territory (as defined herein) the Products, with Twenty Twenty providing Kali certain consideration, including contingent consideration, therefor, all upon the terms and conditions set forth herein (the "Transactions").

NOW, THEREFORE, in consideration of the foregoing premises and the mutual covenants and obligations contained herein, Twenty Twenty and Kali hereby agree as follows:

# Article I DEFINITIONS

For purposes hereof, the following terms shall have the meanings set forth below:

- "Acquired Assets" has the meaning set forth in Section 2.1.
- "Acquired Contracts" has the meaning set forth in Section 6.2(g).
- "Affiliate" means, with respect to any Person, any other Person controlled by, controlling or under common control with such Person. For purposes of this definition, "control" means more than 50% ownership or voting rights and/or the power to direct management. For the avoidance of doubt, AptarGroup, Inc., Santen, Inc., and their respective subsidiaries, are not Affiliates of Kali.
  - "Agreement" has the meaning set forth in the recitals hereto.
  - "Annual Report" has the meaning set forh in Section 5.7.
- "Applicable Law" means all laws, statutes, rules, regulations and guidelines that may apply to the (a) maintenance of the Owned Patents; (b) sale of the Products, (c) the purchase of the Acquired Asset, or (d) development, Manufacturing, promotion, marketing, packaging, labeling, importation, exportation, warehousing or distribution of the Products, including all Good Practice, and all standards or guidelines promulgated by the appropriate Regulatory Authority, in each case, as applicable in the context in which this term is used in this Agreement to the performance of a Party's obligations hereunder.

"<u>Assumed Liabilities</u>" means (i) the Acquired Contracts, and (ii) any other condition arising out of, relating to or incurred in connection with Acquired Assets, in each case to the extent arising after the Closing Date.

"Breaching Party" has the meaning set forth in Section 7.2.

"Cause" means the occurrence of any one of the following: (a) Key Employee fails to perform the material responsibilities reasonably associated with his position; (b) Key Employee materially breaches any written agreement between Twenty Twenty and such Key Employee, including, without limitation, such Key Employee's respective offer letter or employment agreement and the At-Will Employment, Confidential Information, Invention Assignment and Arbitration Agreement; (c) a Key Employee materially violates any written policy applicable to the employees, independent contractors and/or consultants, as applicable, of the Twenty Twenty; or (d) Key Employee is indicted or enters into a plea of either guilty or nolo contendere to any felony, or any misdemeanor involving material acts of moral turpitude, embezzlement, theft, or other similar act and, in each case, any comparably-classified crime under the laws of a non-U.S. jurisdiction.

"Closing" has the meaning set forth in Section 2.4.

"Closing Date" has the meaning set forth in Section 2.4.

"Commercially Reasonable Efforts" means, with respect to each Party, efforts and commitment of resources in accordance with the reasonable business, legal, medical, and scientific judgment that are consistent with the efforts and resources generally used in the medical device and digital health industry with respect to products which are of similar market potential and at a similar stage in their life cycle, taking into account the competitiveness of the marketplace, the regulatory structure involved, the profitability of the applicable products and other relevant factors, including technical, legal, scientific, medical, sales performance, and/or marketing factors.

"Competing Product" shall mean any medical devices or digital health products which are used to monitor, manage, or treat the same medical conditions as the Products.

"Confidential Information" means any information that in any way relates to a Party or an Affiliate thereof, including its products, business, Know-How, methods, trade secrets, business and marketing strategies, customer lists and technology, that shall be furnished or disclosed to the other Parties, on a confidential basis, in connection with this Agreement, and any other information that would be reasonably recognized as confidential or proprietary information; provided, however, that Confidential Information shall not include any information:

- (a) that, at the time of its disclosure, is publicly available;
- (b) that, after its disclosure in connection herewith, becomes publicly available, except as a result of a breach of this Agreement by the recipient of such information;
- (c) that becomes available to the recipient of such information from a Third Party that is not legally or contractually prohibited from disclosing such Confidential Information;

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<u>provided</u>, that such Confidential Information was not acquired, directly or indirectly, from the disclosing Party or its Affiliates; or

(d) that the recipient of which can demonstrate was developed by or for such recipient independently of, and without the use of, the Confidential Information disclosed to the recipient by the disclosing Party or its Affiliates in connection herewith.

"Contingent Consideration" has the meaning set forth in Section 4.1(c).

"Excluded Assets" means (a) all accounts receivable, cash, cash equivalents, and bank deposits on hand as of the Closing Date; (b) Kali's corporate record books containing minutes of meetings of shareholders or directors, as the case may be, and any other records that relate exclusively to Seller's organization or capitalization; (c) all contracts for Indebtedness and any contracts creating a lien on any of the Acquired Assets, and (d) and Kali's rights under this Agreement and the agreements and instruments delivered to Twenty Twenty pursuant hereto.

"Exclusion List" means (i) the U.S. HHS/OIG List of Excluded Individuals/Entities (available through the Internet at http://www.oig.hhs.gov); and (ii) the General Services Administration's List of Parties Excluded from U.S. Federal Programs (available through the Internet at http://www.epls.gov).

"FDA" means the United States Food and Drug Administration or any successor government agency.

"Force Majeure Event" has the meaning set forth in Section 9.1.

"GAAP" means U.S. generally accepted accounting principles, consistently applied across the business of the Party with respect to which GAAP is being measured.

"Good Practices" means the current Good Manufacturing Practices, Good Laboratory Practices, or other good practice regulations of the FDA (as in effect from time to time) or any other applicable Regulatory Authority.

"Governmental Authority" means any federal, state, local or foreign government or political subdivision thereof, or any agency or instrumentality of such government or political subdivision, or any self-regulated organization or other non-governmental regulatory authority or quasi-governmental authority (to the extent that the rules, regulations or orders of such organization or authority have the force of law), or any arbitrator, court or tribunal of competent jurisdiction.

"Ineligible Person" means a Person who: (a) is currently excluded, debarred, suspended, or otherwise ineligible to participate in the U.S. Federal health care programs or in U.S. Federal procurement or non-procurement programs; or (b) has been convicted of a criminal offense that falls within the ambit of 42 U.S.C. § 1320a-7(a), but has not yet been excluded, debarred, suspended, or otherwise declared ineligible.

"Kali" has the meaning set forth in the recitals hereto.

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"Key Employee" shall mean Sina Fateh.

"Know-How" means any and all product specifications or designs, processes, trade secrets, Manufacturing information, engineering and other manuals and drawings, standard operating procedures, flow diagrams, chemical, pharmacological, toxicological, pharmaceutical, physical and analytical, safety, quality assurance, quality control and clinical data, technical information, data, research records and similar data and information.

"Knowledge" means to the reasonable knowledge of any senior executive of an entity after reasonable investigation.

"<u>Launch</u>" means the first commercial sale of any strength of Product to a Third Party in an arms-length transaction in the Territory.

"Losses" has the meaning set forth in Section 6.4.

"Manufacture/Manufacturing/Manufactured" means the procurement of materials for, and the production, packaging, labeling and quality control and release testing or other analysis of, the Products.

"Owned Know-How" means all Know-How relating to the Products which is owned by Kali, including any data, manufacturing know-how, or algorithms.

"Owned Marks" means all trademarks relating to the Products which is owned by Kali, including those set forth on Schedule 6.2(d).

"Owned Patents" means all Patents relating to the Products which are owned by Kali, including those set forth on Schedule 6.2(d).

"<u>Party</u>" has the meaning set forth in the recitals hereto.

"Person" means a natural person, corporation, partnership, company or other entity.

"<u>Post-Approval Regulatory Support Activities</u>" shall have the meaning set forth in Section 5.1(b).

"Privacy Laws" has the meaning set forth in Section 6.2(c)(vi).

"Products" means all products commercialized by Twenty Twenty which utilize any Owned Patent.

"Product Data and Materials" means all data or other information which is owned by or under the control of Kali relating to the Acquired Assets, including but not limited to the Regulatory Documentation and all study data developed in connection with any potential application for Regulatory Approvals relating to the Products or Acquired Assets, as well as all materials, including but not limited to research and engineering materials, component parts, and other materials owned by Kali which related to the Products or Acquired Assets.

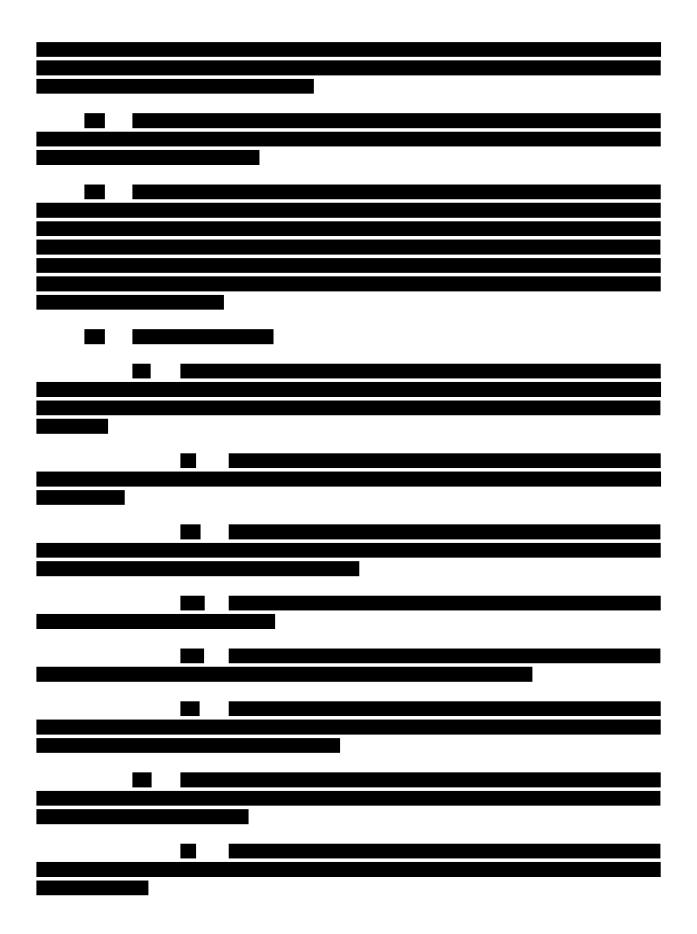
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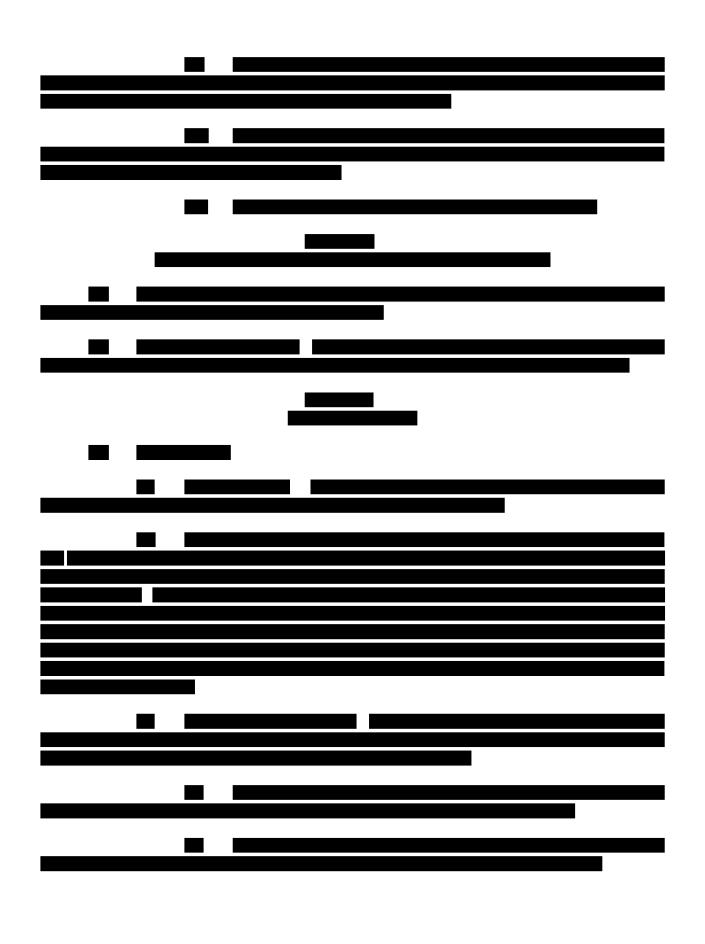
- "Product Litigation Matters" has the meaning set forth in Section 5.2.
- "Purchase Price" has the meaning set forth in Section 4.1(a).
- "Registered Intellectual Property" has the meaning set forth in Section 6.2(d)(i).
- "Regulatory Approval" means approval from a Regulatory Authority necessary for the commencement of the Manufacture of Product.
- "Regulatory Authority" means any and all governmental bodies, organizations and agencies whose approval is necessary to Manufacture, distribute or sell the Product in the Territory or any governmental, international, treaty-based or industry body which establishes standards or certifications for the Manufacture, distribution or sale of the Product in the Territory.
- "Regulatory Documentation" means (a) the technical, medical and scientific licenses, permits, registrations, authorizations and approvals (including applications therefor, supplements and amendments, pre- and post-approvals, and labeling approvals) of any Regulatory Authority necessary for the Manufacture, distribution, marketing, promotion, offer for sale, import, export or sale of a drug product or a drug substance; (b) all technical, scientific, chemical, biological, pharmacological, and toxicological data as well as all clinical and preclinical reports (together with clinical data sets associated with such reports), and all validation documents and data; and (c) all correspondence to or from Regulatory Authorities.
  - "Term" has the meaning set forth in Section 7.1.
  - "Territory" means worldwide.
  - "Third Party" means any Person who or that is neither a Party nor an Affiliate of a Party.
  - "Transactions" has the meaning set forth in the recitals hereto.
  - "Twenty Twenty" has the meaning set forth in the recitals hereto.
  - "<u>Up-Front Consideration</u>" has the meaning set forth in Section 4.1(b).
  - "Up-Front Contingent Consideration" has the meaning set forth in Section 4.1(b).

# Article II ASSIGNMENT OF ACQUIRED ASSETS

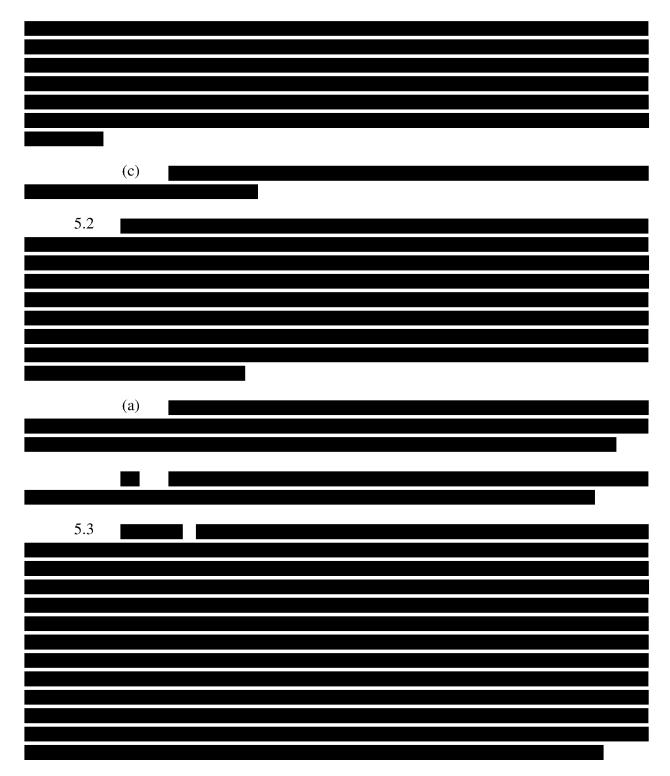
2.1 <u>Assignment of Acquired Asset</u>. On the Closing Date, Kali hereby assigns, conveys and otherwise transfers to Twenty Twenty, as of the Closing, ownership of (1) the Owned Patents; (2) the Owned Know-How; (3) the Owned Marks; (4) the Product Data and Materials; (5) all equipment, and (5) all other assets of any kind of Kali, other than the Excluded Assets (the "<u>Acquired Assets</u>").

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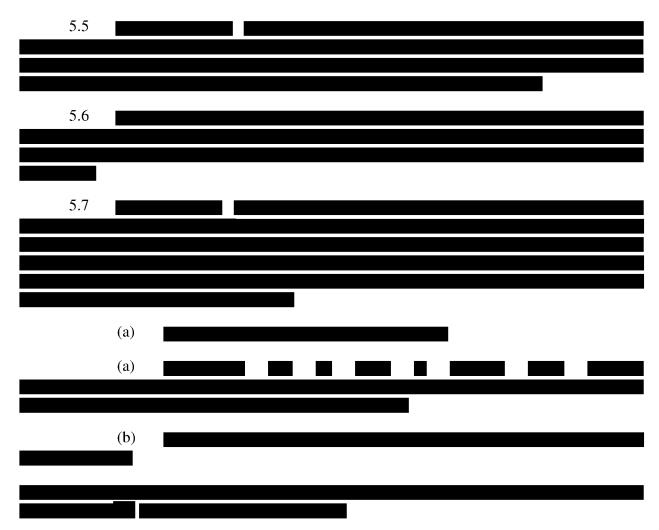
## 5.4 <u>Prosecution of Patents.</u>

(a) Following the Closing, Twenty Twenty shall be solely responsible for and shall control the prosecution and maintenance of all Patents and applications for Patents included

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in the Acquired Assets, and Twenty Twenty shall make all decisions relating thereto acting in its sole discretion.

(b) Kali shall at all times cooperate with and assist Twenty Twenty in the prosecution and maintenance of Patents, including by executing such assignments, a power of attorney and other documents or arranging for Kali's former employees and contractors to execute such assignments, powers of attorney, and other documents as Twenty Twenty may reasonably request. Kali shall waive all conflicts relating to its representation of lawyers or other persons involved in prosecuting and maintaining the Owned Patents so that Twenty Twenty can utilize such lawyers or other persons in continuing to prosecute and maintain patents, including but not limited to the Owned Patents, on behalf of Twenty Twenty.



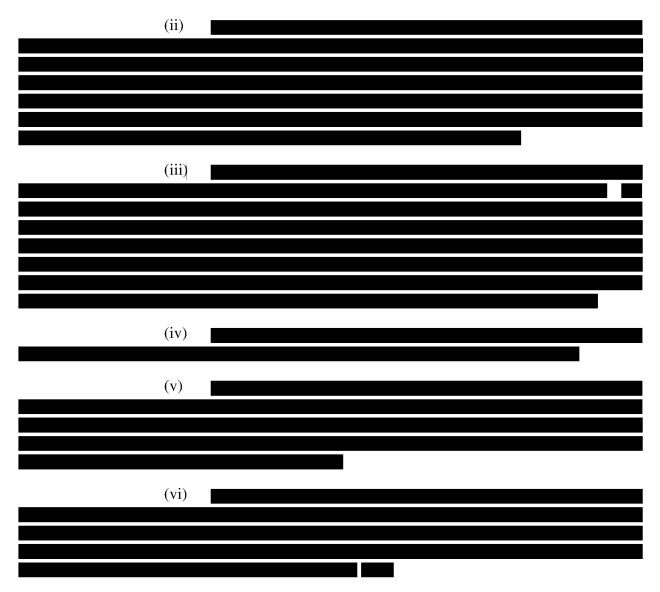
Article VI
WARRANTIES; INDEMNIFICATION; AND LIMITATION OF LIABILITY

6.1 <u>Certain Representations, Warranties and Covenants of Twenty Twenty</u>. Twenty hereby represents, warrants and covenants to Kali as of the date hereof and as of the Closing Date that:

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- (a) (i) Twenty Twenty has the requisite power and authority to enter into this Agreement and to perform its obligations hereunder, including the issuance of Common Stock as provided herein; (ii) this Agreement has been duly executed and delivered by Twenty Twenty; and (iii) the terms of this Agreement and the performance of all obligations hereunder do not conflict with or breach any agreement to which Twenty Twenty or any Affiliate thereof is a Party or by which Twenty Twenty or any Affiliate thereof is otherwise bound or violate any Applicable Law or require any approval which has not been obtained.
- (b) After the Closing Date, Twenty Twenty shall exercise Commercially Reasonable Efforts to comply with all Applicable Law and all obligations imposed by Regulatory Authorities on Twenty Twenty with respect to the Product.
- (c) <u>Independent Investigation</u>. In entering this Agreement, Twenty Twenty is not relying on any factual representations or opinions of Kali or its representatives except the representations and warranties of Kali contained in this Agreement.
- 6.2 <u>Certain Representations, Warranties and Covenants of Kali</u>. Kali hereby represents, warrants and covenants to Twenty Twenty as of the date hereof and as of the Closing Date that:

(a)	(i)
(b)	
(2)	
(3)	
(4)	
	(i)
	(1)



- (5) Regarding intellectual property,
  - (i) Schedule 6.2(d) lists all (i) registered patents, trademarks, or other intellectual property ("Registered Intellectual Property") and (ii) all intellectual property that is not registered but is material to Kali's business or operations. All required filings and fees related to the Registered Intellectual Property have been timely filed with and paid to the relevant governmental authorities and authorized registrars, and all registrations relating to the Registered Intellectual Property are otherwise in good standing. Kali has provided Twenty Twenty with true and complete copies of file histories, documents, certificates, office actions, correspondence and other materials related to all Registered Intellectual Property.

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- (ii) To Kali's knowledge, Kali is the sole and exclusive legal and beneficial, and with respect to the Registered Intellectual Property, record, owner of all right, title and interest in and to Kali's intellectual property, and has the valid right to use all other intellectual property used in or necessary for the conduct of Kali's current business or operations, in each case, free and clear of all liens, encumbrances or restrictions.
- (iii) The consummation of the Transactions contemplated hereunder will not result in the loss or impairment of or payment of any additional amounts with respect to, nor require the consent of any other person in respect of, Kalis' or Twenty Twenty's right to own, use or hold for use any intellectual property as owned, used or held for use in the conduct of Kali's business or operations as currently conducted.
- (iv) Kali's rights in the Owned Patents, the Owned Marks, and the Owned Know-How are subsisting and to Kali's Knowledge, valid and enforceable. Kali has taken reasonable steps to maintain and protect its intellectual property, including requiring all persons having access thereto to execute written non-disclosure agreements.
- (v) To Kali's Knowledge, the conduct of the Kali business as currently and formerly conducted, and the products, processes and services of Kali, have not infringed, misappropriated, diluted or otherwise violated, and do not and will not infringe, dilute, misappropriate or otherwise violate the intellectual property or other rights of any person. To Kali's Knowledge, no person has infringed, misappropriated, diluted or otherwise violated, or is currently infringing, misappropriating, diluting or otherwise violating, any of Kali's intellectual property.
- (vi) To Kali's Knowledge there are no material actions (including any oppositions, interferences or re-examinations) settled, pending or threatened (including in the form of offers to obtain a license): (i) alleging any infringement, misappropriation, dilution or violation of the intellectual property of any person by Kali; (ii) challenging the validity, enforceability, registrability or ownership of any of Kali's intellectual property or Kali's rights with respect to any intellectual property owned, licensed, or used by Kali in its business; or (iii) by Kali or any other person alleging any infringement, misappropriation, dilution or violation by any person of intellectual property which is owned, licensed or used by Kali. Kali is not subject to any outstanding or prospective governmental order (including any motion or petition therefor) that does or

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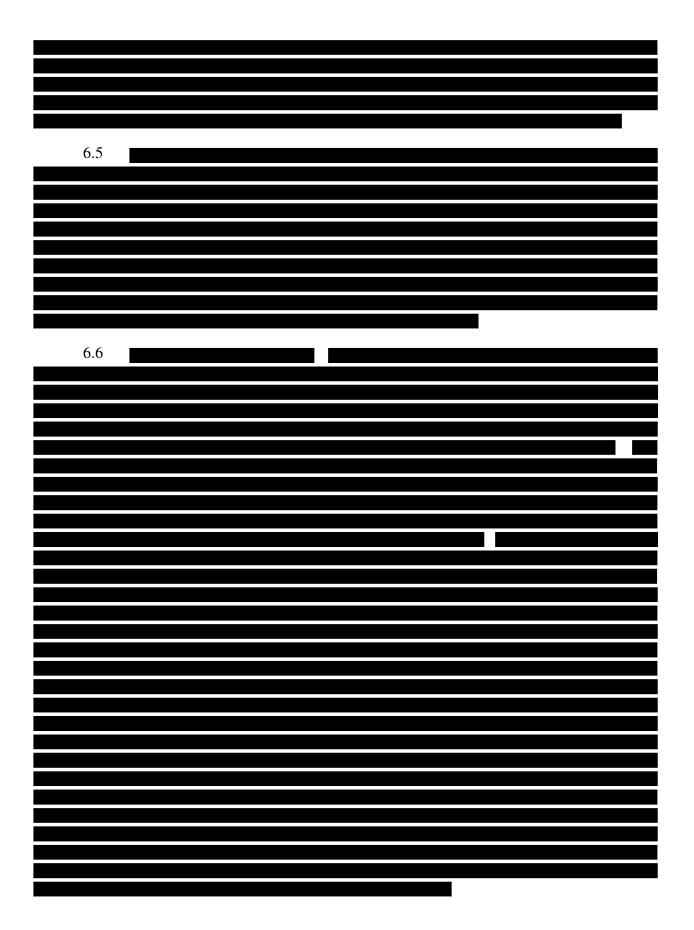
would restrict or impair the use of any intellectual property owned by, licensed to, or used by Kali.

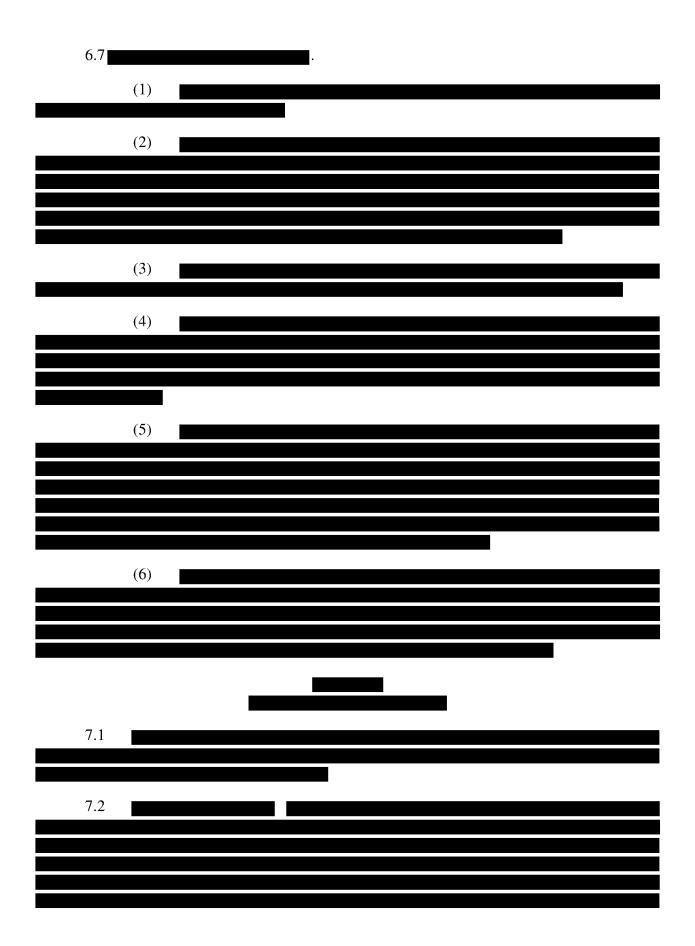
(vii) Kali has taken reasonable measures to protect the secrecy and confidentiality of and to otherwise protect and enforce its rights in all intellectual property held as a trade secret or that is otherwise of a non-public or confidential nature relating to the Acquired Assets, including by obtaining assignment of invention agreements from all persons providing services to Kali.

	(6)			
(	(7)			
(	(8)			
	(a)			
(	(b)			
6.4				

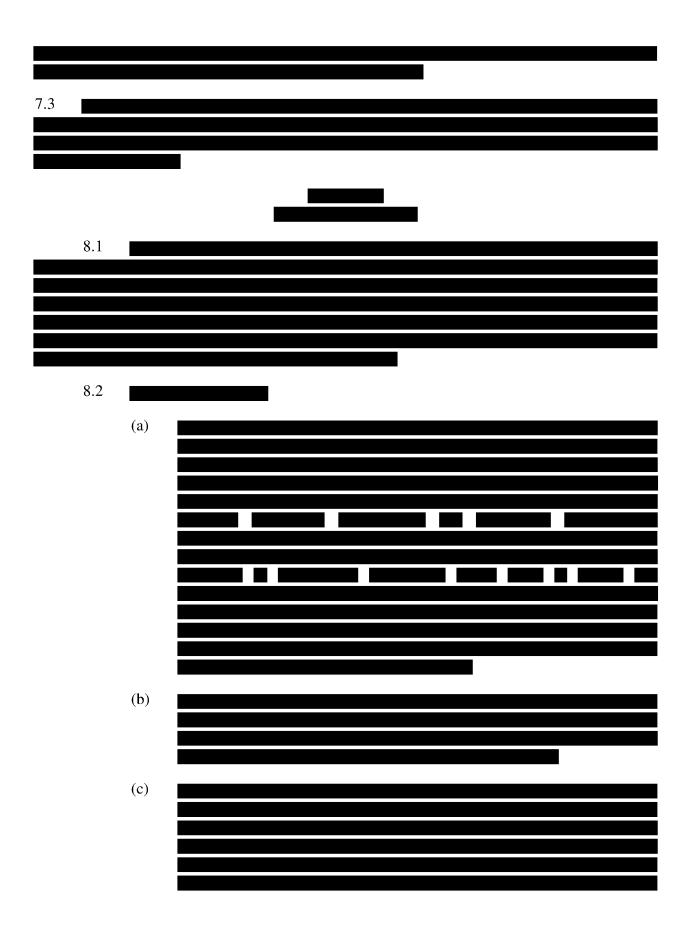
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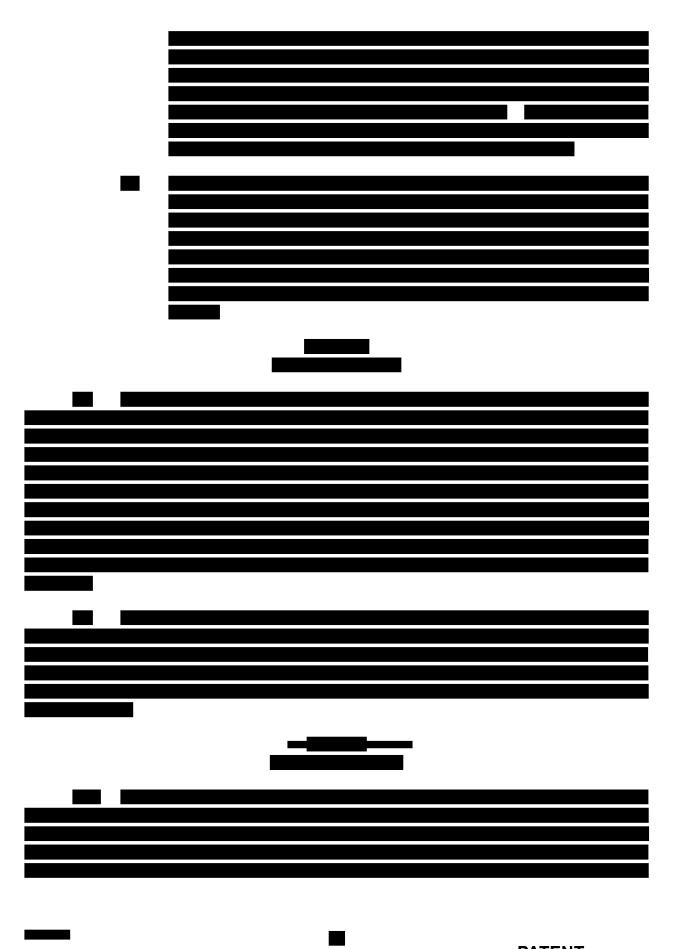
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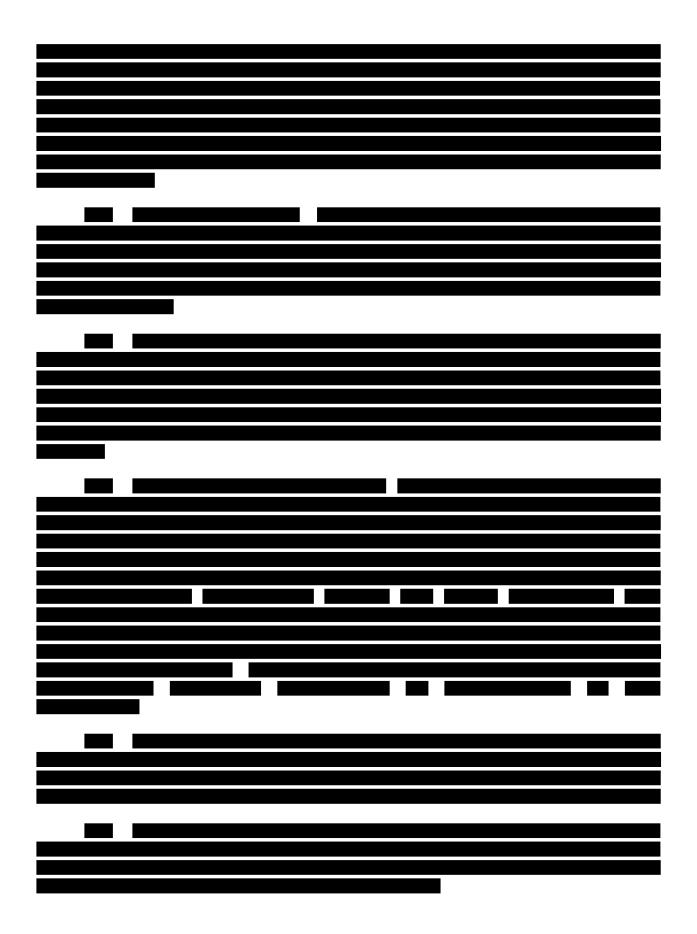


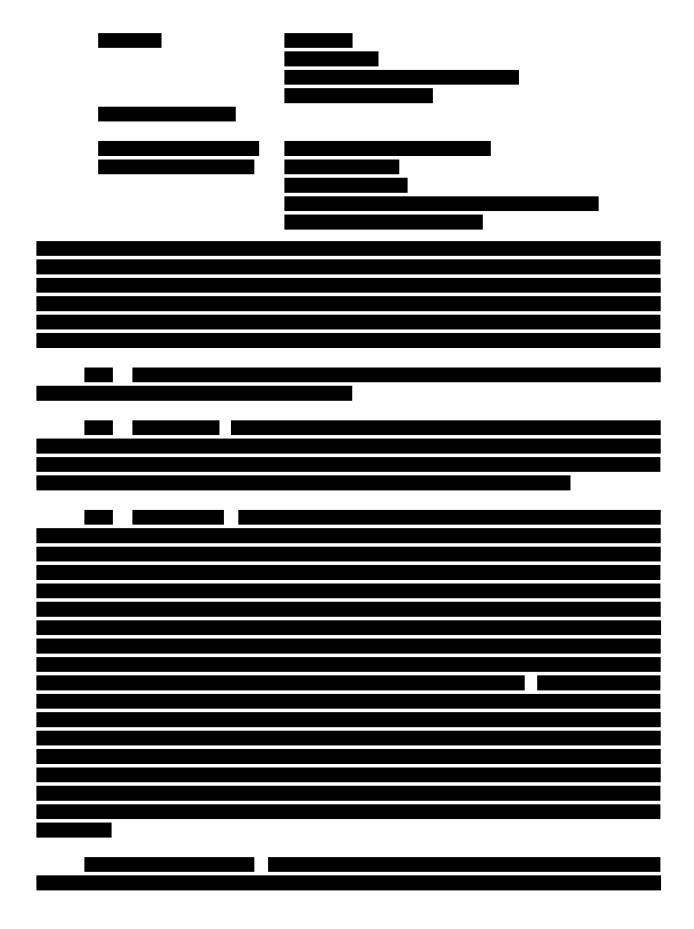


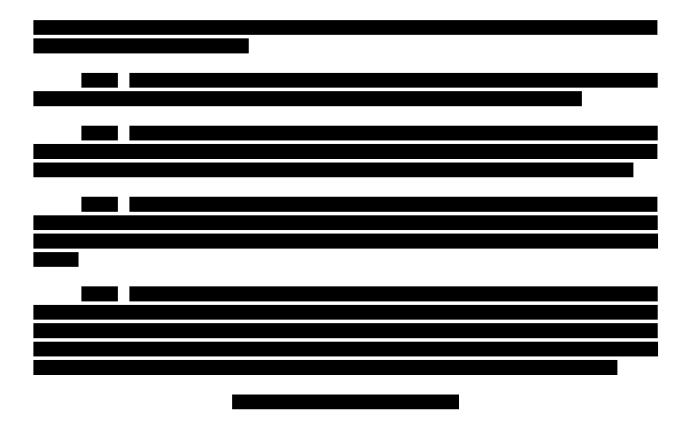
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IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed as of the date first above written by their duly authorized representatives.

KALI CARE, INC.

By:

Name: Sina Fateh

Title: CEO

TWENTY TWENTY THERAPEUTICS, LLC

By:		
NT		

Name: Title:

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IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed as of the date first above written by their duly authorized representatives.

KALI CARE, INC.

By: \_\_\_\_\_

Name: Title:

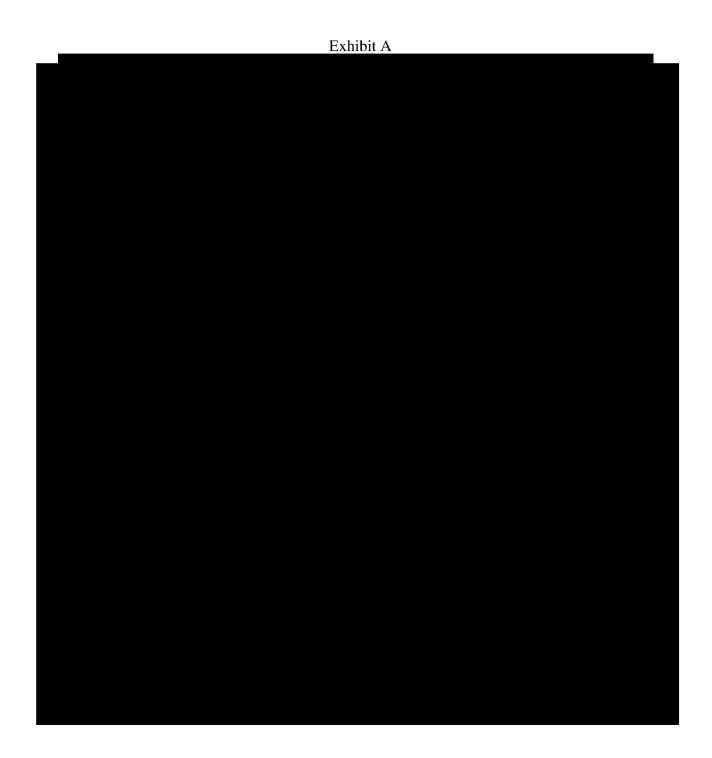
TWENTY TWENTY THERAPEUTICS, LLC

DocuSigned by:

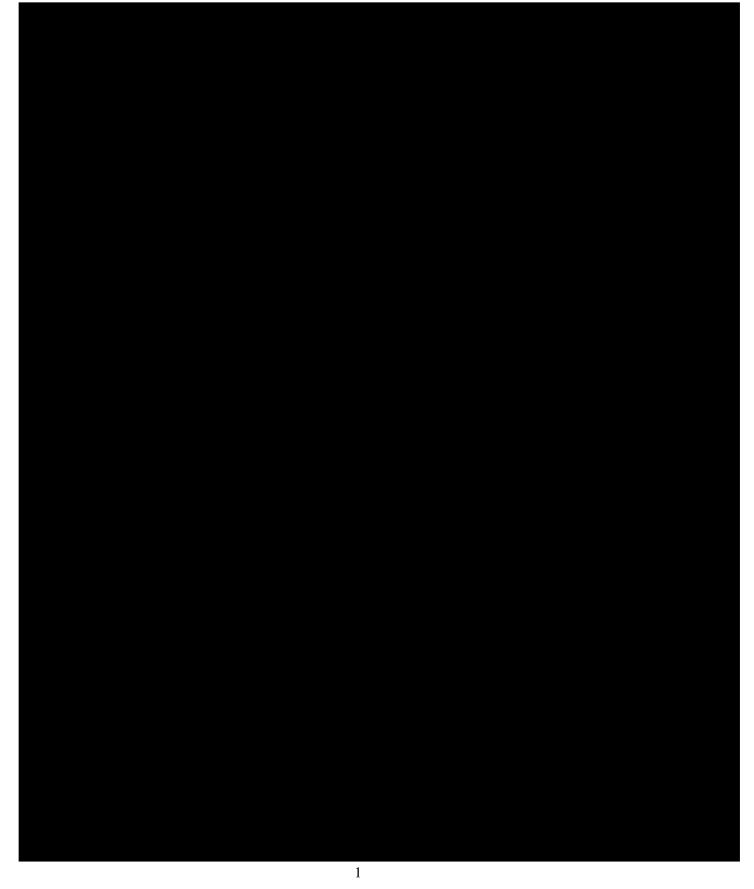
Name: Dimitri Azar 5/19/2022

Title: President & CEO

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## **Schedules**







#### **Family Descriptions**

Family 1

Handle: "Jacket & Tie"

Allowed: US 8,998,861, US 10,152,867, US 10,537,468, CN 104884956, EP 2912460

Pending: US 2020/0113733, HK 1214359

Categories: Adherence, Offload

#### PORTABLE MANAGEMENT AND MONITORING SYSTEM FOR EYE DROP MEDICATION REGIMEN

A jacket that fits around an eye drop bottle, with a motion sensor and a droplet sensor. When the motion sensor detects that the container is moving, or is moving in a way that indicates that medication is about to be dispensed (for example, being tilted to an angle for squeezing an eye drop out to fall into the user's eye) it activates the drop sensor. Typically the power draw on motion sensors is low, while droplet sensors require more power. Thus the jacket can remain in a low-power mode indefinitely, prolonging battery life, while still providing clear confirmation that medication has been dispensed via the drop sensor. The jacket may also include tactile sensors and/or other systems to provide additional data.

Family 2

Handle: "Plug-n-Play" Allowed: US 10,366,207 Pending: US 2019/0295708 Categories: Adherence, Offload

#### MONITORING ADHERENCE TO A MEDICATION REGIMEN USING A SENSOR

A jacket that fits around a medication container, with a port to connect to a smartphone. In use, the jacket and medication container in it moves with the phone, so the phone's sensors, processor, etc. can be used to detect medication being dispensed and process the information.

Family 3

Handle: "Internal Pressure"

Allowed: US 10,441,214, JP 6568954

Pending: US 2020/0000402, JP 2019-213886

Categories: Adherence, Offload

#### MONITORING ADHERENCE TO A MEDICATION REGIMEN USING A SENSOR

A container jacket with a "window" through which a user applies pressure to the container to dispense medication. When the user squeezes the container through the window, the container changes shape to be flatter but broader. Pressure sensors on the inside of the jacket detect the internal pressure of the container expanding against them.

Family 4

Handle: "Cam Band" Allowed: US 10,319,473 Pending: US 2019/0252053

Categories: Adherence, Offload, Wearable

#### WEARABLE SYSTEM FOR HEALTH CARE MANAGEMENT

A wrist band with one or more cameras aimed at the wearer's hand, and possibly other sensors. When the wearer takes a medication, the cameras can capture the medication, the container, the user manipulating the medication or container, the user taking the medication, the user's eye as they instill eyedrops, etc. Images are reviewed to determine whether/when the user has taken their medication. More sophisticated processing (typically external to the device) may reveal where the user was, what the local conditions were (e.g., from backgrounds of the images), whether the user took the medication properly (instilling an eye drop in their eye rather than missing or blinking), and so forth.

Family 5

Handle: "Electric Eye Doc"

Allowed: US 10,231,615, US 10,251,544, US 10,786,149, JP 6643359, JP 6643515

Pending: EP 3291721 Categories: Diagnostic

#### HEAD-MOUNTED DISPLAY FOR PERFORMING OPHTHALMIC EXAMINATIONS

A head mounted display conducts eye screening autonomously and remotely without the presence of an eye care professional. The user gives verbal responses to general questions and/or to formal eye tests. The system detects and recognizes right and wrong answers to test questions and also identifies relevant keywords and phrases spoken by the user, like "blurry", "fuzzy", "pressure within my eye", etc. Based on the user's responses, the system may autonomously make a possible diagnosis, and/or may add, remove, or modify tests in the exam. Data may then be reviewed by an eye care professional for follow-up.

Family 6

Handle: "Smart Bottle" Allowed: US 9,775,780

Pending: EP 3359112, JP 2018-536449

Categories: Adherence

**SMART MEDICATION CONTAINER** 

Uses capacitive pads in the neck of a container to detect medication being dispensed. Pills exiting through the neck change the capacitance between the pads, providing an indication that medication is being dispensed. The conductive elements do not need to be exposed on the inner surface of the neck (e.g., they may be on the outside or within the wall), so potential contamination of the medication by the pads can be avoided.

Family 7

Handle: "Smart Cap"

Allowed: US 10,026,296, US 10,325,479, EP 3429541

Pending: US 2019/0259625, JP 2019-518483

Categories: Adherence, Offload

**NETWORK-CONNECTED CAP FOR A CONTAINER** 

A smart cap for a "dumb" container, physically distinct from the container itself. The cap includes sensors for determining whether and when a product is dispensed, for accessing and/or generating personalized data about the user, and/or for evaluating the local environmental conditions. The cap can tailor the product regimen using this data, such as by detecting UV level and recommending more frequent application of a sunscreen. Being a separate piece, the cap may be retrofitted to an existing container, and/or may be transferred from one container to another (e.g., from an empty to a full container).

Family 8

Handle: "Rx Emoii"

METHOD AND APPARATUS FOR TARGETED INTERACTIVE HEALTH STATUS NOTIFICATION AND

CONFIRMATION

Allowed: US 10,304,314, US 10,535,248

Pending: US 2020/0090491 Categories: Reminder

Provides medication reminders designed to interfere with the graphic interface of a phone in a way that limits the user's ability to interact with the phone, using effects that mimic or otherwise are relevant to the medication and/or the medical condition. A reminder to take a glaucoma medication could gradually gray out the screen of the user's phone beginning from the edges of the screen and progressing inward, corresponding to the typical vision loss from unmedicated glaucoma. Icons, emojis, etc. also may be used, such as animated bacteria gradually filling the screen to remind a user to take their antibiotics. This provides greater impact than a simple text message or audible alarm, by interfering with phone use and by presenting reminders that "hit patients where they live". The system may be implemented as software only, such as a smartphone app.

Family 9

Handle: "Rx Selfie" Allowed: none

Pending: US 2015/0302174, US 2019/0252056

Categories: Adherence

#### METHOD AND APPARATUS FOR VERIFYING THERAPEUTIC COMPLIANCE

Verifies medication use with a "selfie" captured by the user when they take the medication. The images or video reveal the user and the pill, and may show actual use of the medication (e.g., a video of a pill being swallowed). Images may also contain other data such as the user's location, environmental conditions, user activities when the medication is taken, etc.

Family 10

Handle: "Modular Base" Allowed: US 10,548,765 Pending: US 2020/0121500 Categories: Adherence, Offload

#### UNIVERSAL MODULAR ATTACHMENTS FOR EYE DROP CONTAINERS

A modular smart "base" or "shoe" attaches to the bottom of a medication container with a connector on the bottom of the container. The attachment may fit multiple containers, such as by a using a generic connector ring molded into or retrofitted onto the container. The shoe is well-separated from the path for dispensing medication, avoiding contamination issues. Inexpensive disposable sensors may be located in a label or container wall, while the shoe may be moved from one container to the next and used indefinitely.

Family 11

Handle: "Authentic Original"

Allowed: none

Pending: US 2019/0103179 Categories: Adherence, Analysis

## AUTHENTICATED COLLECTION OF MEDICATION DATA AND USE THEREOF IN ADDRESSING NONADHERENCE

Addresses data analysis of indirect sensor data such as container orientation, applied pressure, etc. to determine whether medication is being dispensed/used. When instilling an eye drop a squeeze bottle typically has a cap removed, is then raised and tilted over each eye, and squeezed once over each eye for each droplet dispensed. This differs from false positives such as pressure and orientation changes for a bottle carried in a pocket.

Family 12

Handle: "Cookie Jar" Allowed: US 10,617,605

Pending: none

Categories: Adherence, Offload

## METHOD AND APPARATUS FOR SMART MEDICATION AUTHENTICATION UTILIZING NON-SMART CONTAINERS

A disposal unit for single-use phials, blister packs, etc, typically in the form of a jar with a lid and a disposal slot. The unit detects when the containers are deposited in the jar, registering the deposit as evidence that medication has been taken. Detection may be with optical sensors, impact sensors, acoustic sensors, etc. in/on the jar. No sensors are required on the medication or the single-use container. If the user is away from the unit when taking their medication, the system may still register the use of medication (with some delay) if the user retains the empty containers to discard later.

Family 13

Handle: "Rx F/X"

Allowed: US 10,515,720, US 10,811,128

Pending: none

Categories: Acoustic, Adherence, Offload

DETERMINING USE OF MEDICATION THROUGH CONSEQUENTIAL CHARACTERISTIC ACOUSTIC

**EMISSIONS** 

6

A container or jacket produces a specific sound "signature" (audible or not) when opened, when medication is dispensed, etc. For example, a pneumatic sleeve with a whistle may produce a specific pitch or combination of pitches when the container inside is squeezed (e.g., to expel an eye drop). The sound is detected by a base station such as a smartphone or smart speaker. The jacket and container may both be purely mechanical and "dumb", while still providing smart functionality.

Family 14

Handle: "Radio Star" Allowed: US 10,565,849 Pending: US 2020/0152041 Categories: Adherence, Offload

#### DETERMINING USE OF MEDICATION THROUGH RADIO-FREQUENCY PASSIVE MODULATION

A container is fitted with a radio-frequency passive modulator (RFPM). The RFMP receives a base signal, modifies it, and re-transmits the modified signal. The modified signal is then detected by a smartphone or other device. The RFMP remains inert until activated by an action associated with using the medication, such as squeezing an eye drop bottle; and it is a fixed-function device, which needs no processor. The dispensing action itself may provide power for the RFPM, e.g, through a piezoelectric element that is deformed when a bottle is squeezed. The base signal may be ambient radio noise, or a dedicated signal from an emitter device.

Family 15

Handle: "Half-Shell" Allowed: none

Pending: US 2020/0095055 Categories: Adherence, Offload

## METHOD AND APPARATUS FOR INDIRECTLY DETERMINING THE DISPENSING OF MEDICATION FROM A CONTAINER

A rigid partial jacket encloses part (e.g., half) of a cylindrical container, leaving a large area exposed. To dispense medication, the patient applies pressure to the exposed portion of the container. That pressure is transmitted through the container to the inside of the partial jacket, where a pressure sensor is located. Pressure applied to that sensor through the container is used to determine when medication is dispensed. Other components also may be located in the jacket.

Family 16

Handle: "Acoustic Bar Code"

Allowed: US 10,377,543, US 10,723,529

Pending: WO 2020/101894 Categories: Acoustic

#### DETERMINING USE AND VALIDITY OF VEHICLES THROUGH ACOUSTIC EMISSIONS

A container is equipped with a mechanism to produce a sound with information encoded in it. For example, a bottle cap may have a series of rigid plastic blades that strike an anvil as the cap is rotated to remove it from or replace it on the bottle. The length of each blade determines the pitch produced when it strikes the anvil; the series of varying pitches is analogous to an acoustic version of the series of stripes of varying width in an optical bar code. The sound is received by a station such as a smartphone, smart speaker, etc. The cap or other component does not require any electronics, and may be a single piece of molded plastic. Significant amounts of data may be encoded, e.g., 12 blades with 8 possible pitches exhibits billions of possible combinations, so highly unique signals may be produced. Mass-produced caps could encode the product name, lot number, dosage, etc. Caps produced on-demand (e.g., 3D printed at a pharmacy) may encode the patient name or ID, date of dispensing, etc.

Family 17

Handle: "Acoustic Tape" Allowed: US 10,497,225 Pending: US 2020/0090473 Categories: Acoustic

#### DETERMINING OPENING OF PORTALS THROUGH ACOUSTIC EMISSIONS

Acoustic emitters with encoded data may be made in the form of packing tape, safety seals, etc., and need not be limited to containers. Thus, essentially anything that may be opened and closed may be made to produce a sound

with encoded data when the container, package, door, etc. is opened and/or closed. Forms may be dispensed on-demand, such as by using a hand-held tape gun with a punch mechanism to encode data using punched holes, adhesive stripes, etc. as tape is dispensed. Some forms also may be optically readable, e.g., a series of perforations in packing tape that are spaced to encode data as sound when torn also may be visible and read by a scanner without opening the package.



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