

Computerized, Modular-Designed, Temperature-Controlled, Parcel-Securing, Parcel-Preserving, Internet of Things (IoT) Device and Management System.

Abstract

A parcel receiving, securing and preservation device that aids in the order fulfilment part of the the e-commerce supply chain process with special focus on the receiving, securing, preservation and management of the parcel at the its final destination. The device is designed to be an Internet of Things device with communication and sensory modules that is capable of supervising the delivery process for a variety of parcel type with a heavier role during the last mile delivery of said parcels in terms of coordination with device users and third-party logistics (3PL) delivery parties on matters regarding notification, delivery authorization, identity authentication and parcel management. Receptacle chamber-ambience temperature control systems also allow said receptacle to hold temperature sensitive parcels like food, medicine, groceries and perishables indefinitely.

The major aspects of the device consist of:

- 1) A “head module” that acts as the master controller and power relay for the main and optional receptacle units.
- 2) A main receptacle composing of a temperature controlled, thermal-insulated chamber capable of ambience cooling and heating. Optional receptacle units could be attached and secured to the bottom of the main receptacle via a docking connector unit which facilitates device-to-device communication and energy relay. An automated push-lift upward-sliding door. with a window and switchable privacy smart screen, acts as the gateway control and threshold-setting mechanism.
- 3) A housing serves as protection against tampering and the elements of nature. The housing also serves as an aesthetic piece that aids product personalization and accessorization.
- 4) Electronical components such as LED, LCD Screen, Speakers facilitate device-to-human interfacing and interaction.

DESCRIPTION OF DRAWINGS

FIG. 1A is an illustration of the device (codenamed BOXY) assembly. It lists the various major part assemblies. A bottle of wine in the interior provides the context for the kind of parcels that the receptacle could possibly hold.

FIG. 1A-1 is an illustration of the door assembly. It features a window that is retrofitted with an electronically switchable privacy film

FIG. 1A-2 is an illustration of a door handler assembly with descriptions of the various parts and assemblies that it comprises of. Within the door handler assembly is a door lock assembly and a lifter mechanism that aids in the upward and downward sliding motion of the device door.

FIG. 1A-3 is another illustration of the door handler assembly from the back and side perspectives.

FIG. 1A-4 is an illustration of the door lock assembly

FIG. 1A-5 is an illustration of the door lock assembly in its “exploded” perspective revealing the various components that it comprises of.

FIG. 1B is an illustration of the “head module”. It lists the various major components that it comprises of.

FIG. 1C is an illustration of the chamber assembly.

FIG. 2A is a schematic drawing of the chamber control module. Raspberry Pi 3B+ is the microprocessor used. Control signals for lateral and vertical movement from the microprocessor to the motor driver module via the use of transistors. Input from limit sensors will determine the cut off of the control signals when the door assembly reaches the ideal positions. Chamber assembly lighting is also controlled via the use of MOSFET.

FIG. 2B is a schematic drawing of the Peltier control module. Heating and cooling is achieved with control signals to a relay that control power supplied to the Peltier and fans.

FIG. 3A is a descriptive illustration of the worm and worm gear mechanisms in “exploded” perspective that serves to describe the self-locking mechanism.

FIG. 3B is an illustration of the receptacle chamber equipped with dual Peltier devices.

In FIG. 3C is a user interface of the device illustrating the various commands that users could access and remotely control the device.