



(51) International Patent Classification:

G01K 1/02 (2021.01) *G01D 21/00* (2006.01)
A61J 7/04 (2006.01) *G01K 11/12* (2021.01)

(21) International Application Number:

PCT/CA2020/051474

(22) International Filing Date:

30 October 2020 (30.10.2020)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

3,060,303	30 October 2019 (30.10.2019)	CA
3,061,876	16 November 2019 (16.11.2019)	CA
3,063,247	29 November 2019 (29.11.2019)	CA

(71) Applicant: **INTELLIGENT DEVICES SEZC INC.**;
Cayman Enterprise City, PO Box 10315, 90 North Church
Street, George Town, Grand Cayman, KY1-1003 (KY).

(72) Inventors; and

(71) Applicants: **PETERSEN, Michael** [CA/CA]; 7-65
Whitemarl Dr, Ottawa, Ontario K1L 8J9 (CA). **WILSON,**
Allan [CA/CA]; 38 McKinnon Road, Ottawa, Ontario K1M
0G3 (CA). **BROTZEL, Dean** [CA/CA]; 1502 Ambassador
Drive, Ottawa, Ontario K1J 1G5 (CA).

(74) Agent: **MACRAE & CO.**; 222 Somerset Street West, Suite
600, Ottawa, Ontario K2P 2G3 (CA).

(81) Designated States (*unless otherwise indicated, for every
kind of national protection available*): AE, AG, AL, AM,
AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ,
CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO,
DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN,
HR, HU, ID, IL, IN, IR, IS, IT, JO, JP, KE, KG, KH, KN,
KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD,
ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO,
NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW,
SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN,
TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States (*unless otherwise indicated, for every
kind of regional protection available*): ARIPO (BW, GH,
GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ,
UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ,
TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,
EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV,
MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
KM, ML, MR, NE, SN, TD, TG).

(54) Title: COMPLIANCE SYSTEM AND SMART PACKAGE SYSTEM FOR DYNAMICALLY DISPLAYING USE
CONDITIONS

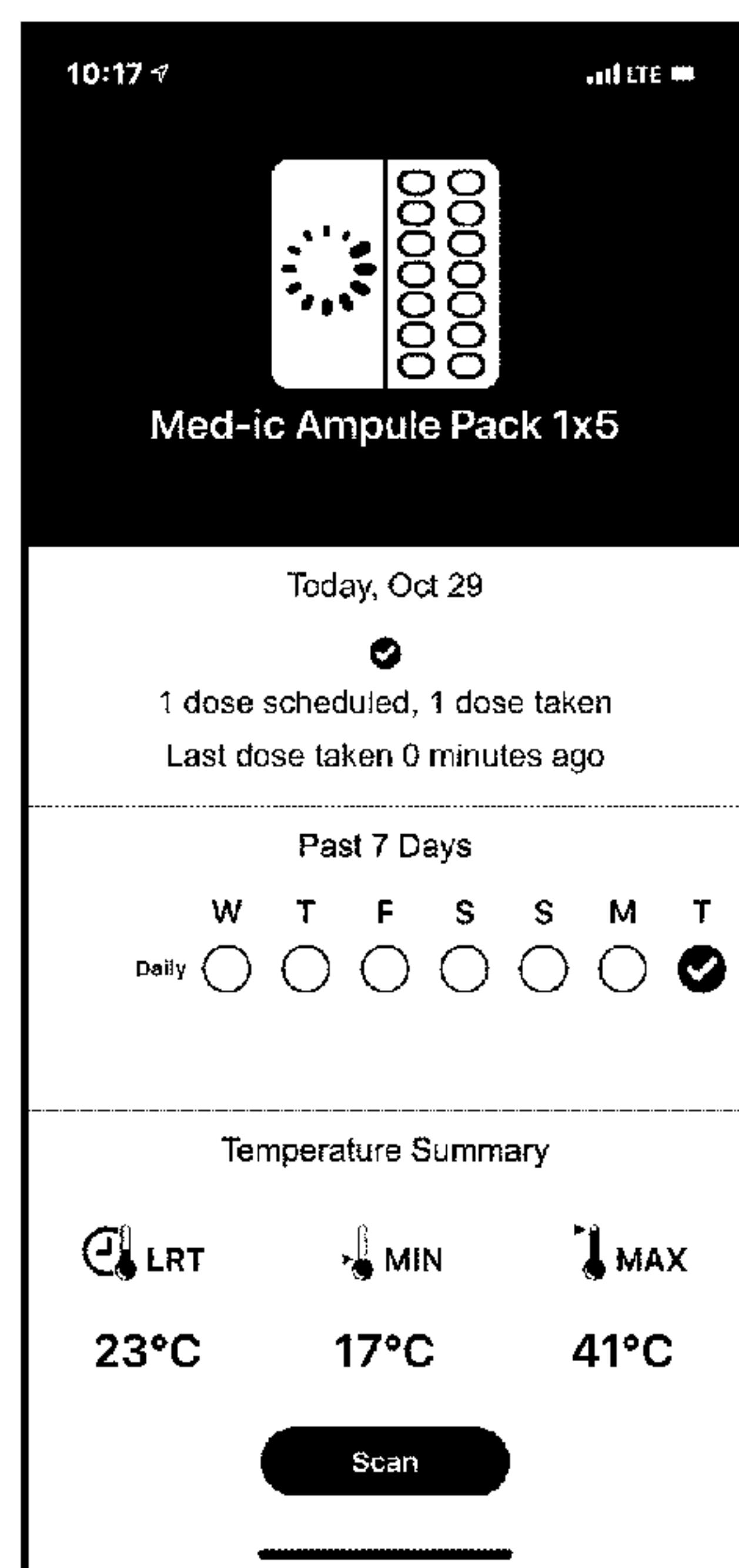


Figure 2

(57) Abstract: There is provided a system for monitoring a package. The system comprises a scanning device and a dynamic display connected to the package and comprising a display. The scanning device scans the dynamic display and sends the scanned results to a server, which processes the results and sends the scanning device an update for the dynamic display. The scanning device then sends the update to the dynamic display and the dynamic display changes the display to show the update. There is also provided a system for monitoring compliance of a user with health related activities, assisting a user with compliance, encouraging a user to comply and detecting compliance.

Published:

- *with international search report (Art. 21(3))*
- *with amended claims and statement (Art. 19(1))*
- *in black and white; the international application as filed contained color or greyscale and is available for download from PATENTSCOPE*

COMPLIANCE SYSTEM AND SMART PACKAGE SYSTEM FOR DYNAMICALLY DISPLAYING USE CONDITIONS

Technical Field

5 There is provided a system for monitoring a package. More particularly, the system includes a dynamic display. There is also provided a system for monitoring compliance of a user with health related activities, assisting a user with compliance, encouraging a user to comply and detecting compliance.

10 Background

Devices for monitoring, recording and downloading medication compliance data for vials, bottles, syringes and blister packages are well known. Allan Wilson, Michael Petersen, Dean Brotzel, Jakob Ehrensvaerd and Stina Grip, amongst others, have described such devices for blister packaged medication, for example
15 US Patent Nos. 7,113,101, 7,178,417, 6,628,199, 6,244,462, 7,170,409, 6,616,035, 7,616,116 and 7,772,974; PCT applications WO/2009/135283, and WO 2013/159198 A1; Canadian application No. 2353350 and US Publication Nos. 20070278285, 20080191174 and 20080053222. Such devices are commonly referred to as smart packages.

20

The pharmaceutical industry is required to advise patients regarding expiry of medication. Such information is usually provided on a label printed and put on the medication packaging or container, or the information can be printed directly onto the box or packaging for the medication. If any information on a label changes,
25 the label cannot be reprinted and replaced easily. Regulations require the pharmaceutical industry to repack the medication contents in new packaging. Oftentimes medication must be recalled to perform the repackaging if new information comes to light regarding anticipated expiry dates or other details. This causes delay and extra expense.

30

Beyond ensuring a patient has access to an appropriate and accurate expiry date, there are other aspects of patient compliance that can be challenging. Encouraging patients to adhere to medication dosage regimes can be difficult and ensuring that the medication dosage regimes are followed can be critical. Many patients take several medications each day, each medication having a different expiry date, different dosage regime and requiring different quantities. Furthermore, each medication often has dosage requirements, timing requirements, food intake requirements and other related elements, which can be difficult for a user to track. It is also difficult, if not nearly impossible for a user to track any changes to expiry, because only a pharmacy or doctor would know if medication that has been dispensed to a patient has undergone a change of expiry from the pharmaceutical provider. Furthermore, it would be impossible for anyone to be aware of a change in expiry date due to other reasons, such as environmental conditions.

Summary

The present disclosure provides, in one aspect, a novel ability to update the label on a pharmaceutical package without requiring repackaging of the contents in a new package and without requiring recalling the medication from distribution.

In one aspect, there is described herein a dynamic display which a user can scan with a scanning device. In one example embodiment, the dynamic display measures temperature and time and displays information to the user. The scanning device consults a cloud, server or other database. The scanning device retrieves the results from the server and optionally runs various processes. Alternatively, or in addition, the cloud or server or the dynamic display can run the processes. The scanning device sends an update to the dynamic display in order to change the information shown on the display.

In one example embodiment, the dynamic display can show or display various information such as expiration date, current time, current date, temperature information, time of next dose and a status indicator. Some or all of the information can be updated by the scanning device. Various colour schemes can be used to indicate different information.

In another further aspect, there is provided a compliance system, comprising a scanning device which receives one or more health related activities as an input from a user. In one example embodiment, the compliance system has a slider for allotting a time interval and a counter for allotting dosing frequency. A series of one or more clocks are connected to the slider and the counter wherein the clocks set the time during a predetermined time period for performing one of the health related activities based on the dosing frequency and time interval.

The compliance system can assist a user in scheduling all health aspects of their life, for example, but not limited to, exercise, food preparation, food consumption, meal times, medication dosage times, medication expiry, meditation, prayer, and other lifestyle related items.

20

Brief Description of the Drawings

The invention will be further understood from the following description with reference to the attached drawings.

25 FIG. 1 depicts an example medication package having a dynamic display showing example information thereon.

FIG. 2 depicts an example display of an example app or computing program on the scanning device and sample information that the scanning device can show, including temperature.

30

FIG. 3 depicts an example display of an example app or computing program on the scanning device and sample information that the scanning device can show, including a slider and a series of clocks.

5

Detailed Description of Preferred Embodiments

The exemplary embodiments of the present disclosure are described and illustrated below to encompass a dynamic display and compliance system for example purposes only. It will be apparent to those of ordinary skill in the art that
10 the embodiments discussed below are exemplary in nature and may be reconfigured without departing from the scope and spirit of the present disclosure. However, for clarity and precision, the exemplary embodiments as discussed below may include optional steps, methods, and features that one of ordinary skill should recognize as not being a requisite to fall within the scope of the present
15 disclosure.

In one example embodiment, Figure 1 shows a sample medication package 10 having a dynamic display 12 thereon. The medication package 10 could be a blister package, bottle, vial, syringe or any other type of medication package. The
20 example dynamic display 12 shows example types of information, in this case showing the expiry date, temperature and status.

The dynamic display 12 can be formed from various methods. For example, the display portion can be printed with printable ink, optical ink or can be formed with
25 any other suitable method of display. In one example embodiment, the dynamic display is printed with e-ink which has the advantage that the ink only requires power when the display changes. Once changed, the e-ink does not require power to maintain the changed display.

30 In another example embodiment, the dynamic display uses two colours of e-ink, for example green can illustrate good status such that the medication is viable and

can be consumed, while red can indicate bad status such that the medication has been exposed to time or temperature combinations that dictate it should no longer be consumed. A third colour can be used to provide other information, such as expiry date. More colours can be used as necessary, for example to show
5 temperature status or time of next dose.

In another example embodiment, Figure 2 shows an app on an example scanning device for receiving information from a dynamic display on a medication package. The scanning device and dynamic display communicate using any suitable form
10 of communication, such as NFC (Near Field Communication). In cases where the scanning device does not have NFC, other methods can be used to communicate such as encoding dose information in a dynamic QR code (Quick Response Code) on the display for optical scanning by the scanning device.

15 In Figure 2, the scanning device is shown as a smartphone, however the scanning device can be any example of hand-held scanner, such as an RFID tag reader, a smart phone, a tablet, or any other type of scanner.

In one example preferred embodiment, a smart phone has an app that is used by
20 the user. The user scans the dynamic display and the smart phone communicates with the server or cloud to determine whether there are any updates to the information on the display. The smart phone then communicates with the dynamic display using NFC or other communication means to send the updated information to the dynamic display. The dynamic display then changes to show the updated
25 information. The app on the smart phone can be used to optionally show the history and analytics of updated information, such as maximum and minimum temperatures, along with current information, such as current expiry date. The processes to determine if the display needs updating can be run by the server or cloud, or on the app on the smart phone or on the dynamic display itself.

30

In another example embodiment, the dynamic display tracks the temperature either continuously or periodically and stores the temperature internally in a storage medium for use by the dynamic display. In another embodiment, the dynamic display has a transmitter and receiver for transmitting the stored temperature data to the server, the scanning device or elsewhere. In another embodiment, the dynamic display polls the temperature periodically and transmits the result to the server, the scanning device or elsewhere. The transmission of the data can occur continuously or the data can be stored and transmitted when the scanning device comes into range.

In a preferred example embodiment, the scanning device is a smart phone and the dynamic display is operatively connected or integrated within a smart package or smart cap containing medication. The smart package has an RFID tag which communicates with the dynamic display. In such an example embodiment, the tag can contain the temperature sensor, time tracking and dose monitoring system and the dynamic display can display the information showing temperature, expiry, time, time of next dose or other information. Alternatively, the dynamic display can contain the temperature sensor and time tracking, in which case the dynamic display can optionally have an internal clock. Internal storage can be optionally provided on the dynamic display or the tag.

The processes that are run by the server, dynamic display or scanning device determine whether the combination of elapsed time and exposed temperature have led to conditions such that the medication should no longer be consumed. In one example embodiment, when the process is run on the server, the smart phone scans the dynamic display and an app on the smart phone communicates with the server. The server processes the data to determine if updates to the dynamic label are required. The app on the smart phone receives the results from the server and transmits the results to the dynamic display in order to update the information shown on the dynamic display. In this way, a user can determine at a glance

whether the medication is consumable prior to opening the package and consuming the medication.

The app on the smart phone can be used to optionally show a history of updated information, such as maximum and minimum temperatures and/or a history of dosage regime, along with current information, such as current expiry date, current date, time and/or date of next dose, time and/or date of last dose, number of doses taken, number of doses scheduled for the next time period and/or amount of remaining medication.

As discussed above, the dynamic display can be updated based on information the scanning device finds in the cloud. In another variation, the dynamic display on a smart package or smart cap has predefined parameters which allow the temperature monitoring tag of the smart package to run a process and determine expiration conditions of the package contents. The expiration conditions or other details determined by the tag are then communicated from the tag to the dynamic display to change the information shown on the display without needing a scanning device to connect to a server.

In a further example embodiment, the dynamic display has its own transceiver (for example, Bluetooth or other over-the-air low power protocols) and periodically checks for updates directly from the server over communication channels. In other alternatives, updates can be automatically “pushed” to the dynamic display and/or the dynamic display can update the cloud or server data regarding the expiration status and/or use status that are determined autonomously by the dynamic display. The dynamic display device in one example embodiment has predetermined parameters upon which it can make autonomous expiration or best-used-by decisions and, without further external input, update the display.

The dynamic display has one advantage in that the dynamic display can be updated between doses. For example, a user could scan the dynamic display prior

to consuming a first dose of medication and the results of the process could show a green status that the medication is good to consume. At the time of taking the next dose, the user can scan the dynamic display again and determine whether the next dose is good to consume. If conditions have changed between the time the first dose was taken and the second dose was scanned, it is possible the second dose could be bad to consume. As another alternative, once a first dose is scanned, the process might result in an updated expiry date on the dynamic display, showing that the remaining contents must be consumed within a shorter time frame in order to remain good to consume.

In a further example embodiment, the dynamic display system is able to calculate remaining best-used-by dates based on previous storage conditions and provide this information to the user, for example either on the package, the scanning device, the user's mobile phone or in the cloud/server. This would enable the user to determine if all of the package contents could be consumed prior to expiry.

In a further example embodiment, the scanning device has multiple profiles for registering multiple users or multiple medications. The scanning device is able to update each profile individually or collectively as a whole.

In another example embodiment, the dynamic display is a standalone sticker or has another method of attachment so the dynamic display can be attached, adhered or connected to the package which is being monitored. The sticker could have an optional feature of being reusable by not requiring permanent adhesive. Such an embodiment is useful in instances, for example, where compliance with medication consumption is not a priority, however the integrity of the package contents is important.

It could be beneficial to detect conditions at the time of removal of a dose. In one example embodiment, a smart package, smart cap or dynamic display has a button or other indicator which a patient would push or mark each time a dose is removed.

The button or indicator can be used by a patient to indicate the removal of a medicine vial from a temperature sensitive package, for example. The smart package, smart cap or dynamic display records the time and conditions of dosage removal, which is made available to the scanning device. As an alternative system, the button is provided on the scanning device so a user can mark off the administration of a dose, while the smart package, smart cap or dynamic display records the time and conditions of dosage removal. As a further alternative, the smart cap or smart blister package auto-records the removal of a dose, along with the time, temperature or other related environmental conditions at the time of removal. The smart cap, smart package or dynamic display transmits the information as per other methods discussed herein, such as storing the results in internal storage or communicating the results to the scanning device either at periodic intervals or only when scanned by the scanning device.

Once removal of a dose has been detected and the conditions have been recorded, the compliance system optionally determines whether the medicine dose was removed while the package was within allowable temperature limits and/or before the medication expired. A warning or alert could be generated if the timing of removal of the dose fails to meet safe consumption requirements. Either the smart package, smart cap, dynamic display, server or scanning device can determine whether the dose was safe and/or provide the warning or alert.

In a variant, the compliance system records the temperature history related to the removal of each dose from the package. Through tracking the history, the compliance system can determine and calculate the remaining best-used-by dates through use of predefined parameters.

It will be appreciated by one skilled in the art that variants can exist in the above-described arrangements and applications. For example, while this description has been limited to use of a dynamic display with medication packaging for example

purposes, the compliance system and/or dynamic display could be used on alternative content packaging systems.

Figure 3 shows an app on an example scanning device having a slider and a series
5 of clocks to assist a user with compliance. In this example, by adjusting the number of dosages and moving the slider to indicate the spacing per dose, the user can control the times for taking the medication. The time period is usually a day, but it could be a different period of time, such as the span of multiple days, a week, a month or any other time period that is reasonable for the timing
10 requirements. The app on the smart phone of Figure 3 can be combined with the app of Figure 2 so that a consumer has a comprehensive app for monitoring expiry dates and timing of health related activities.

In one example, the scanning device can be set up to avoid setting dosage times
15 overnight when the user would be sleeping. As another example, if the user has an activity at a particular time during that day, say for example 2:00pm, such that the user would not be able to take their medication at that time, the user can adjust the time slider until a better, more convenient, dosage time is obtained.

20 In Figure 3, the scanning device is shown as a smartphone, however the scanning device can be any example of hand-held scanner, such as an RFID tag reader, a smart phone, a tablet, or any other type of scanner. Furthermore, the scanning device can operate with a smart phone or can alternatively be integrated into the smart phone. Thus, the slider and series of clocks can be provided on a separate
25 device which communicates with the scanning device in any reasonable communication method, such as those discussed herein.

The compliance system permits the user to use a time slider device and a series of clocks that are based on the number of doses of medication required by the user
30 in that time period. As the user adjusts the slider, each clock is adjusted to provide the user with the new times for taking the medication during that particular time

period, based on the number of doses required during the time period and the slider time interval between doses. A user can adjust the number of doses and time interval. The user moves the slider to adjust the time between doses. By adjusting the time between doses, the user can control the times for taking the medication.

In another aspect, there is provided a compliance system that assists a user in setting up family health. The system can be used for multiple family members concurrently by setting up a different profile for each family member. In one example, the scanning device enables the user to set up, not only dosage times, but also times for other health related daily activities, such as exercise or movement activities. For example, a user might be required to walk for 10 minutes three times a day, or a physiotherapist might require a patient to practice standing 5 times a day. In one example, such repetitive daily activities can be entered into the scanning device and scheduled along with medication dosage times or other health related activities.

In another example, the compliance system can assist a user in scheduling all health aspects of their life, for example, but not limited to, exercise, food preparation, food consumption, meal times, medication dosage times, medication expiry, meditation, prayer, and other lifestyle related items. For example, this could be useful for a user who must schedule certain medications with meals and other medications away from meals, or for a user who must take certain medications at separate times throughout the day to reduce the likelihood of drug interactions.

In one example, the compliance system comprises a code on a package, wherein the scanning device scans the code, determines the contents of the package and inserts the type of contents as one of the health related activities in the scanning device. The package can have any type of contents related to health. As an example, the compliance system can operate in conjunction with a smart cap or smart blister package containing medication therein. The smart cap or blister

package has a scan code associated with it, for example, a barcode, RFID chip, NFC or QR code. The user can scan the code with a scanning device. When determining the content of the package, the scanning device can optionally set the number of dosages and the spacing per dose.

5

In another aspect, there is provided a compliance system having an alarm system in which a user can receive reminders or alarms at the appropriate time for a health related activity. The reminders can be sent to the scanning device, to one or more cell phones via text message or SMS message, to the email address of the user, 10 to a telephone call, or to any other manner of reminder system selected by the user. The alarm system can be set to send reminders.

In a further example aspect, use data from the compliance system and/or scanning device is sent to a physician, psychologist or other health practitioner in order to 15 track the compliance of the user to the lifestyle requirements prescribed by the health practitioner. In order to communicate such information, the scanning device can have a transmitter and receiver for transmitting the compliance data periodically or continuously to a cloud, server or other database. The scanning device can optionally store the compliance data in internal storage memory 20 temporarily or permanently. Alternatively, the scanning device might not have internal storage and instead, the scanning device might be separate from the compliance system in which case, the scanning device can periodically poll the compliance system and transmit the results to the cloud, server or other database or administrator without storage. Alternatively, the user can mark or indicate 25 completion of each health-related activity with an indicator on the system or the scanning device. The indicator sends the completed health-related activities to a health practitioner in order to track the compliance of the user to the lifestyle requirements prescribed by the health practitioner.

30 In another aspect, there is a provided a compliance system in which the user receives rewards for good compliance by tracking the compliance of the user and

using behaviour modification through a reward system to increase compliance through provision of rewards to the user. In one example, the reward system could comprise either positive or negative reinforcement to encourage the user to comply with the dosage regime or other health related activities. For example, negative reinforcement could include payment by the user of a sum of money in advance after which the user receives a set amount of money returned for compliance, such as for each pound or for pain reduction due to weight loss.

In one example, such a reward system can be tracked and implemented by compliance system, including the scanning device and/or through communication from the scanning device to the cloud, server, database or other administrator. In this example, the reward system encourages the user to comply with the dosage regime or other health related activities. The reward system could involve coupons from stores at which the user generally shops. Other alternatives for a reward system include, but are not limited to, discounts, credits towards future purchases, or other monetary forms of reward.

In one example involving various aspects, the health practitioner can set up a schedule on the compliance system for one or more health related activities for the user. The health practitioner could have the ability to lock the schedule in part or in full so that the user receives the completed schedule or so the user is able to set the times of use each day through the slider device. Alternatively, the user could enter all health related activities into the compliance system. As a further alternative, the user could scan the smart package or smart cap, which enables the scanning device to enter the medication into the compliance system, with proposed or fixed dosage regimes. When the user completes a scheduled health related activity or task, the user can mark or indicate completion through a push button or other indicator and the compliance system can record the time of completion. As the user increases compliance, the compliance system can provide the user with rewards and incentives, which will further encourage the user to increase compliance.

The compliance system can enable the scanning device to be updated based on information the scanner receives from the cloud, server, database or other administrator, such as the health practitioner.

5

Following from the above description, it should be apparent to those of ordinary skill in the art that, while the methods and apparatuses herein described constitute exemplary embodiments of the present invention, the invention described herein is not limited to any precise embodiment and that changes may be made to such
10 embodiments without departing from the scope of the invention as defined by the claims. Consequently, the scope of the claims should not be limited by the preferred embodiments set forth in the examples but should be given the broadest interpretation consistent with the description as a whole. Likewise, it is to be understood that it is not necessary to meet any or all of the identified advantages
15 or objects of the invention disclosed herein in order to fall within the scope of any claims, since the invention is defined by the claims and since inherent and/or unforeseen advantages of the present invention may exist even though they may not have been explicitly discussed herein.

What is claimed is:

1. A compliance system, comprising:

5 a dynamic display on a package, the dynamic display comprising an adjustable display for providing information to a user;

a temperature sensor for sensing the temperature of the package, the temperature sensor being in communication with the dynamic display;

10 wherein the information is formed from changeable ink, such as printable ink, optical ink or e-ink.

2. The compliance system of claim 1 further comprising a scanning device configured to communicate with the dynamic display.

15 3. The compliance system of claim 1 or 2 wherein the information is selected from the group consisting of expiration date, current time, current date, temperature information, time of next dose and a status indicator.

20 4. The system of any one of claims 1 to 3 wherein the information is updated based on determining whether a combination of elapsed time and history of the temperature have set a condition such that contents of the package have expired.

25 5. The compliance system of any one of claims 1 to 4 wherein the information includes a best-used-by date which is updated based on predefined parameters, including history of the temperature.

30 6. The compliance system of any one of claims 1 to 5 wherein the information is updated through direct communication with a server.

7. The compliance system of any one of claims 1 to 5 wherein the information is updated by the scanning device.
- 5 8. The compliance system of any one of claims 1 to 5 wherein the information is updated through a process run directly on the dynamic display.
- 10 9. The compliance system of any one of claims 1 to 8 wherein the dynamic display further comprises an internal clock.
10. The compliance system of any one of claims 1 to 9 wherein the ink has different colours to indicate different types of the information.
- 15 11. The compliance system of any one of claims 1 to 10 wherein the scanning device is selected from the group consisting of a hand-held scanner, an RFID tag reader, a smart phone, a tablet, and a laptop.
- 20 12. The compliance system of any one of claims 1 to 11 wherein the scanning device provides history and analytics of the information.
13. The compliance system of any one of claims 1 to 12 wherein the scanning device provides the information shown on the dynamic display.
- 25 14. The compliance system of any one of claims 1 to 13 wherein the scanning device provides current information selected from the group consisting of expiry date, current date, current time, date of next dose, time of next dose, date of last dose, number of doses taken, number of doses scheduled for the next time period, the temperature and amount
- 30 of remaining medication.

15. The compliance system of any one of claims 1 to 14 wherein the scanning device has multiple profiles for registering multiple users or multiple packages; and wherein the scanning device is configured to update each of the profiles individually or collectively as a whole.
- 5
16. The compliance system of any one of claims 1 to 15 wherein the dynamic display is attached, adhered or connected to the package in a reusable or permanent manner.
- 10
17. The compliance system of any one of claims 1 to 16 wherein the dynamic display further comprises a storage medium for tracking and storing the temperature of the package.
- 15
18. The compliance system of claim 17 wherein the dynamic display further comprises a transmitter and receiver for transmitting the stored temperature to a server, scanning device or elsewhere.
- 20
19. The compliance system of any one of claims 1 to 16 wherein the dynamic display periodically polls the temperature sensor and the dynamic display further comprises a transmitter and receiver for transmitting the polled temperature to a server, scanning device or elsewhere.
- 25
20. The compliance system of any one of claims 1 to 19 wherein the package is a smart package or smart cap containing medication.
- 30
21. The compliance system of claim 20 wherein the smart package or smart cap comprises a tag containing the temperature sensor.
22. The compliance system of claim 21 wherein the tag comprises a time tracking and dose monitoring system.

23. The compliance system of claim 21 or 22 wherein the smart package or smart cap has predefined parameters which allow the tag to run a process and determine expiration conditions of the medication; wherein the expiration conditions are communicated from the tag to the dynamic display to update the information.
24. The compliance system of claim 23 wherein the smart package or smart cap updates the information on the dynamic display between removal of dosages of medication.
25. The compliance system of any one of claims 1 to 24 further comprising an indicator for a user to indicate each time a content of the package is removed, wherein the time and conditions of removal are recorded.
26. The compliance system of any one of claims 20 to 24 wherein the smart cap or smart blister automatically senses removal of the contents of the package and records the time and conditions of removal.
27. The compliance system of claim 25 or 26 wherein the information is updated based on determining whether the time and conditions of removal have set a condition such that contents of the package have expired.
28. The compliance system of any one of claims 1 to 27 further comprising a warning which alerts the user to expiry of the contents of the package.
29. A compliance system, comprising:
a scanning device which receives one or more health related activities as an input;
a slider for allotting a time interval;

a counter for allotting frequency;
a series of one or more clocks;
wherein the clocks set the time during a predetermined time period
for performing one of the health related activities based on the frequency
and the time interval.

5

30. The compliance system of claim 29, further comprising:

a code on a package;
wherein the scanning device scans the code, determines the
contents of the package and inserts the contents as one of the health
related activities.

10

31. The compliance system of claim 30 further comprising the compliance
system of any one of claims 1 to 28.

15

32. The compliance system of claim 30 wherein the scanning device sets a
number of dosages and spacing per dose based on the code.

33. The compliance system of any one of claims 29 to 32 wherein the health
related activities are selected from the group consisting of exercise, food
preparation, food consumption, meal times, medication expiry,
medication dosage times, meditation, prayer, and other lifestyle related
items.

20

34. The compliance system of any one of claims 29 to 33 wherein the
predetermined time period avoids overnight times.

25

35. The compliance system of any one of claims 29 to 34 wherein the
scanning device is selected from the group consisting of a hand-held
scanner, an RFID tag reader, a smart phone, a tablet, and a laptop.

30

- 5 36. The compliance system of any one of claims 29 to 35 wherein the scanning device is configured to communicate with an other device selected from the group consisting of a smart phone, tablet, a laptop and a computing device, wherein the other device receives the one or more health related activities as an input and the other device comprises the slider, the counter and the series of one or more clocks.
- 10 37. The compliance system of any one of claims 29 to 36 further comprising an alarm for setting a reminder connected to one or more of the series of one or more clocks.
- 15 38. The compliance system of any one of claims 29 to 37 wherein the alarm sends the reminder to the scanning device, to a cell phone as a text message, to an email address, or to a telephone call.
- 20 39. The compliance system of any one of claims 29 to 38 further comprising an indicator for a user to indicate each time a health-related activity was completed.
- 25 40. The compliance system of claim 39 wherein the scanning device, other device or indicator stores, tracks and/or sends the completed health-related activities to a health practitioner in order to track compliance of the user.
- 30 41. The compliance system of claim 40 further comprising a reward for the compliance which satisfies minimum requirements.
42. The compliance system of claim 41 wherein the reward is selected from the group consisting of monetary, coupons, discounts and credits toward future purchases.

43. The compliance system of any one of claims 29 to 42 wherein the time interval and the frequency are updated based on information received from the group consisting of a cloud, a server, a database, the scanning device or a health practitioner.

5

44. A system for monitoring a package, comprising:

a scanning device;

a dynamic display on the package and configured to communicate information with the scanning device;

10

wherein the scanning device sends the information to a server;

wherein the scanning device receives an update from the server; and

wherein the scanning device sends the update to the dynamic display and the dynamic display changes in response to the update.

15

45. The system of claim 44 wherein the server determines whether elapsed time and exposed temperature have led to conditions such that contents of the package should no longer be consumed.

46. A method comprising the steps of:

20

a. scanning a dynamic display on a package with a scanning device to obtain information;

b. communicating the information to a server with the scanning device;

c. processing the information by the server to determine whether a combination of elapsed time and exposed temperature have led to expiry of contents of a package;

25

d. communicating an update to the scanning device;

e. sending the update to the dynamic display from the scanning device; and

f. changing the information shown on the dynamic display based on the update.

30

47. The compliance system of claim 21 or 22 wherein the smart package or smart cap communicates with the scanning device or server to receive updates to the information.

5

AMENDED CLAIMS
received by the International Bureau on 1 April 2021 (01.04.2021)

What is claimed is:

1. A compliance system, comprising:
 - 5 a dynamic display on a package, the dynamic display comprising an adjustable display for providing information to a user;
 - a temperature sensor for sensing the temperature of the package, the temperature sensor being in communication with the dynamic display;
 - 10 wherein the information is formed from changeable ink, such as printable ink, optical ink or e-ink; and
 - wherein the information includes a best-used-by date which is updated based on predefined parameters, including history of the temperature.
 - 15
2. The compliance system of claim 1 further comprising a scanning device configured to communicate with the dynamic display.
3. The compliance system of claim 1 or 2 wherein the information is
20 selected from the group consisting of expiration date, current time, current date, temperature information, time of next dose and a status indicator.
4. The system of any one of claims 1 to 3 wherein the information is
25 updated based on determining whether a combination of elapsed time and history of the temperature have set a condition such that contents of the package have expired.

5. The compliance system of any one of claims 1 to 4 wherein the information is updated through direct communication with a server.
- 5 6. The compliance system of any one of claims 1 to 4 wherein the information is updated by the scanning device.
- 10 7. The compliance system of any one of claims 1 to 4 wherein the information is updated through a process run directly on the dynamic display.
8. The compliance system of any one of claims 1 to 7 wherein the dynamic display further comprises an internal clock.
- 15 9. The compliance system of any one of claims 1 to 8 wherein the ink has different colours to indicate different types of the information.
- 20 10. The compliance system of any one of claims 1 to 9 wherein the scanning device is selected from the group consisting of a hand-held scanner, an RFID tag reader, a smart phone, a tablet, and a laptop.
11. The compliance system of any one of claims 1 to 10 wherein the scanning device provides history and analytics of the information.
- 25 12. The compliance system of any one of claims 1 to 11 wherein the scanning device provides the information shown on the dynamic display.
13. The compliance system of any one of claims 1 to 12 wherein the scanning device provides current information selected from the group consisting of expiry date, current date, current time, date of next dose,

time of next dose, date of last dose, number of doses taken, number of doses scheduled for the next time period, the temperature and amount of remaining medication.

- 5 14. The compliance system of any one of claims 1 to 13 wherein the scanning device has multiple profiles for registering multiple users or multiple packages; and wherein the scanning device is configured to update each of the profiles individually or collectively as a whole.
- 10 15. The compliance system of any one of claims 1 to 14 wherein the dynamic display is attached, adhered or connected to the package in a reusable or permanent manner.
- 15 16. The compliance system of any one of claims 1 to 15 wherein the dynamic display further comprises a storage medium for tracking and storing the temperature of the package.
- 20 17. The compliance system of claim 16 wherein the dynamic display further comprises a transmitter and receiver for transmitting the stored temperature to a server, scanning device or elsewhere.
- 25 18. The compliance system of any one of claims 1 to 15 wherein the dynamic display periodically polls the temperature sensor and the dynamic display further comprises a transmitter and receiver for transmitting the polled temperature to a server, scanning device or elsewhere.
19. The compliance system of any one of claims 1 to 18 wherein the package is a smart package or smart cap containing medication.

20. The compliance system of claim 19 wherein the smart package or smart cap comprises a tag containing the temperature sensor.
- 5 21. The compliance system of claim 20 wherein the tag comprises a time tracking and dose monitoring system.
22. The compliance system of claim 20 or 21 wherein the smart package or smart cap has predefined parameters which allow the tag to run a process and determine expiration conditions of the medication; wherein
10 the expiration conditions are communicated from the tag to the dynamic display to update the information.
23. The compliance system of claim 22 wherein the smart package or smart cap updates the information on the dynamic display between removal of
15 dosages of medication.
24. The compliance system of any one of claims 1 to 23 further comprising an indicator for a user to indicate each time a content of the package is removed, wherein the time and conditions of removal are recorded.
20
25. The compliance system of any one of claims 19 to 23 wherein the smart cap or smart blister automatically senses removal of the contents of the package and records the time and conditions of removal.
25
26. The compliance system of claim 24 or 25 wherein the information is updated based on determining whether the time and conditions of removal have set a condition such that contents of the package have expired.

27. The compliance system of any one of claims 1 to 26 further comprising a warning which alerts the user to expiry of the contents of the package.
- 5 28. A compliance system, comprising:
- a scanning device which receives one or more health related activities as an input;
 - a slider for allotting a time interval;
 - a counter for allotting frequency;
 - 10 a series of one or more clocks;
- wherein the clocks set the time during a predetermined time period for performing one of the health related activities based on the frequency and the time interval.
- 15 29. The compliance system of claim 28, further comprising:
- a code on a package;
 - wherein the scanning device scans the code, determines the contents of the package and inserts the contents as one of the health related activities.
- 20 30. The compliance system of claim 29 further comprising the compliance system of any one of claims 1 to 27.
31. The compliance system of claim 29 wherein the scanning device sets a
- 25 number of dosages and spacing per dose based on the code.
32. The compliance system of any one of claims 28 to 31 wherein the health related activities are selected from the group consisting of exercise, food preparation, food consumption, meal times, medication expiry,

medication dosage times, meditation, prayer, and other lifestyle related items.

5 33. The compliance system of any one of claims 28 to 32 wherein the predetermined time period avoids overnight times.

34. The compliance system of any one of claims 28 to 33 wherein the scanning device is selected from the group consisting of a hand-held scanner, an RFID tag reader, a smart phone, a tablet, and a laptop.

10 35. The compliance system of any one of claims 28 to 34 wherein the scanning device is configured to communicate with an other device selected from the group consisting of a smart phone, tablet, a laptop and a computing device, wherein the other device receives the one or more health related activities as an input and the other device comprises the slider, the counter and the series of one or more clocks.

15 36. The compliance system of any one of claims 28 to 35 further comprising an alarm for setting a reminder connected to one or more of the series of one or more clocks.

20 37. The compliance system of any one of claims 28 to 36 wherein the alarm sends the reminder to the scanning device, to a cell phone as a text message, to an email address, or to a telephone call.

25 38. The compliance system of any one of claims 28 to 37 further comprising an indicator for a user to indicate each time a health-related activity was completed.

39. The compliance system of claim 38 wherein the scanning device, other device or indicator stores, tracks and/or sends the completed health-related activities to a health practitioner in order to track compliance of the user.
- 5
40. The compliance system of claim 39 further comprising a reward for the compliance which satisfies minimum requirements.
41. The compliance system of claim 40 wherein the reward is selected from the group consisting of monetary, coupons, discounts and credits toward future purchases.
- 10
42. The compliance system of any one of claims 28 to 41 wherein the time interval and the frequency are updated based on information received from the group consisting of a cloud, a server, a database, the scanning device or a health practitioner.
- 15
43. A system for monitoring a package, comprising:
- 20
- a scanning device;
 - a dynamic display on the package and configured to communicate information with the scanning device;
 - wherein the scanning device sends the information to a server;
 - wherein the scanning device receives an update from the server; and
 - wherein the scanning device sends the update to the dynamic display and the dynamic display changes in response to the update.
- 25
44. The system of claim 43 wherein the server determines whether elapsed time and exposed temperature have led to conditions such that contents of the package should no longer be consumed.

45. A method comprising the steps of:

- a. scanning a dynamic display on a package with a scanning device to obtain information;
- 5 b. communicating the information to a server with the scanning device;
- c. processing the information by the server to determine whether a combination of elapsed time and exposed temperature have led to expiry of contents of a package;
- d. communicating an update to the scanning device;
- 10 e. sending the update to the dynamic display from the scanning device; and
- f. changing the information shown on the dynamic display based on the update.

15

46. The compliance system of claim 20 or 21 wherein the smart package or smart cap communicates with the scanning device or server to receive updates to the information.

MACRAE & CO.

PATENT AND TRADE-MARK AGENTS

DANIEL S. SHER
KEVIN M. O'BRIEN
SHAUNA M. PAUL
KEVIN A. JARZYNA

MAIL ADDRESS: P.O. BOX 806, STATION "B"
OTTAWA, ONTARIO, CANADA
K1P 5T4

TELEPHONE: (613) 234-3559
FACSIMILE: (613) 234-3563

OFFICE/COURIER ADDRESS
326 Somerset St. West
Ottawa, Ontario, Canada
K2P 0J9

EMAIL: mail@macrae.ca
WEBSITE: www.macrae.ca

OUR FILE: 481-50

BY ePCT:
April 1, 2021

International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva, 20
Switzerland

Gentlemen:

Re: International Patent Application PCT/CA2020/051474
APPLICANT: INTELLIGENT DEVICES SEZC INC.
TITLE: COMPLIANCE SYSTEM AND SMART PACKAGE
SYSTEM FOR DYNAMICALLY DISPLAYING USE CONDITIONS
FILED: OCTOBER 30, 2020

STATEMENT UNDER ARTICLE 19(1)

The Written Opinion cites the following documents:

D1: US2017229000

The Written Opinion alleges that claims 1-4, 6-22 and 28 lack novelty and inventiveness in view of D1.

Claim 1 has been amended to include the subject matter of previous claim 5, which was not rejected by the Examiner. As a result of these amendments, claim 5 has been removed from the application and the remaining claims have been renumbered. As confirmed indirectly by the Examiner's selection of rejected claims, the cited reference does not teach, suggest or disclose a compliance system, as set forth in the amended claims. Applicant respectfully submits that the

MACRAE & CO.

rejection in view of the cited reference is thus rendered moot and independent claim 1, along with the claims dependent thereon, are allowable in view of the cited reference.

Respectfully submitted,

By:____/Shauna M. Paul/_____
Shauna M. Paul
MacRae & Co.
Patent Agents For the Applicant

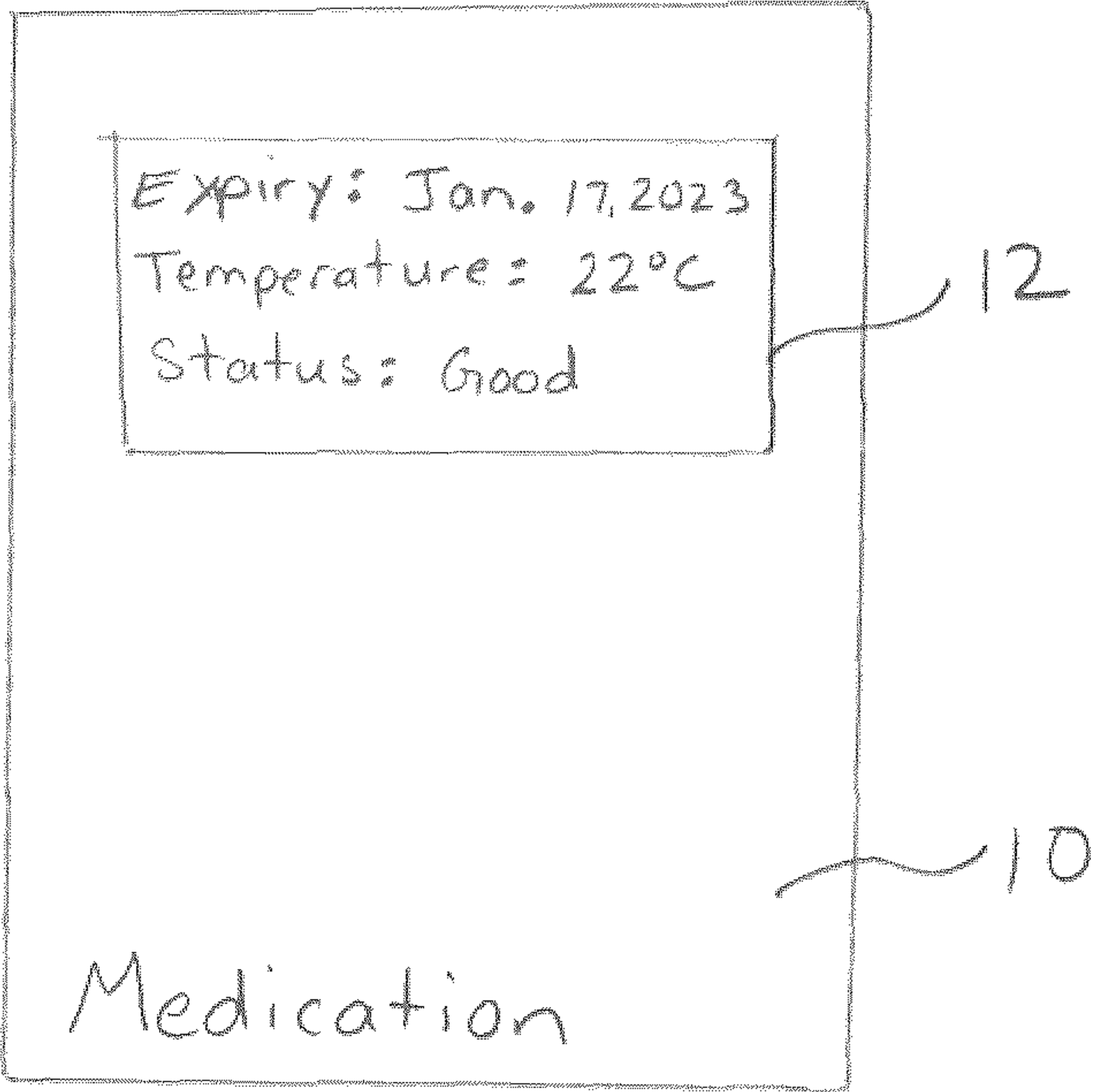


Figure 1

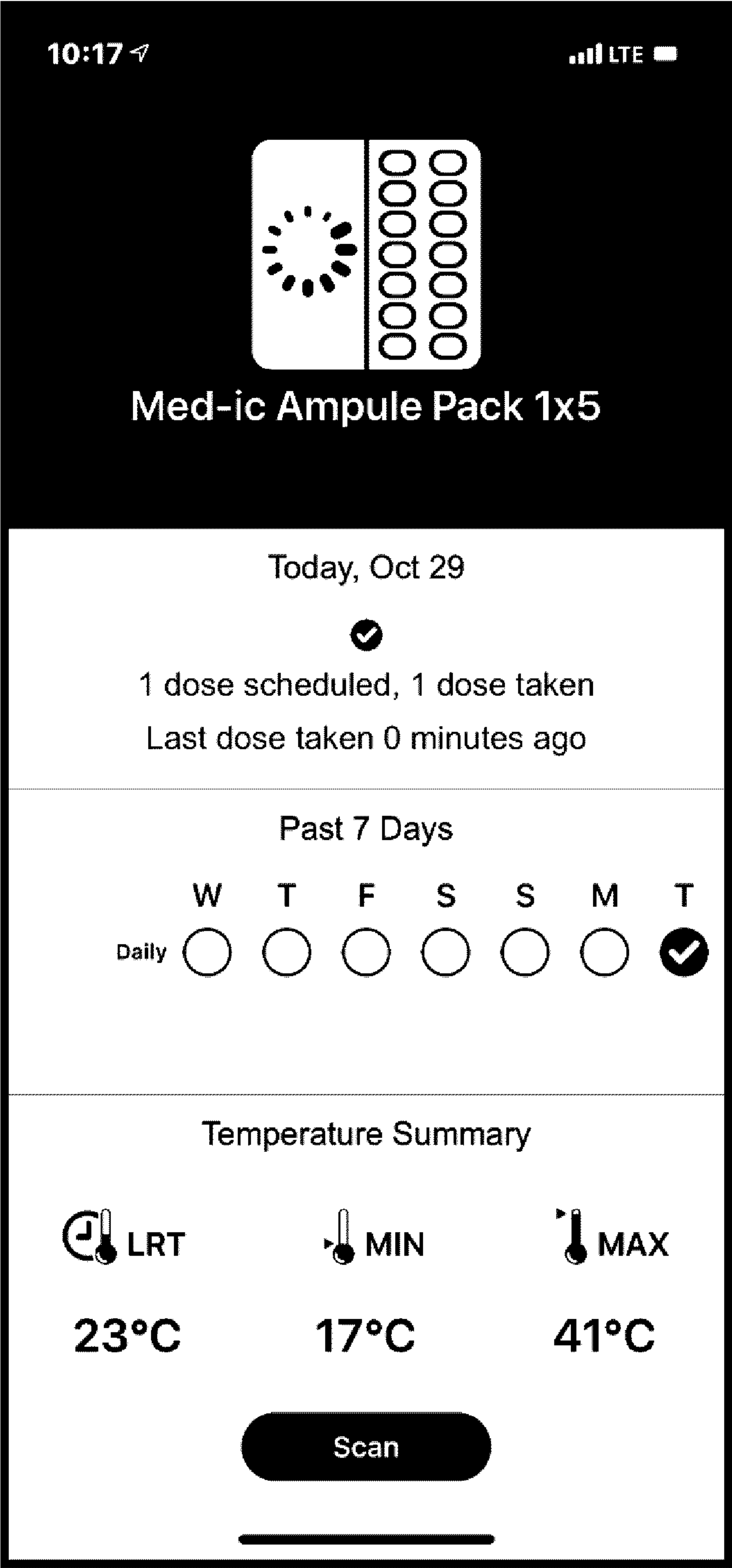


Figure 2

Home

New Medication

Done

Enter Medication Name

Daily Dose Count

1

2

3

4

Time Between Doses

8h

Dose Details

07

00

15

00

23

00

Figure 3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA2020/051474

A. CLASSIFICATION OF SUBJECT MATTER
IPC: **G01K 1/02** (2006.01) , **A61J 7/04** (2006.01) , **G01D 21/00** (2006.01) , **G01K 11/12** (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Keywords used across entire IPC

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used)

Database: Questel-Orbit; Search Tool: Google Patents

Keywords: temperature/climate/condition/heat/frozen sensing/alarm/signal/warning package/bag/package/parcel/carton/crate, changing/dynamic/optical/electronic ink, e-ink, dynamic/changing/progressive display/screen/text, communication/link display/screen/text, provide/dispense/present notification/information/data/message, compliance/conform/track/observe system/user Monitor/trace/status/surveil package/bag/package/parcel/carton/crate scan/optical device/tool/apparatus dynamic/changing/progression/refresh/status/update display/screen/text/image/barcode/indicator communicate/connect/transfer/write info/instruct/message/data send/deliver server scan/optical/QR device/tool/appliance/read/code activity/health/dosage/prescription input/track/enter counter/calculate/estimate/clock/tally/next frequency/number/regular/recurring/repetition predetermined/premeditated/set/determined/prearranged/fixed period/time/clock/interval

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US2017229000A1 (Law) 10 August 2017 (10-08-2017) **paragraphs 8, 26, 41, 46, 47, 58, 59, 80, 85, 92-94, 97-98, 103, 105-111, 114, 116, 122, 135, 136, 138, 141, 153, 158, 160, 161**	1-4, 6-22, 28
A	US2013285681A1 (Wilson et al.) 31 October 2013 (31-10-2013) **whole document**	1-28, 47
A	US2015041616A1 (Gentile et al.) 12 February 2015 (12-02-2015) **whole document**	1-28, 47
A	US9492355B2 (Ratnakar) 15 November 2016 (15-11-2016) **whole document**	29-43
A	US2008059228A1 (Bossi et al.) 06 March 2008 (06-03-2008) **whole document**	29-43
A	US2015227887A1 (Minvielle) 13 August 2015 (13-08-2015) **whole document**	44-46
A	US2018114597A1 (Grabiner et al.) 26 April 2018 (26-04-2018) **whole document**	44-46

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* “A” “D” “E” “L” “O” “P”	Special categories of cited documents: document defining the general state of the art which is not considered to be of particular relevance document cited by the applicant in the international application earlier application or patent but published on or after the international filing date document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) document referring to an oral disclosure, use, exhibition or other means document published prior to the international filing date but later than the priority date claimed	“T” “X” “Y” “&”	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art document member of the same patent family
---	---	--------------------------	--

Date of the actual completion of the international search
20 January 2021 (20-01-2021)

Date of mailing of the international search report
01 February 2021 (01-02-2021)

Name and mailing address of the ISA/CA
Canadian Intellectual Property Office
Place du Portage I, C114 - 1st Floor, Box PCT
50 Victoria Street
Gatineau, Quebec K1A 0C9
Facsimile No.: 819-953-2476

Authorized officer

Gary Sy (873) 354-9776

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of the first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.

☐

Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2.

☐

Claim Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3.

☐

Claim Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

Group A - Claims 1-28 and 47 are directed to a compliance system comprising a temperature sensor, and a dynamic display on a package comprising an adjustable display for providing information to a user, the information being formed from changeable ink;

Group B - Claims 29-43 are directed to a compliance system comprising a scanning device, a slider, a counter, and wherein a series of one or more clocks set the time during a predetermined time period for performing one or more health related activities based on a frequency and time interval; and

Group C - Claims 44-46 are directed to a means for monitoring a package comprising communicating information to a server by means of a dynamic display on a package and a scanning device, wherein said scanning device sends an update to, and causing a change in, the dynamic display based on the update.

1.

☒

As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2.

☐

As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3.

☐

As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claim Nos.:
4.

☐

No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim Nos.:

- Remark on Protest

☐

The additional search fees were accompanied by the applicant’s protest and, where applicable, the payment of a protest fee.
- ☐

The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☒

No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CA2020/051474

Patent Document Cited in Search Report	Publication Date	Patent Family Member(s)	Publication Date
US2017229000A1	10 August 2017 (10-08-2017)	US10282967B2 AU2015301198A1 BR112017002366A2 CA2957057A1 CN106574873A EP3178038A1 JP2017530441A KR20170039692A MX2017001572A WO2016022607A1	07 May 2019 (07-05-2019) 02 March 2017 (02-03-2017) 05 December 2017 (05-12-2017) 11 February 2016 (11-02-2016) 19 April 2017 (19-04-2017) 14 June 2017 (14-06-2017) 12 October 2017 (12-10-2017) 11 April 2017 (11-04-2017) 02 August 2017 (02-08-2017) 11 February 2016 (11-02-2016)
US2013285681A1	31 October 2013 (31-10-2013)	US10278287B2 AU2013252443A1 CA2775546A1 CA2871285A1 CN104302555A EP2844582A1 ES2698323T3 IN2153MUN2014A JP2015520702A JP6278412B2 KR20150015472A KR101700864B1 PL2844582T3 WO2013159198A1	30 April 2019 (30-04-2019) 27 November 2014 (27-11-2014) 25 October 2013 (25-10-2013) 31 October 2013 (31-10-2013) 21 January 2015 (21-01-2015) 11 March 2015 (11-03-2015) 04 February 2019 (04-02-2019) 28 August 2015 (28-08-2015) 23 July 2015 (23-07-2015) 14 February 2018 (14-02-2018) 10 February 2015 (10-02-2015) 31 January 2017 (31-01-2017) 31 January 2019 (31-01-2019) 31 October 2013 (31-10-2013)
US2015041616A1	12 February 2015 (12-02-2015)	US10548418B2 AU2014243784A1 CN105593921A EP2973525A2 JP2019094217A JP6768774B2 JP2016517032A US2015048161A1 US9123018B2 US2016189091A1 US9684884B2 US2015041537A1 WO2014160491A2	04 February 2020 (04-02-2020) 05 November 2015 (05-11-2015) 18 May 2016 (18-05-2016) 20 January 2016 (20-01-2016) 20 June 2019 (20-06-2019) 14 October 2020 (14-10-2020) 09 June 2016 (09-06-2016) 19 February 2015 (19-02-2015) 01 September 2015 (01-09-2015) 30 June 2016 (30-06-2016) 20 June 2017 (20-06-2017) 12 February 2015 (12-02-2015) 02 October 2014 (02-10-2014)
US9492355B2	15 November 2016 (15-11-2016)	US2014326744A1 US2006124655A1 US7269476B2 US2010049363A1 US8483872B2 US2009057328A1 US8985388B2 US2009259336A1 US9043015B2 US2007271001A1 US2010096399A1 US2010100237A1 US2013304255A1 US2016247345A1 WO2010054205A2	06 November 2014 (06-11-2014) 15 June 2006 (15-06-2006) 11 September 2007 (11-09-2007) 25 February 2010 (25-02-2010) 09 July 2013 (09-07-2013) 05 March 2009 (05-03-2009) 24 March 2015 (24-03-2015) 15 October 2009 (15-10-2009) 26 May 2015 (26-05-2015) 22 November 2007 (22-11-2007) 22 April 2010 (22-04-2010) 22 April 2010 (22-04-2010) 14 November 2013 (14-11-2013) 25 August 2016 (25-08-2016) 14 May 2010 (14-05-2010)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CA2020/051474

Patent Document Cited in Search Report	Publication Date	Patent Family Member(s)	Publication Date
US2008059228A1	06 March 2008 (06-03-2008)	AU2004319427A1	17 November 2005 (17-11-2005)
		AU2004319427B2	21 April 2011 (21-04-2011)
		AU2008225193A1	18 September 2008 (18-09-2008)
		AU2008275962A1	22 January 2009 (22-01-2009)
		CA2564977A1	17 November 2005 (17-11-2005)
		CA2564977C	12 August 2014 (12-08-2014)
		CA2684867A1	18 September 2008 (18-09-2008)
		CA2693893A1	22 January 2009 (22-01-2009)
		CN101103350A	09 January 2008 (09-01-2008)
		CN101743548A	16 June 2010 (16-06-2010)
		CN101802830A	11 August 2010 (11-08-2010)
		EP1749246A2	07 February 2007 (07-02-2007)
		EP1749246A4	02 November 2011 (02-11-2011)
		EP2137654A2	30 December 2009 (30-12-2009)
		EP2179377A2	28 April 2010 (28-04-2010)
		JP2007535036A	29 November 2007 (29-11-2007)
		JP2010533927A	28 October 2010 (28-10-2010)
		KR20070001285A	03 January 2007 (03-01-2007)
		KR20100027094A	10 March 2010 (10-03-2010)
		KR20100039865A	16 April 2010 (16-04-2010)
		US2008035520A1	14 February 2008 (14-02-2008)
		US7828147B2	09 November 2010 (09-11-2010)
		US2005240305A1	27 October 2005 (27-10-2005)
		US8019471B2	13 September 2011 (13-09-2011)
		US2007185615A1	09 August 2007 (09-08-2007)
		US8600548B2	03 December 2013 (03-12-2013)
		US2011060455A1	10 March 2011 (10-03-2011)
		US2011202174A1	18 August 2011 (18-08-2011)
		US2014114472A1	24 April 2014 (24-04-2014)
		WO2005109119A2	17 November 2005 (17-11-2005)
		WO2005109119A3	11 January 2007 (11-01-2007)
		WO2008112731A2	18 September 2008 (18-09-2008)
		WO2008112731A3	11 December 2008 (11-12-2008)
		WO2009012371A2	22 January 2009 (22-01-2009)
		WO2009012371A3	30 April 2009 (30-04-2009)
US2015227887A1	13 August 2015 (13-08-2015)	CA2869861A1	27 May 2015 (27-05-2015)
		CN104678410A	03 June 2015 (03-06-2015)
		EP2678677A1	01 January 2014 (01-01-2014)
		EP2695092A2	12 February 2014 (12-02-2014)
		EP2753925A1	16 July 2014 (16-07-2014)
		EP2776826A1	17 September 2014 (17-09-2014)
		EP2823391A1	14 January 2015 (14-01-2015)
		EP2839386A1	25 February 2015 (25-02-2015)
		EP2839388A1	25 February 2015 (25-02-2015)
		EP2839424A2	25 February 2015 (25-02-2015)
		EP2839425A2	25 February 2015 (25-02-2015)
		EP2881759A1	10 June 2015 (10-06-2015)
		EP2984620A2	17 February 2016 (17-02-2016)
		EP3014475A2	04 May 2016 (04-05-2016)
		EP3055817A1	17 August 2016 (17-08-2016)
		EP3065561A1	14 September 2016 (14-09-2016)
		EP3068695A1	21 September 2016 (21-09-2016)
		FR3004569A1	17 October 2014 (17-10-2014)
		HK1200211A1	31 July 2015 (31-07-2015)
		HK1201584A1	04 September 2015 (04-09-2015)
		IN3240DE2014A	25 September 2015 (25-09-2015)
		JP2015515045A	21 May 2015 (21-05-2015)
		JP6194323B2	06 September 2017 (06-09-2017)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CA2020/051474

Patent Document Cited in Search Report	Publication Date	Patent Family Member(s)	Publication Date
		JP2015102546A	04 June 2015 (04-06-2015)
		JP2015520888A	23 July 2015 (23-07-2015)
		JP2017224326A	21 December 2017 (21-12-2017)
		JP2017505106A	16 February 2017 (16-02-2017)
		KR20160072089A	22 June 2016 (22-06-2016)
		KR101926764B1	07 March 2019 (07-03-2019)
		KR20140146202A	24 December 2014 (24-12-2014)
		KR20140146208A	24 December 2014 (24-12-2014)
		KR20140146586A	26 December 2014 (26-12-2014)
		KR20140146617A	26 December 2014 (26-12-2014)
		KR20150003733A	09 January 2015 (09-01-2015)
		KR20150143666A	23 December 2015 (23-12-2015)
		KR20160074534A	28 June 2016 (28-06-2016)
		KR20160082701A	08 July 2016 (08-07-2016)
		MX2014008770A	25 September 2015 (25-09-2015)
		MX342699B	06 October 2016 (06-10-2016)
		MX2014010787A	09 March 2015 (09-03-2015)
		MX346969B	06 April 2017 (06-04-2017)
		MX346970B	06 April 2017 (06-04-2017)
		MX2014004257A	05 August 2015 (05-08-2015)
		MX2014004378A	08 September 2014 (08-09-2014)
		MX2014008414A	11 May 2015 (11-05-2015)
		MX2014012587A	06 March 2015 (06-03-2015)
		RU2014147621A	10 June 2016 (10-06-2016)
		SG10201406107XA	28 May 2015 (28-05-2015)
		US8490862B1	23 July 2013 (23-07-2013)
		US8550365B1	08 October 2013 (08-10-2013)
		US2013275477A1	17 October 2013 (17-10-2013)
		US2013269544A1	17 October 2013 (17-10-2013)
		US8668140B2	11 March 2014 (11-03-2014)
		US2013290364A1	31 October 2013 (31-10-2013)
		US8733631B2	27 May 2014 (27-05-2014)
		US2014038140A1	06 February 2014 (06-02-2014)
		US8783556B2	22 July 2014 (22-07-2014)
		US2014061296A1	06 March 2014 (06-03-2014)
		US8851365B2	07 October 2014 (07-10-2014)
		US2014214714A1	31 July 2014 (31-07-2014)
		US9016193B2	28 April 2015 (28-04-2015)
		US2015057773A1	26 February 2015 (26-02-2015)
		US9069340B2	30 June 2015 (30-06-2015)
		US2013276644A1	24 October 2013 (24-10-2013)
		US9072317B2	07 July 2015 (07-07-2015)
		US2014037805A1	06 February 2014 (06-02-2014)
		US9080997B2	14 July 2015 (14-07-2015)
		US2014041532A1	13 February 2014 (13-02-2014)
		US9121840B2	01 September 2015 (01-09-2015)
		US2013297642A1	07 November 2013 (07-11-2013)
		US9171061B2	27 October 2015 (27-10-2015)
		US2013275318A1	17 October 2013 (17-10-2013)
		US9414623B2	16 August 2016 (16-08-2016)
		US2014364972A1	11 December 2014 (11-12-2014)
		US9429920B2	30 August 2016 (30-08-2016)
		US2014236359A1	21 August 2014 (21-08-2014)
		US9436170B2	06 September 2016 (06-09-2016)
		US2014364971A1	11 December 2014 (11-12-2014)
		US9460633B2	04 October 2016 (04-10-2016)
		US2015037764A1	05 February 2015 (05-02-2015)
		US9497990B2	22 November 2016 (22-11-2016)
		US2015260699A1	17 September 2015 (17-09-2015)
		US9528972B2	27 December 2016 (27-12-2016)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CA2020/051474

Patent Document Cited in Search Report	Publication Date	Patent Family Member(s)	Publication Date
		US2013273222A1	17 October 2013 (17-10-2013)
		US9541536B2	10 January 2017 (10-01-2017)
		US2015012122A1	08 January 2015 (08-01-2015)
		US9564064B2	07 February 2017 (07-02-2017)
		US2013273217A1	17 October 2013 (17-10-2013)
		US9619781B2	11 April 2017 (11-04-2017)
		US9702858B1	11 July 2017 (11-07-2017)
		US2015145719A1	28 May 2015 (28-05-2015)
		US9766346B2	19 September 2017 (19-09-2017)
		US2017208850A1	27 July 2017 (27-07-2017)
		US9877504B2	30 January 2018 (30-01-2018)
		US2017011653A1	12 January 2017 (12-01-2017)
		US9892657B2	13 February 2018 (13-02-2018)
		US2013269297A1	17 October 2013 (17-10-2013)
		US9902511B2	27 February 2018 (27-02-2018)
		US2017320655A1	09 November 2017 (09-11-2017)
		US10207859B2	19 February 2019 (19-02-2019)
		US2016342144A1	24 November 2016 (24-11-2016)
		US10209691B2	19 February 2019 (19-02-2019)
		US2018003687A1	04 January 2018 (04-01-2018)
		US10215744B2	26 February 2019 (26-02-2019)
		US2013269542A1	17 October 2013 (17-10-2013)
		US10219531B2	05 March 2019 (05-03-2019)
		US2018165985A1	14 June 2018 (14-06-2018)
		US10332421B2	25 June 2019 (25-06-2019)
		US2019295441A1	26 September 2019 (26-09-2019)
		US10847054B2	24 November 2020 (24-11-2020)
		US2013269454A1	17 October 2013 (17-10-2013)
		US2013269537A1	17 October 2013 (17-10-2013)
		US2013269538A1	17 October 2013 (17-10-2013)
		US2013269543A1	17 October 2013 (17-10-2013)
		US2013270337A1	17 October 2013 (17-10-2013)
		US2013273507A1	17 October 2013 (17-10-2013)
		US2013275037A1	17 October 2013 (17-10-2013)
		US2013275342A1	17 October 2013 (17-10-2013)
		US2013275343A1	17 October 2013 (17-10-2013)
		US2013275370A1	17 October 2013 (17-10-2013)
		US2013275426A1	17 October 2013 (17-10-2013)
		US2013275439A1	17 October 2013 (17-10-2013)
		US2013275460A1	17 October 2013 (17-10-2013)
		US2013295532A1	07 November 2013 (07-11-2013)
		US2013309138A1	21 November 2013 (21-11-2013)
		US2013309636A1	21 November 2013 (21-11-2013)
		US2013309637A1	21 November 2013 (21-11-2013)
		US2013310955A1	21 November 2013 (21-11-2013)
		US2014041533A1	13 February 2014 (13-02-2014)
		US2014069838A1	13 March 2014 (13-03-2014)
		US2014191025A1	10 July 2014 (10-07-2014)
		US2014290395A1	02 October 2014 (02-10-2014)
		US2014290396A1	02 October 2014 (02-10-2014)
		US2015051841A1	19 February 2015 (19-02-2015)
		US2015100462A1	09 April 2015 (09-04-2015)
		US2015235566A1	20 August 2015 (20-08-2015)
		US2015269867A1	24 September 2015 (24-09-2015)
		US2016011162A1	14 January 2016 (14-01-2016)
		US2016180739A1	23 June 2016 (23-06-2016)
		US2016217420A1	28 July 2016 (28-07-2016)
		WO2013126579A1	29 August 2013 (29-08-2013)
		WO2013134325A1	12 September 2013 (12-09-2013)
		WO2013134544A1	12 September 2013 (12-09-2013)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CA2020/051474

Patent Document Cited in Search Report	Publication Date	Patent Family Member(s)	Publication Date
		WO2013142218A1	26 September 2013 (26-09-2013)
		WO2013158571A2	24 October 2013 (24-10-2013)
		WO2013158572A2	24 October 2013 (24-10-2013)
		WO2013158576A1	24 October 2013 (24-10-2013)
		WO2013176800A1	28 November 2013 (28-11-2013)
		WO2013180925A2	05 December 2013 (05-12-2013)
		WO2014168844A2	16 October 2014 (16-10-2014)
		WO2014182566A2	13 November 2014 (13-11-2014)
		WO2014210531A2	31 December 2014 (31-12-2014)
		WO2015006351A1	15 January 2015 (15-01-2015)
		WO2015013030A1	29 January 2015 (29-01-2015)
		WO2015013031A2	29 January 2015 (29-01-2015)
		WO2015054082A1	16 April 2015 (16-04-2015)
		WO2015069325A1	14 May 2015 (14-05-2015)
		WO2015069950A1	14 May 2015 (14-05-2015)
		WO2015073569A1	21 May 2015 (21-05-2015)
		WO2015195573A1	23 December 2015 (23-12-2015)
		WO2015195575A1	23 December 2015 (23-12-2015)
		WO2016028705A1	25 February 2016 (25-02-2016)
		WO2018034800A1	22 February 2018 (22-02-2018)
US2018114597A1	26 April 2018 (26-04-2018)	CN104115185A	22 October 2014 (22-10-2014)
		DK2769359T3	10 April 2017 (10-04-2017)
		EP2769359A1	27 August 2014 (27-08-2014)
		HK1196172A1	05 December 2014 (05-12-2014)
		JP2015503138A	29 January 2015 (29-01-2015)
		US2011258130A1	20 October 2011 (20-10-2011)
		US9053616B2	09 June 2015 (09-06-2015)
		US2012175412A1	12 July 2012 (12-07-2012)
		US9224120B2	29 December 2015 (29-12-2015)
		US2016154939A1	02 June 2016 (02-06-2016)
		US9811632B2	07 November 2017 (07-11-2017)
		US2015269589A1	24 September 2015 (24-09-2015)
		WO2013058991A1	25 April 2013 (25-04-2013)