

TITLE OF THE INVENTION: A VENDING MACHINE AND A PAYMENT TERMINAL FOR THE SAME

Technical Field

[0001] The present invention relates to self-service vending machines, and in particular, a payment terminal for such self-service vending machines. The present invention has particular application in vending machines that are configured to dispense one or more vendible products, such as food and/or beverage items or other personal items. The present invention also has application in vending machines that issue and/or dispense parking tickets for a motor vehicle, and vending machines that issue washing and/or drying cycles of an associated washing machine, albeit the present invention is not limited in regard to the type of vending machine.

Background Art

[0002] Self-service vending machines for dispensing one or more vendible products are well known. Such vending machines typically comprise a housing for containing one or more vendible products such as food and/or beverage items, a payment terminal for accepting a payment so that a user can purchase the one or more vendible products, and a dispensing portion that dispenses the one or more vendible products upon a successful payment being made via the payment terminal. The payment terminal may be operatively associated with a bill acceptor and/or a coin acceptor for respectively accepting bills and coins in order to make the payment.

[0003] The payment terminal may also be operatively associated with an electronic payment interface for facilitating an electronic payment by way of a credit and/or debit card or by way of a personal electronic device, such as a mobile telephone. The electronic payment interface may include any one or more of: a magnetic stripe reader for reading a magnetic stripe of the credit and/or debit card; a chip reader for reading a chip of the credit and/or debit card; an NFC reader for reading an NFC chip of the credit and/or debit card, and for reading an NFC chip of the personal electronic device; a camera for scanning a QR code generated by a display of the

personal electronic device; and a display for displaying a QR code to be scanned by a camera of the personal electronic device.

[0004] The housing of the vending machine also typically comprises at least a partially transparent front panel that enables a user to view the one or more vendible products so as to assist the user with making a purchase decision. Depending upon the nature of the one or more vendible products, at least a portion of the housing may be at least partially refrigerated to preserve the one or more vendible products.

[0005] The payment terminal associated with the vending machine is typically located on an external portion of the housing so as to enable the user to interface with the payment terminal. For example, the user may need to depress one or more depressible buttons or touch one or more touch-sensitive buttons of the payment terminal in order to make a selection of the one or more vendible products and/or to input information related to a payment for the one or more vendible products. There are some downsides however to an externally located payment terminal. For example, the payment terminal may be subjected to adverse weather that may affect the operation of the payment terminal, or the payment terminal may be subjected to vandalism.

[0006] It is an object of at least one embodiment of the present invention to address one or more shortcomings of the prior art, or at least provide a useful alternative.

[0007] Reference to any prior art in the specification is not an acknowledgment or suggestion that this prior art forms part of the common general knowledge in any jurisdiction or that this prior art could reasonably be expected to be understood, regarded as relevant, and/or combined with other pieces of prior art by a skilled person in the art.

Summary of Invention

[0008] In an aspect, the present invention provides a vending machine comprising:

a housing including an at least partially transparent outer panel; and a payment terminal comprising a touch surface configured to receive a touch input from a user;

wherein the payment terminal is wholly located within the housing such that the touch surface is adjacent an inside surface of the at least partially transparent outer panel, and wherein the touch surface is configured to receive a touch input by the user touching an outer surface of the at least partially transparent outer panel.

[0009] Advantageously, by being located wholly within the housing of the vending machine, the payment terminal is relatively better protected from adverse weather and vandalism, for example, then when being located externally of the housing or when being located on the housing. As will be appreciated, by being wholly located within the housing of the vending machine, the payment terminal is not directly contactable or touchable.

[00010] The payment terminal preferably comprises a payment terminal housing. The touch surface may form part of the payment terminal housing. The payment terminal housing and/or the touch surface may be affixed to the inside surface of the at least partially transparent outer panel. Preferably, the payment terminal housing and/or the touch surface are affixed to the at least partially transparent outer panel such that there is no relative movement therebetween. Preferably, the payment terminal housing and/or the touch surface are affixed to the at least partially transparent outer panel such that the touch surface is in direct abutting engagement with the inside surface of the at least partially transparent outer panel and there is no air gap therebetween. Advantageously, by being affixed to the inside surface of the at least partially transparent outer panel, the payment terminal can be retro-fitted to the vending machine without the need for making destructive alterations to the vending machine.

[00011] In a preferred embodiment, the touch surface protrudes relatively outwardly from a remainder of the payment terminal housing. At least a portion of the remainder of the payment terminal housing preferably includes double-sided

adhesive such that the payment terminal is affixable to the inside surface of the at least partially transparent outer panel. Preferably, a thickness of the double-sided adhesive is similar to, or the same as, a distance by which the touch surface protrudes relatively outwardly from the remainder of the payment terminal housing.

- 5 Advantageously therefore, the payment terminal is affixable to the at least partially transparent panel such that the touch surface is in direct abutting engagement with the inside surface of the at least partially transparent outer panel and there is no air gap therebetween.

[00012] The at least partially transparent outer panel may comprise plastic, glass,
10 or any other suitable material known to those skilled in the art. In a preferred embodiment, the at least partially transparent outer panel comprises poly(methyl methacrylate) (PMMA), which is also known as acrylic. In an alternative embodiment, the at least partially transparent outer panel comprises polycarbonate. The at least partially transparent outer panel may have a thickness of up to around
15 5 mm, but is more preferably between 2 to 3 mm thick.

[00013] In an embodiment, the vending machine is a self-service vending machine configured to dispense one or more vendible products, such as food and/or beverage items. In an alternative embodiment, the vending machine is a self-service vending machine configured to issue and/or dispense one or more parking tickets
20 for a motor vehicle. In a further alternative embodiment, the vending machine is a self-service vending machine configured to issue one or more washing and/or drying cycles of an associated washing machine and/or dryer.

[00014] In at least an embodiment in which the vending machine is configured to dispense one or more vendible products, the at least partially transparent outer
25 panel is preferably located on a front side of the vending machine so as to enable a user to view the one or more vendible products. The at least partially transparent panel may be integral with the housing of the vending machine and/or may form part of an outer surface of the housing of the vending machine.

[00015] The vending machine may further comprise any one or more of: a payment
30 terminal controller configured to control the operation of the payment terminal; a

vending machine controller configured to control the operation of the vending machine; a dispensing portion configured to dispense one or more vendible products from the vending machine; a network device configured to communicate with a wired or wireless communication network; a bill acceptor for accepting bills in order to make a payment; and a coin acceptor for accepting coins in order to make a payment. The coin acceptor is preferably further configured to dispense coins. For example, the coin acceptor may dispense change by dispensing one or more coins. The bill acceptor is preferably further configured to dispense bills. For example, the bill acceptor may dispense change by dispensing one or more bills.

10 [00016] The payment terminal controller and/or the vending machine controller may be operatively associated with any one or more of the network device, the bill acceptor, the coin acceptor, and the dispensing portion. The payment terminal controller and/or the vending machine controller may be configured to communicate with any one or more of the network device, the bill acceptor, the coin acceptor, and
15 the dispensing portion via the multi-drop bus (or “MDB”) computer networking protocol and/or via the VCCS computer networking protocol. The vending machine controller is configured to control the operation of the vending machine, including at least controlling the operation of the dispensing portion upon a successful payment being made via the payment terminal and/or the bill acceptor and/or the coin
20 acceptor.

[00017] In a preferred embodiment, the vending machine controller is configured to communicate with the bill acceptor and the coin acceptor via the MDB or VCCS communication protocols. The coin acceptor is preferably configured to communicate with the bill acceptor via the MDB or VCCS communication protocol.
25 The payment terminal controller is preferably configured to communicate with the bill acceptor and the coin acceptor via the MDB communication protocol, and is further configured to communicate with the payment terminal. The payment terminal controller is preferably configured to communicate with the network device. Upon a successful payment being made, the payment terminal controller communicates
30 with the vending machine controller by emulating responses from the bill acceptor and/or the coin acceptor to indicate that a successful payment has been made. The

bill acceptor and/or coin acceptor thereafter communicate with the vending machine controller, which in turn communicates with the dispensing portion to thereby dispense the purchased one or more items.

5 [00018] As is described above, the payment terminal controller is configured to control the operation of the payment terminal. Preferably, the payment terminal is configured to perform any one or more of the following: identify false and/or unintended touches on the touch surface of the payment terminal, which false and/or unintended touches may be caused by touching the outer surface of the at least partially transparent outer panel; and identify and/or disregard false or unintended
10 touches on the touch surface of the payment terminal caused by vibrations.

[00019] The vibrations may be caused by an external force imparted on the vending machine and/or by a force generated by a component of the vending machine. In one example, the vending machine may comprise a refrigeration unit for refrigerating the at least one or more vendible products, which refrigeration unit may
15 vibrate during normal use.

[00020] The payment terminal is preferably further configured to identify true and/or intended touches on the touch surface of the payment terminal, which true and/or intended touches are applied by touching the outer surface of the at least partially transparent outer panel. In an embodiment, the payment terminal is configured to
20 determine a true and/or intended touch according to a threshold amount of time that a touch is applied to the touch surface. In an embodiment, the threshold amount of time may be at least 10 milliseconds.

[00021] The payment terminal preferably comprises a display associated with the touch surface. For example, the touch surface may comprise a touch-sensitive layer
25 disposed on the display. The touch-sensitive layer may be a capacitive touch sensing layer. The display may comprise any suitable display technology, such as LCD, OLED, mini-LED, micro-LED, or any other suitable display technology known to those skilled in the art.

[00022] The display may be configured to display any one or more of: one or more touch elements associated with a payment to be made by the user; one or more touch elements associated with a quantity of one or more vendible products; and a QR code associated with a payment, which QR code may be scanned by a camera of a personal electronic device, such as a mobile telephone, in order to facilitate a payment. The payment terminal may further comprise a QR code scanner and/or a barcode scanner for respectively scanning a QR code and a barcode. The QR code and/or the barcode may be generated by a personal electronic device, such as a mobile telephone, and may contain information necessary in order to make a payment. For example, the QR code may contain information related to a user's credit and/or debit card. Alternatively, the QR code may be generated and displayed by an e-wallet platform that is configured on the personal electronic device. The e-wallet platform may be any suitable e-wallet platform, such as GrabPay®, Apple Pay®, Samsung Pay®, and Google Pay®. The payment terminal may further comprise an electronic payment interface, which electronic payment interface may include any one or more of: a magnetic stripe reader for reading a magnetic stripe of the user's credit and/or debit card; a chip reader for reading a chip of the user's credit and/or debit card; an NFC reader for reading an NFC chip of the user's credit and/or debit card, and for reading an NFC chip of the personal electronic device.

[00023] In another aspect, the present invention provides a payment terminal for a vending machine, the payment terminal comprising:

a touch surface configured to receive a touch input from a user;

wherein the payment terminal is configured to be wholly located within a housing of the vending machine, wherein the housing comprises an at least partially transparent outer panel, and wherein the touch surface is configured to receive a touch input by the user touching an outer surface of the at least partially transparent outer panel.

[00024] The payment terminal may further include any one or more of the features of the described above.

[00025] As used herein, except where the context requires otherwise, the term "comprise" and variations of the term, such as "comprising", "comprises" and "comprised", are not intended to exclude further additives, components, integers or steps.

- 5 [00026] Further aspects of the present invention and further embodiments of the aspects described in the preceding paragraphs will become apparent from the following description, given by way of example and with reference to the accompanying drawings.

Brief Description of Drawings

- 10 [00027] Figure 1 is a front view of a vending machine according to an embodiment of the invention;

[00028] Figure 2 is a rear perspective view of an at least partially transparent outer panel of the vending machine of Figure 1, and a payment terminal according to an embodiment of the invention;

- 15 [00029] Figure 3 is a front view of the payment terminal of Figure 2; and

[00030] Figure 4 is a schematic diagram of certain components of the vending machine of Figure 1.

Description of Embodiments

- [00031] Figure 1 illustrates a front view of a vending machine 10 according to an
20 embodiment of the invention. The vending machine 10 comprises a housing 12 that is generally rectangular in front and side cross-sections. The housing 12 defines an internal space for storing a plurality of vendible products 14 that are configured to be dispensed by the vending machine upon a successful payment being made by a user of the vending machine. The plurality of vendible products 14 may be food
25 and/or beverage items. The vending machine 10 further comprises an at least partially transparent outer panel 16 on a front side of the vending machine 10. The

at least partially transparent outer panel 16 facilitates viewing of the plurality of vendible products 14 located within the housing 12 of the vending machine 10. As is illustrated in Figure 1, the at least partially transparent outer panel 16 is generally rectangular in cross-section and substantially defines a front part of the housing 12 of the vending machine 10.

[00032] The vending machine 10 further comprises a dispensing portion 18. The dispensing portion 18 defines a generally rectangular opening in the at least partially transparent outer panel 16. The dispensing portion 18 is dimensioned such that at least a single one of the plurality of vendible products 14 is dispensable therefrom at a time upon a successful payment being made by the user of the vending machine 10.

[00033] The vending machine further comprises an electronic payment terminal 20 according to an embodiment of the invention. Advantageously, the electronic payment terminal 20 is configured to be interfaceable with an existing vending machine. As is described below, the electronic payment terminal 20 is retro-fitted to the vending machine 10 by being affixed to an inside surface of the at least partially transparent outer panel 16. A person skilled in the art would appreciate that the vending machine 10 is merely exemplary, and the electronic payment terminal 20 could be retro-fitted to a variety of alternative non-illustrated vending machines. Further advantageously, as is described below, the electronic payment terminal 20 can be retro-fitted to an existing vending machine without the need for making destructive alterations to the existing vending machine. For example, it is possible to retro-fit the electronic payment terminal 20 to an existing vending machine without the need for drilling, cutting, or otherwise making any other destructive alterations.

[00034] The payment terminal 20 is configured to accept a payment from the user so that the user can purchase at least one of the plurality of vendible products 14, which at least one purchased vendible product 14 is thereafter dispensed from the vending machine 10 via the dispensing portion 18. The payment terminal 20 comprises a housing 22 that is generally rectangular in front and side cross-

sections, and includes a touch surface 24 on a front side thereof. The touch surface 24 is configured to receive a touch input from the user.

[00035] As is illustrated in Figure 1, the payment terminal 20 is wholly located within the housing 12 of the vending machine 10 such that the touch surface 24 is adjacent an inside surface of the at least partially transparent outer panel 16. In this position, the touch surface 24 is advantageously configured to receive a touch input from the user by the user touching an outer surface 30 of the at least partially transparent outer panel 16.

[00036] Advantageously, by being wholly located within the housing 12 of the vending machine 10, the payment terminal 20 is relatively better protected from adverse weather and vandalism, for example, then when being located externally of the housing 12 or when being located on the housing 12.

[00037] As is stated above, a person skilled in the art would appreciate that the illustrated vending machine 10 is merely exemplary, and that the present invention could be utilised in a variety of alternative non-illustrated vending machines, such as a vending machine that issues and/or dispenses parking tickets for a motor vehicle, and a vending machine that issues washing and/or drying cycles of an associated washing machine and/or dryer.

[00038] Figure 2 illustrates a rear perspective view of the at least partially transparent outer panel 16 and the payment terminal 20 of the vending machine 10 (other portions of the vending machine 10 are not shown for the sake of clarity). As is described above, the payment terminal housing 22 is generally rectangular in front and side cross-sections, and includes a front side 26 having the touch surface 24. The touch surface 24 is affixed to an inside surface 28 of the at least partially transparent outer panel 16 such that the payment terminal 20 is mounted to the outer panel 16. As is described below, the payment terminal 20 is mounted directly adjacent the outer panel 16 so that the touch surface 24 is in direct abutting engagement with the inside surface 28 of the outer panel 16 with no air gap therebetween. Preferably, the payment terminal 20 is fixedly mounted to the outer panel 16 such that there is no relative movement therebetween.

[00039] The at least partially transparent outer panel 16 comprises poly(methyl methacrylate) (PMMA), which is also known as acrylic. The at least partially transparent outer panel 16 may have a thickness of up to around 5 mm between its inner and outer surfaces 28, 30, but is more preferably between 2 to 3 mm thick. A person skilled in the art would appreciate that the outer panel 16 may alternatively comprise glass, or a plastic, or any other suitable at least partially transparent material such as polycarbonate for example.

[00040] The front side 26 of the payment terminal 20 is shown in Figure 3. As is described above, the front side 26 of the payment terminal 20 includes the touch surface 24. The touch surface 24 slightly protrudes relatively outwardly from a remainder of the payment terminal housing 22. As is illustrated in Figure 3, the touch surface 24 is bound in a vertical direction by an upper front housing surface 27 and a lower front housing surface 29, which upper and lower front housing surfaces 27, 29 are slightly recessed when compared to the slightly protruding touch surface 24. Affixed to each of the upper and lower front housing surfaces 27, 29 are generally rectangular double-sided adhesive strips (not shown) that enable the payment terminal 20 be affixed to the inside surface 28 of the outer panel 16. The thickness of the generally rectangular double-sided adhesive strips is similar to, or the same as, a distance by which the touch surface 24 protrudes relatively outwardly from the recessed upper and lower front housing surfaces 27, 29. Advantageously therefore, the payment terminal 20 is affixable to outer panel 16 such that the touch surface 24 is in direct abutting engagement with the inside surface 28 of the outer panel 16 with no air gap therebetween.

[00041] The touch surface 24 comprises a touch-sensitive capacitive layer disposed on or adjacent a display 32. The display 32 is an LCD display, but may alternatively comprise any suitable display technology known to those skilled in the art, such as OLED, mini-LED, or micro-LED. The touch surface 24 is configured to measure capacitance between the touch surface 24 and the environment, and is specifically configured to measure capacitance generated by a finger touching the outer surface 30 of the at least partially transparent outer panel 16. The touch surface 24 may

comprise capacitive touch-sensing technology marketed under the name Capsense®.

[00042] The payment terminal 20 further comprises a QR code scanner in the form of a camera 34. The camera 34 is configured to scan a QR code that may be generated on a personal electronic device, such as a mobile telephone. The generated QR code contains information necessary in order to make a payment. Typically, the generated QR code contains information related to a user's credit and/or debit card. The information may include any one or more of: the user's credit and/or debit card number; the expiry date of the user's credit and/or debit card number; and the card verification value (or "CVV") number of the user's credit and/or debit card. Alternatively, the QR code may be generated and displayed by an e-wallet platform that is configured on the personal electronic device. The e-wallet platform may be any suitable e-wallet platform, such as GrabPay®, Apple Pay®, Samsung Pay®, and Google Pay®. As will be appreciated by those skilled in the art, the QR code information may be used by the payment terminal 20 in order to execute a payment on behalf of the user so that the user can purchase at least one of the plurality of vendible products 14. As will be further appreciated by those skilled in the art, the payment terminal 20 necessarily further includes at least a controller, a display driver for driving the display 32, and a power supply.

[00043] Referring to Figure 3, the display 32 of the payment terminal 20 is configured to display one or more touch elements. In particular, the display 32 is configured to display: a first touch element 36 associated with a first payment amount; a second touch element 38 associated with a second payment amount, the second payment amount being different than the first payment amount; a third touch element 40 configured to undo and/or cancel one or more previous touch inputs; and a fourth touch element 42 configured to confirm one or more previous touch inputs. As is shown in Figure 3, the first payment amount associated with the first touch element 36 is 10c, and the second payment amount associated with the second touch element 38 is 50c. It will be appreciated that the first and second payment amounts are merely exemplary, and that alternative payment amounts and/or currencies may be utilised and displayed by the display 32 according to the

requirements of the operator of the vending machine 10. For example, the currency may be the Malaysian Ringgit ("RM") and the first payment amount may be RM 0.10 and the second payment amount may be RM 0.50.

[00044] A user is able to enter a desired payment amount by selectively touching the first and/or second touch elements 36, 38 to add the first and/or second payment amounts. For example, to enter a desired payment amount of \$1.50, the user may selectively touch the second touch element 38 three separate times so as to add three payment amounts of 50c each. In another example, to enter a desired payment amount of 50c, the user may either selectively touch the first touch element 36 five separate times so as to add five payment amounts of 10c each, or may touch the second touch element once so as to add a single payment amount of 50c. Once the desired payment amount is entered, the user may selectively touch the fourth touch element 42 to confirm the desired payment amount. If the user wishes to undo the addition of a previous payment amount, the user can selectively touch the fourth element 42. As will be appreciated, the desired payment amount may correspond to the overall cost of one or more of the plurality of vendible products 14. As is described above, the selection of any one or more of the touch elements 36, 38, 40, and 42 is achieved by touching the outer surface 30 of the at least partially transparent panel 16 in a position corresponding to the position of the respective touch element.

[00045] Figure 4 illustrates a schematic diagram of certain components of the vending machine 10. As is shown in Figure 4, the vending machine 10 includes the payment terminal 20 and the dispensing portion 18. The vending machine 10 further includes a payment terminal controller 50, a vending machine controller 51, a network device 52, a bill acceptor 54 for accepting bills in order to make the desired payment, and a coin acceptor 56 for accepting coins in order to make the desired payment. The bill acceptor 54 is preferably also configured to dispense bills. For example, the bill acceptor 54 may dispense change by dispensing one or more bills. The coin acceptor 54 is preferably also configured to dispense coins. For example, the coin acceptor may dispense change by dispensing one or more coins.

[00046] The payment terminal controller 50 is configured to control the operation of the payment terminal 20, and is operatively associated with at least the network device 52, the bill acceptor 54, and the coin acceptor 56. The vending machine controller is configured to control the operation of the vending machine 10, and is operatively associated with at least the bill acceptor 54, the coin acceptor 56, and the dispensing portion 18. The payment terminal controller 50 and/or the vending machine controller 51 are configured to communicate with any one or more of the network device 52, the bill acceptor 54, the coin acceptor 56, and the dispensing portion 18 via the multi-drop bus (or "MDB") computer networking protocol and/or via the VCCS computer networking protocol commonly used in Japan. The payment terminal controller 50 may form part of the payment terminal 20, or may alternatively be external to the payment terminal 20 and may communicate with the payment terminal 20 via any suitable means known to those skilled in the art, such as by a wired or wireless networking interface.

[00047] The network device 52 is operatively associated with the payment terminal 20 and/or the payment terminal controller 50 and is configured to communicate with a wired or wireless communication network. In the illustrated embodiment, the network device 52 is a 4G telecommunications network device and is thus configured to wirelessly communicate with a 4G telecommunications network. It will be appreciated that the network device 52 may alternatively be a 3G or 5G telecommunications network device, for example. Although the network device 52 is illustrated as a separate component of the vending machine 10 in Figure 4, it will be appreciated that the networking device 52 may be incorporated into the electronic payment terminal 20 or the payment terminal controller 50.

[00048] In the preferred embodiment illustrated in Figure 4, the vending machine controller 51 is configured to communicate with the dispensing portion 18 to thereby dispense one or more vendible products 14 upon a successful payment being made via any one or more of the electronic payment terminal 20, the bill acceptor 54, and the coin acceptor 56. Furthermore, the vending machine controller 51 is configured to communicate with the coin acceptor 56 via the MDB or VCCS communication protocol. The coin acceptor 56 is configured to communicate with the bill acceptor

54 via the MDB or VCCS communication protocol. Furthermore, the payment terminal controller 50 is configured to communicate with the coin acceptor 56 and the bill acceptor 54 via the MDB communication protocol. The payment terminal controller 50 is further configured to communicate with the payment terminal 20, and
5 the payment terminal controller 50 is further configured to communicate with the network device 52. Upon a successful payment being made, the payment terminal controller 50 emulates responses from the bill acceptor 54 and/or the coin acceptor 56 to indicate to the vending machine controller 51 that a successful payment has been made. The bill acceptor 54 and/or coin acceptor 56 thereafter communicate
10 with the vending machine controller 51, which in turn communicates with the dispensing portion 18 to thereby dispense the purchased one or more items 14.

[00049] When a payment is to be made by the electronic payment terminal 20, the user selects the desired payment amount by selectively touching the first and second touch elements 36, 38 in the manner described above. Once the user
15 confirms the desired payment amount by selectively touching the fourth touch element 42, the display 32 displays a prompt advising the user that the camera 34 is attempting to scan a QR code in order to process the desired payment. The user may then present a QR code to the camera 34 in order to complete the desired payment. As is described above, the QR code may be generated by a personal
20 electronic device, such as a display of a mobile telephone device, and will contain information necessary in order to make the desired payment. Once the QR code is scanned by the camera 34, the payment terminal 20 communicates with a payment API via the network device 52 in a known manner in order to process the user's payment.

25 [00050] Upon successful validation of the user's payment, the payment terminal 20 displays a prompt advising the user that their payment has been successful and the vending machine controller 51 subsequently controls a user interface (not shown) on the vending machine 10 to enable the user to select one or more vendible products that may be dispensed in light of the user's payment. For example, the
30 user interface may be a touch button associated with each vendible product. Each touch button may display a visual indicia indicating that the associated product may

be selected for dispensing from the vending machine 10 if the user's payment matches or exceeds the cost of the associated product. Once the user makes a selection of the one or more vendible products via the user interface, the vending machine controller 51 subsequently controls the operation of the dispensing portion
5 18 in the manner described above in order to dispense the purchased vendible product(s) 14.

[00051] The purchase flow described in the immediately preceding paragraph also applies for payments made by the bill acceptor 54 and/or the coin acceptor 56.

[00052] In addition to the above operations, the payment terminal controller 50 is
10 further configured to control the operation of the payment terminal 20 in the following manner.

[00053] The payment terminal 20 is advantageously configured to identify and process true and/or intended touches on the touch surface 24, and identify and disregard false and/or unintended touches on the touch surface 24. In an
15 embodiment, the payment terminal 20 is configured to determine a true and/or intended touch according to a threshold amount of time that a touch is consecutively applied to the touch surface 24 via the at least partially transparent outer panel 16. In an embodiment, the threshold amount of time is at least 10 milliseconds. If a touch is applied to the touch surface 24 for a period of time less than the threshold amount
20 of time, the payment terminal 20 is configured to identify the touch as a false and/or unintended touch and the touch is then disregarded.

[00054] The payment terminal 20 is further configured to identify and/or disregard false or unintended touches on the touch surface 24 caused by vibrations. The vibrations may be caused by an external force imparted on the vending machine 10
25 and/or by a force generated by a component of the vending machine 10. For example, the vending machine 10 may further comprise a refrigeration unit for refrigerating the plurality of vendible products 14, which refrigeration unit may vibrate during normal use and thereby provide false or unintended touches on the touch surface 24. The vending machine controller 51 may control the operation of

any one or more other components of the vending machine 10 in a manner known to those skilled in the art.

[00055] Accordingly, the present invention provides a payment terminal for a vending machine that is advantageously protected from at least adverse weather
5 and vandalism by being at least partially located within the housing of the vending machine. More preferably, the payment terminal is wholly located within the housing of the vending machine so as not to be directly contactable or touchable. Advantageously, the payment terminal comprises a touch surface that is configured to receive a touch input by a user selectively touching an outer surface of an at least
10 partially transparent outer panel of the vending machine in a position corresponding to a position of the touch surface.

[00056] It will be understood that the invention disclosed and defined in this specification extends to all alternative combinations of two or more of the individual features mentioned or evident from the text or drawings. All of these different
15 combinations constitute various alternative aspects of the invention.

CLAIMS

1. A payment terminal (20) for a vending machine (10), the payment terminal (20) comprising:

a touch surface (24) configured to receive a touch input from a user;

5 wherein the payment terminal (20) is configured to be wholly located within a housing (12) of the vending machine (10), wherein the housing (12) comprises an at least partially transparent outer panel (16), and wherein the touch surface (24) is configured to receive a touch input by the user touching an outer surface (30) of the at least partially transparent outer panel (16).

10 2. The payment terminal (20) of claim 1, wherein the touch surface (24) is affixed to an inside surface (28) of the at least partially transparent outer panel (16).

3. The payment terminal (20) of claim 2, wherein the touch surface (24) is in direct abutting engagement with the inside surface (28) of the at least partially transparent outer panel (16).

15 4. The payment terminal (20) of any one of claims 1 to 3, wherein the payment terminal (20) comprises a payment terminal housing (22) and wherein the touch surface (24) forms part of the payment terminal housing (22).

5. The payment terminal (20) of any one of claims 1 to 4, further comprising a payment terminal controller (50).

20 6. The payment terminal (20) of claim 5, wherein the payment terminal (20) is configured to perform any one or more of the following: identify false and/or unintended touches on the touch surface (24) of the payment terminal (20) caused by touching the outer surface (30) of the at least partially transparent outer panel (16); and identify and/or disregard false or unintended touches on the touch surface
25 (24) of the payment terminal (20) caused by vibrations.

7. The payment terminal (20) of claim 5 or 6, wherein the payment terminal (20) is further configured to identify true and/or intended touches on the touch surface (24) of the payment terminal (20) caused by touching the outer surface (30) of the at least partially transparent outer panel (16).
8. The payment terminal (20) of claim 7, wherein the payment terminal (20) is configured to identify a true and/or intended touch on the touch surface (24) of the payment terminal (20) according to a threshold amount of time that a touch is applied to the touch surface (24).
9. The payment terminal (20) of claim 8, wherein the threshold amount of time is at least 10 milliseconds.
10. The payment terminal (20) of any one of claims 1 to 9, further comprising a display (32).
11. The payment terminal (20) of claim 10, wherein the display (32) is configured to display any one or more of: one or more touch elements associated with a payment to be made by the user; and one or more touch elements associated with a quantity of one or more vendible products (14) of the vending machine (10).
12. The payment terminal (20) of claim 10 or 11, wherein the payment terminal (20) further comprises a QR code scanner and/or a barcode scanner for respectively scanning a QR code and a barcode in order to facilitate a payment.
13. A vending machine (10) comprising the payment terminal (20) of any one of claims 1 to 12.
14. The vending machine (10) of claim 13, wherein a thickness of the at least partially transparent outer panel (16) is less than or equal to 5 mm.

15. The vending machine (10) of claim 14, wherein the at least partially transparent outer panel (16) comprises poly(methyl methacrylate) (PMMA) or acrylic.

16. The vending machine (10) of any one of claims 13 to 15, further comprising any one or more of: a vending machine controller (51); a dispensing portion (18) configured to dispense one or more vendible products from the vending machine (10); a network device (52) configured to communicate with a wired or wireless communication network; a bill acceptor (54) for accepting bills in order to make a payment; and a coin acceptor (56) for accepting coins in order to make a payment.

17. The vending machine (10) of claim 16, wherein the vending machine controller (51) is configured to communicate with any one or more of the dispensing portion (18), the bill acceptor (54), and the coin acceptor (56).

18. The vending machine (10) of claim 17, wherein the payment terminal controller (51) is configured to communicate with any one or more of the bill acceptor (54), the coin acceptor (56), and the payment terminal (20).

19. The vending machine (10) of claim 18, wherein whereupon a successful payment has been made via the payment terminal (20), the payment terminal (20) emulates responses from the bill acceptor (54) and/or the coin acceptor (56) to indicate that the successful payment was made, and wherein the bill acceptor (54) and/or the coin acceptor (56) thereafter communicate with the vending machine controller (51), which in turn communicates with the dispensing portion (18) to thereby dispense the one or more vendible products (14).

20. A vending machine (10) comprising:

a housing (12) including an at least partially transparent outer panel (16); and

a payment terminal (20) comprising a touch surface (24) configured to receive a touch input from a user;

wherein the payment terminal (20) is wholly located within the housing (12) such that the touch surface (24) is adjacent an inside surface (28) of the at least partially transparent outer panel (16), and wherein the touch surface (24) is configured to receive a touch input by the user touching an outer surface (30) of the

5 at least partially transparent outer panel (16).