in particular United States of America, Canada, European Union, Japan, and other countries, also following a worldwide trend of increasing elder population, and related consumption of prescribed pain relievers medicines.

Summary

Purpose of the present disclosure is to overcome the above-mentioned drawbacks by providing a medicament dispenser as substantially defined in independent claims 1 and 32.

Further object of the present disclosure is to provide an auxiliary device as substantially defined in claim 40.

Further object of the present disclosure is to provide a medicament re-filling apparatus as substantially defined in claim 43.

Further objects of the present disclosure is to provide an inhaler as substantially defined in claim 42.

Further object of the present disclosure is to provide a medical system as substantially defined in claim 47.

Further preferred characteristics are defined in the corresponding dependent claims.

According to a first aspect of the present disclosure, it is provided a medical dispenser for delivering a medicament to a user, the medical dispenser comprising:

one or more internal storages for storing one or more medicaments;

a dispensing unit configured to access the one or more internal storages and dispense the medicament based on a predefined dispensing protocol;

a control unit comprising:

a user recognition unit adapted to collect user authentication data; and

a communication module, configured to send/receive user authentication data and delivery control data associated to said predefined dispensing protocol to/from a remote server;

wherein the control unit is configured to enable/disable the dispensing unit based on user authentication data and delivery control data.

In an exemplary example, the communication module is configured to send/receive the delivery control data and the user authentication data through wireless means.

In an exemplary example, the control unit is further configured to collect health data associated to the user.

In an exemplary example, the communication module is further configured to send/receive the health data to/from the remote server, the delivery control data being adjusted based on the user health data.

In an exemplary example, the communication module is configured such to send/receive the health data through wireless means.

In an exemplary example, the medicament dispenser comprises a camera for detecting user’s visual data associated to user’s physical characteristics, the control unit being configured to process the visual data such to obtain the health data. The camera can also be used to timely perform pupilometry and correlate with the effects of medicine intake.

In an exemplary example, the control unit is configured to receive/send health data associated to the user from/to an auxiliary external device.

In an exemplary example, the internal storage is an elongate compartment having a top end and a bottom end, the elongate compartment being adapted to accommodate a plurality of medicaments in the form of a pile.

In an exemplary example, the dispensing unit comprises an ejector configured to slide along a transversal direction R with respect to an axis A of the elongate compartment, the ejector being slidable from an inner position where it collects a medicament located at the bottom end of the compartment to an outer position where the ejector protrudes out of the dispenser to deliver the medicament and vice/versa.

In an exemplary example, the medicament dispenser comprises a resilient means located at the top end of the compartment, the resilient means being arranged to exert a pressure on the pile such to ensure that the medicament located at the bottom end of the compartment is intercepted by the ejector for delivery when the latter is in the inner position.

In an exemplary example, the medicament dispenser further comprises a blocking device associated to the ejector, the blocking device being adapted to prevent/allow a movement of the ejector when activated/de-activated by the control unit.

In an exemplary example, the activation/de-activation of the blocking system is operated by the control unit based on the user authentication data and the delivery control data

In an exemplary example, the activation/de-activation of the blocking system is operated by the control unit based on the health data.

In an exemplary example, the ejector is connected to a slidable button located on an external wall of the medicament dispenser, the slidable button being operable by the user.

In an exemplary example, the internal storage is configured to accommodate a canister that is adapted to store the medicament in a form such to be delivered as an inhalable aerosol.

In an exemplary example, the dispensing unit comprises a movable shutter for allowing/preventing access to the canister.

In an exemplary example, the movable shutter is connected to a slidable lever of the medicament dispenser and operable by the user.

In an exemplary example, the canister comprises an upper component adapted to be connected to an inhaler, for inhaling the aerosol.

In an exemplary example, the medicament dispenser comprises a cover for accessing the internal storage, wherein the cover is removably connected to a main body of the medicament dispenser by a locking/unlocking means.

In an exemplary example, the locking/unlocking means is configured to cooperate for connecting/removing the cover with an external medicament re-filling apparatus, when the latter is located in physical proximity with the medicament dispenser.

In an exemplary example, the medicament dispenser further comprises a safety clamping mechanism configured to irreversibly prevent unlocking of the cover.

In an exemplary example, the safety clamping mechanism is activable by the control unit upon reception of a service termination order from the remote server.

In an exemplary example, the safety clamping mechanism is associated to an internal electric circuit arranged to detect a local attempt of forcing the medicament dispenser to access the internal storage, wherein the safety clamping system is activated if such attempt is detected.

In an exemplary example, the safety clamping mechanism comprises an electro-mechanical switch including a component having a slidable pin, the pin being arranged when activated to project into a receiving groove of the cover to prevent its removal.

In an exemplary example, the medicament dispenser further comprises a destruction system of the medicaments.

In an exemplary example, the destruction system is activable by the control unit upon reception of a service destruction order from the remote server.

In an exemplary example, the destruction system is associated to an internal electric circuit arranged to detect a local attempt of forcing the medicament dispenser to access the internal storage, wherein the destruction system is activated if such attempt is detected.

In an exemplary example, the destruction system comprises a reservoir disposed within the internal storage, the reservoir having frangible walls and containing a medicament-neutralizing agent.

In an exemplary example, the medicament dispenser may comprise a puncher element configured to break, when

activated, the frangible walls, wherein the reservoir is arranged within the internal storage such that upon breakage of the frangible walls the medicament-neutralizing agent is released within the internal storage.

In an exemplary example, the destruction system comprises an electro-mechanical switch including a component having a slidable pin such that, when activated, the slide of the pin triggers a release of the puncher element for breaking the reservoir walls.

In an exemplary example, the electro-mechanical switch is arranged such that the slide of the pin causes both its projection into the receiving groove of the cover for preventing its removal and the release of the puncher element for breaking the reservoir walls.

According to a further aspect of the present disclosure, it is provided a medicament dispenser for delivering a medicament to a user, comprising:

- a connector for connecting the medicament dispenser to an external storage adapted to store a medicament;
- a control unit comprising:

  a user recognition unit adapted to collect user authentication data; and

  a communication module, configured to send/receive said user authentication data and a delivery control data to/from a remote server, the delivery control data being associated to a predefined dispensing protocol of the user;

wherein the control unit is configured to enable/disable delivery of medicament from the external storage to the user based on the user authentication data and the delivery control data.

A further example of the present disclosure provides an auxiliary device for use with the medicament dispenser for monitoring health of a user, the auxiliary device being configured to collect health data of the user and to send/receive the health data to the medicament dispenser.

A further aspect of the present disclosure provides an auxiliary device for monitoring health of a user, the auxiliary device being configured to collect health data of the user and to send/receive said health data to a medicament dispenser as described herein.

In an exemplary example, the auxiliary device is a wearable device.

A further example of the present disclosure provides an inhaler for use with the medicament dispenser.

A further aspect of the present disclosure provides an inhaler for use with a medicament dispenser as described herein, comprising an end portion configured to be connected with the upper component of a canister accommodated into a storage of the medicament dispenser for inhaling the medicament contained therein in the form of aerosol.

A further example of the present disclosure provides a medicament re-filling apparatus for use with the medicament dispenser.

A further aspect of the present disclosure provides a medicament re-filling apparatus for use with a medicament dispenser as described herein, comprising a detaching system adapted to cooperate with the locking/unlocking means of the medicament dispenser.

In an exemplary example, the medicament re-filling apparatus comprises a communication system configured to exchange validation data with the control unit of the medicament dispenser and/or a remote server for authenticating the medicament dispenser.

In an exemplary example, the medicament re-filling apparatus comprises a base with a receiving slot for internally receiving at least a portion of the medicament dispenser.

In an exemplary example, the communication system is configured to exchange validation data with the control unit and/or the remote server through wireless means.

A further example of the present disclosure provides medical system for a medicament intake and monitoring, comprising the medicament dispenser and the auxiliary device.

A further aspect of the present disclosure provides a medical system for a medicament intake and monitoring, comprising a medicament dispenser as described herein and an auxiliary device as described herein.