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(54) **Vending machine**

(57) A vending machine comprising a cabinet 2 having:

an insulated upper compartment 4 bounded by insulated walls and an insulated access door 20; the insulated upper compartment 4 having one or more dispensing devices 14 therein for storing and dispensing a vendible product;

a product dispensing compartment 8 disposed laterally with respect to the insulated upper compartment 4; the product dispensing compartment 8 communicating with the insulated upper compartment 4 by means of an opening 10 therebetween; and the product dispensing compartment 8 having a closable outlet through which a user of the vending machine can extract a vendible product; a lower compartment 6 containing a refrigeration unit; the refrigeration unit being connected to a cooling element mounted in the insulated upper compartment; and one or more solar panels 38 capable of producing electricity to power the vending machine.

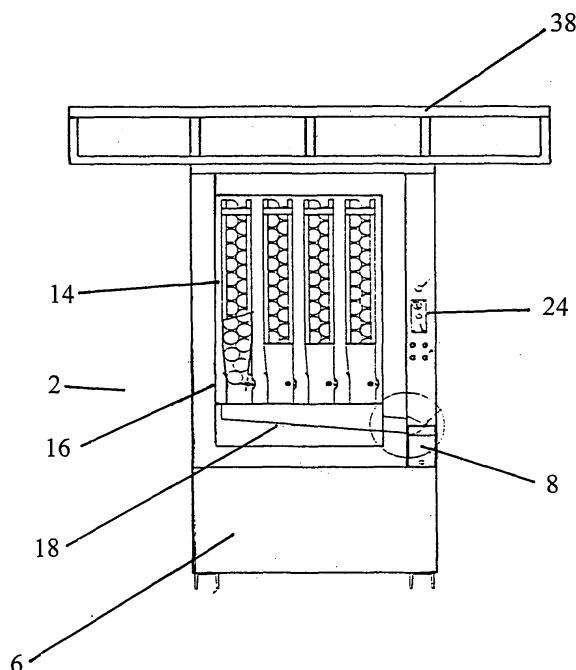


Figure 1

Description

[0001] This invention relates to a vending machine and more particularly to a vending machine powered by solar energy.

Background of the Invention

[0002] Vending machines for dispensing containers of drink or food items are well known and typically are powered by mains electricity. However, there are circumstances where it may be undesirable or impractical to make use of mains electricity, for example where the vending machine is required in a location where there is no electricity supply. Examples of such circumstances are the provision of vending machines in outdoor locations such as golf courses, parks, beaches and other outdoor recreational areas, and temporary locations (for example outdoor sporting events) where mains electricity may either be absent or difficult to access.

[0003] One way of providing electricity for vending machines in the circumstances outlined above is to make use of solar energy, and this approach is disclosed in international patent application WO 01/55985 (Smith). WO 01/55985 describes a vending machine comprising an insulated compartment within which are stored containers of drink or food items. The insulated compartment is mounted on a framework that holds a dispensing system and a refrigeration system comprising a motor, compressor unit, DC/AC converter, electrical battery and a regulator. The battery is supplied with electricity by means of a photovoltaic solar panel. The refrigeration unit is connected to a heat exchanger located within the insulated compartment, and the heat exchanger serves to cool the interior of the insulated compartment thereby maintaining the drinks and food items at a desired temperature.

[0004] Japanese patent application JP 10177680A (Fuji Electric Co. Ltd.) discloses a vending machine in which a solar panel is used to provide an auxiliary source of electricity. In this case, the solar panel powers a fan which is mounted at the top of a duct running up the outside of the rear of the vending machine, the duct being connected at its lower end to the interior of a compartment housing a compressor and condenser unit. By means of the fan and the associated duct, air is drawn through the housing from an opening in the front of the housing to cool the condenser and compressor, presumably to prevent overheating.

[0005] French patent application FR 2745 104 (Gerard Peudepeice) describes a cooled container powered by solar energy.

[0006] Maintaining a balance between power consumption and power generation in a solar powered vending machine represents a major problem. In addition to the refrigeration unit, a typical vending machine for dispensing chilled drinks will typically contain a number of power-consuming elements such as the product selector

mechanism and any motors and moving parts associated with it, as well as any lights or displays. If the only source of power for the vending machine is solar power, there is a risk that the consumption of power by these elements may well exceed the amount of power that can be generated from any solar panels associated with the vending machine, and the machine will rapidly grind to a halt. It might be expected that in regions where there is a great deal of sunshine, the generation of sufficient electricity by solar means should not present any difficulties. However, in such circumstances, although the amounts of electricity generated by the solar panels may increase, the increased air temperature means that the refrigeration unit will tend to consume much more power in keeping the vendible products cool. Conversely, in cooler climates, where the power demands on the refrigeration unit may not be as great, the amount of electricity generated will generally be much smaller. It will be apparent therefore that the development of a solar powered vending machine that is capable of functioning efficiently in a wide range of environmental conditions without being connected to a supply of mains electricity is not a straightforward exercise.

Summary of the Invention

[0007] The present invention provides an improved vending machine powered by solar energy.

[0008] More particularly, in a first aspect, the invention provides a vending machine comprising a cabinet having:

an insulated upper compartment bounded by insulated walls and an insulated access door; the insulated upper compartment having one or more dispensing devices therein for storing and dispensing a vendible product;

a product dispensing compartment disposed laterally with respect to the insulated upper compartment; the product dispensing compartment communicating with the insulated upper compartment by means of an opening therebetween; and the product dispensing compartment having a closable outlet through which a user of the vending machine can extract a vendible product;

a lower compartment containing a refrigeration unit; the refrigeration unit being connected to a cooling element mounted in the insulated upper compartment; and

one or more solar panels capable of producing electricity to power the vending machine.

[0009] Particular and preferred embodiments of the invention are as set out in the claims and as described below.

[0010] The vendible product is typically an edible product or a drinks product and in one preferred embodiment is a bottle or can of drink.

[0011] The insulated upper compartment has lower,

upper, side and rear walls, and optionally a front wall (when present) containing an insulating material. The insulating material is preferably a foamed polymer which typically has a thickness of at least 75 mm, more usually at least 80 mm, or at least 90 mm thick, for example approximately 100 mm or more. The walls of the compartment can be constructed from a sandwich structure comprising a relatively thin outer layer of a metal such as steel or a plastics material such as un-plasticised polyvinyl chloride (uPVC or PVCu), a much thicker intermediate layer of the insulating material and an inner layer which can be for, example, formed from a relatively thin layer of a metal such as steel or a plastics material or a thin metal foil. The foamed polymer may be foamed polystyrene or polyurethane, for example.

[0012] The product dispensing devices in the insulated upper compartment can take various forms. They can, for example, take the form of cascades or racks upon which cans or bottles of drinks are stored, the cans or bottles moving under the force of gravity to the bottom of the cascade or rack and then passing through a dispensing mechanism down into a dispensing chute leading to the product dispensing compartment. In one embodiment, the dispensing device takes the form of one or more hoppers or bins disposed inside the insulated upper compartment, into which hoppers or bins are placed bottles or cans or other vendible products. The hoppers or bins each have an opening at the lower end thereof and a dispensing control mechanism that allows one bottle or can at a time to pass through the opening into the dispensing chute. The dispensing control mechanism can take the form of a turnstile mechanism comprising rotating arms mounted on a spindle, the arms as they rotate allowing one bottle or can at a time to pass into the dispensing chute. The dispensing control mechanism is linked to a coin mechanism such that it is actuated to rotate to the extent required to dispense one can or bottle when a particular product has been selected and the correct money inserted into the coin-operated mechanism.

[0013] In order to minimise heat loss through the opening into the product dispensing compartment, an insulated flap is preferably provided between the insulated upper compartment and the product dispensing compartment. The insulated flap is preferably displaceable to an open position by the weight of a bottle or can of drink rolling down the dispensing chute, and is arranged to return to a closed position once the bottle or can has passed through. The flap could also in principle be opened by a motorised mechanism but this would involve the consumption of electricity and hence is less preferred. The flap can be lightly spring biased towards a closed position but preferably there is no spring biasing to impede movement of the can or bottle and the flap returns to the closed position under the influence of gravity.

[0014] The insulated upper compartment has mounted therein a cooling element connected to the refrigeration unit in the lower compartment. A cover member may be

provided for the cooling element, the cover member and a wall of the insulated compartment together defining a passage extending from a lower part of the insulated upper compartment to an upper part of the insulated upper compartment; and one or more fans for moving air from top to bottom through the passage past the cooling element so that cooled air is expelled from the passage into the upper part of the insulated upper compartment. In order to minimise energy consumption, it is preferred that only a single fan is present in the insulated upper compartment.

[0015] The arrangement of the cover member over the cooling element and the presence of a fan or fans enable cooled air to be circulated more efficiently around the insulated compartment with the result that a more even temperature is obtained throughout the compartment. This forced air cooling is particularly advantageous in very warm environments, for example where the vending machine is exposed to direct sunshine for prolonged periods. Without a cooling system of the type defined herein, there would be a tendency for a temperature differential to build up within the compartment with cans and bottles at the upper end of the compartment being cooled to a lesser extent than cans and bottles lower in the compartment.

[0016] In one preferred configuration, the cover member comprises a substantially rectangular plate covering the cooling element. The cover member can be provided with side walls that link the rectangular plate to the wall of the insulated compartment so that the passage takes the form of a tunnel having openings at the upper and lower ends thereof.

[0017] A fan can be mounted at any location within the passage but preferably is located at or towards the upper end of the passage so that it sucks air up past the cooling element. The fan can be mounted in the cover member, for example at the upper end of the cover member. In one preferred configuration, a single fan is mounted in an opening at the upper end of the passage or tunnel.

[0018] The cooling element can be a conventional evaporator plate and, as such, is connected to the refrigeration unit by one or pipes forming part of a coolant circuit. The refrigeration unit can also be of conventional type and typically is provided with a compressor and heat exchanger in standard fashion.

[0019] The vending machine of the invention is powered by means of the solar panels which are typically mounted on top of the machine. Examples of solar panels suitable for use with the vending machine are the monocrystalline panels manufactured by BP Solar of Sunbury on Thames, Middlesex, United Kingdom that provide an electrical output of 50 watts each. Electrical energy from the solar panels is stored in a battery, for example a 12 volt battery, so that the vending machine can go on working in unfavourable light conditions or after sunset. The battery is typically mounted in the lower compartment of the cabinet. The battery may be removed and recharged using mains electricity from time to time.

[0020] The solar panels may be mounted in one fixed orientation on the vending machine or the mountings for the panels may be adjustable so as to allow the panels to be mounted at any one of a plurality of orientations so as to take maximum advantage of the prevailing solar conditions. For example, the solar panel can be mounted on a frame which can be secured to the top of the vending machine in one of a plurality of orientations. Thus, the frame can be fitted with the panels facing towards the front of the vending machine or can be reversed so that the panels face the rear of the machine. This may be achieved for example by removing securing screws holding the frame in place, rotating the frame and refitting the screws.

[0021] In another embodiment, the solar panel can be disposed in a recess on top of the cabinet. The recess can be defined by a peripheral wall around the top of the cabinet. An advantage of this arrangement is that the solar panel is hidden from view and is therefore less likely to be damaged, for example by vandalism.

[0022] The size of the solar panels can be varied according to the climatic conditions in which the vending machine is intended to be used. For example, the solar panel may have a greater area than the area of the top of the cabinet. In one embodiment, the solar panel may be of a size whereby it extends laterally beyond one or more sides of the cabinet (for example wherein the solar panel extends laterally beyond two or more sides of the cabinet). In such an arrangement, the solar panels can provide an area of shade to shelter users of the machine from the sun while they wait for a drink to be dispensed.

[0023] The vending machines of the invention are powered by electricity generated by the solar panels. However, a wind turbine may be used as an additional means of generating electricity to power the vending machine. The wind turbine is typically mounted on a mast anchored to the casing of the vending machine, although it may alternatively be mounted separately.

[0024] The vending machines of the invention may be coin-operated or token-operated, although alternative payment mechanisms may also be used. The coin mechanisms may be of conventional type and typically comprise one or more slots for receiving coins or other monetary tokens and a means (e.g. a counter) for counting the value of the coins or monetary tokens. The term "coin mechanism" as used herein refers generically to a mechanism which receives payment from a customer, either in the form of coins or tokens, or bank notes, or credit or debit card payments or by any other means.

[0025] The vending machine typically has an electronic controller (e.g. a control board) which links the coin mechanism, selector mechanism and the various electronically operated component parts of the vending machine (e.g. the dispensing unit(s)).

[0026] The coin mechanism can be mounted in a side wall of the cabinet above the product dispensing compartment.

[0027] The coin mechanism is typically associated with

a selector mechanism comprising one or more buttons, switches or touch panels whereby users of the machine can select a product from one of several different types stored in the vending machine. The coin mechanism and selector mechanism may form part of the same unit.

[0028] The coin mechanism and/or the selector mechanism can be programmed to go into a sleep mode when there are no customers present, being activated again by a new customer. For example, the sleep mode can be triggered when the vending machine has not been used for a predefined period of time, for example 2 minutes, or 5 minutes, or 10 minutes. In the sleep mode, any lights or visual displays are turned off thereby saving energy. When the vending machine is in the sleep mode, a stimulus such the touching of one or more buttons, switches or touch panels forming part of the selector mechanism, or the insertion of a coin or other monetary token or payment means into the coin mechanism, can awaken the vending machine from the sleep mode into an active mode.

[0029] The vending machine may be provided with a telemetry facility to enable the operation of the machine to be monitored remotely. For example, a modem (e.g. a GPRS modem) may be linked to a control board within the machine and may be used to transmit data regarding, for example, the number of products sold and the conditions within the vending machine such as battery strength and the temperature within the cooled first compartment. The control board may be programmed to send out an alarm signal when, for example, stocks are low, or the battery condition is poor, or there is a malfunction of any one or more components of the machine, such as the dispensing unit or coin operating mechanism. The signals received from the vending machine are typically fed into and processed by a computer at a location remote from the vending machine. The computer may be programmed to interrogate the vending machine at regular intervals, for example daily, or part-daily or hourly. In this way, the operators of the vending machine can monitor the status of the vending machine remotely thereby reducing the requirement for personal inspections of the machines.

[0030] The invention will now be illustrated in more detail (but not limited) by reference to the specific embodiment shown in the drawings

Brief Description of the Drawings

[0031]

Figure 1 is a view from the front of a vending machine according to one embodiment of the invention. In Figure 1, a front access door of the vending machine has been omitted.

Figure 2 is a view from one side of the vending machine of Figure 1.

Figure 3 is a partially sectioned view from the other side of the vending machine shown in Figure 2.

Figure 4 is a partially sectioned view from above of the vending machine of Figures 1 to 3.

Figure 5 is an enlarged view of the region marked "A" in Figure 1.

Figure 6 is a view from the front of the vending machine of Figures 1 to 4 but with the solar panel omitted and the dispensing devices removed to show the cooling element.

Figure 7 is a partially sectioned enlarged view of the region marked "B" in Figure 6.

Figure 8 is a view from above of a vending machine according to a second embodiment of the invention.

Detailed Description of the Invention

[0032] Figures 1 to 7 show a vending machine according to one embodiment of the invention. The vending machine comprises a cabinet 2 having an upper insulated compartment 4, a lower compartment 6 and a product dispensing compartment 8.

[0033] An opening 10 communicates between the upper insulated compartment 4 and the product dispensing compartment 8, a flap 12 serving to close the opening between dispensing operations. The flap 12 is pivotally mounted above the opening so that it can swing shut under the force of gravity. Alternatively or additionally, it may be lightly spring-biased towards the closed position. The flap 12 may be insulated and may comprise a layer of 25 mm thick polyurethane or polystyrene foam.

[0034] The upper compartment contains one or more dispensing devices 14 (four are shown in Figure 1) in the form of hoppers in which bottles or cans are stacked on their sides. A dispensing mechanism 16, described in more detail below, is disposed at the lower end of each hopper. Below the dispensing devices is an inclined chute 18 which leads to the opening 10. The chute 18 may be formed from fabricated sheet metal.

[0035] The insulated upper compartment 4 has rear, side, top and bottom walls formed from a thick sandwich structure comprising a relatively thin outer layer of a metal such as steel or a plastics material such as un-plasticised polyvinyl chloride (uPVC or PVCu), a much thicker intermediate layer of an insulating material such as foamed polystyrene or polyurethane, and an inner layer which can be for, example, formed from a relatively thin layer of a metal such as steel or a plastics material as described above or a thin metal foil. The insulating layer is preferably at least 75 mm thick, and can be, for example approximately 100 mm thick. The upper insulated compartment 4 is provided with an insulated access door 20 to give access to the interior of the compartment to allow

refilling of the bottles and cans in the dispensing devices 14. The access door 20 has a thick protruding portion 22 on its inner side, the lateral edges of the protruding portion sitting snugly against the inner surfaces of the walls of the upper insulated compartment 4 to prevent or minimise heat loss around the edges of the door 20. The protruding portion contains a layer of insulating material (e.g. a foam material as described above) which can be, for example approximately 100 mm thick.

[0036] Each of the dispensing devices 14 comprises a hopper which is typically formed from fabricated sheet metal such as aluminium or steel, although it could be formed from other materials such as a plastics material. Each of the hoppers may contain the same type of drink or, as is more usually the case, each hopper can contain a different type of drink. The bottles or cans of drink are stacked on their sides inside the hopper and are gravity fed towards the dispensing mechanism 16 at the lower end of the hopper. The dispensing mechanism 16 takes the form of a "turnstile-like" arrangement comprising a spindle on which are mounted four arms. As can be seen from Figure 1, the lowermost can or bottle in the stack inside the hopper rests on one of the arms and hence is prevented from falling into the chute 18 below. The spindle is driven by a motor (not shown) which is connected to an electronic controller which forms part of a coin mechanism 24 mounted above the product dispensing compartment 8. In order to dispense a bottle or can of drink, the spindle is rotated through 90° (or less in the case of a smaller can or bottle) the force of gravity together with the movement of the arms serving to convey the bottle or can through the turnstile and into the chute 18. The bottle or can will then roll or tumble down the chute through the opening 10 and into the product dispensing compartment 8, the weight of the bottle or can serving to displace the flap 12. The product dispensing compartment has a door (usually formed from a transparent material such as a transparent plastics material), which can be in the form of a spring loaded flap or a slide-up panel, through which a customer can remove the bottle or can.

[0037] The coin mechanism 24 can be of conventional type and is provided with one or more slots into which coins or tokens or other means of payment such as credit and debit cards or charge cards can be inserted. A plurality (e.g. four) of buttons or touch panels are provided, each one of which corresponds to one of the dispensing devices 14. The coin mechanism 24 contains an electronic controller that is linked to the electric motors of the dispensing mechanism of each of the dispensing devices. When the correct monetary value has been inserted into the slot by a customer, and one of the buttons or touch panels has been pressed or touched to select a particular drink, the electronic controller actuates the relevant electric motor to dispense the required drink.

[0038] The bottles or cans of drink in the upper insulated compartment 4 are cooled by means of an evaporator plate 26 which is linked by pipes 28 to a refrigeration

unit (not shown) in the lower compartment 6 of the vending machine. The evaporator plate 26 is positioned behind an air baffle plate 30, in the upper end of which is mounted a fan 32. The baffle plate 30 and rear wall of the compartment 4 together form a tunnel running from the bottom to the top of the upper insulated compartment 4. The evaporator plate is chilled by refrigerant pumped from the refrigeration unit and air is drawn up through the tunnel and over the surface of the evaporator plate 26 by the fan 32 which expels the cooled air into the top part of the compartment. In this way, the cooled air is circulated around the interior of the compartment ensuring an even temperature within the compartment and preventing the temperature fluctuations that would occur with a vending machine of the type disclosed in WO 01/55985. The refrigeration system and cooling fan are switched off by an upper compartment door switch (not shown) to stop the cooling operation when the refrigerated compartment doors are open. The cooling fan and refrigeration system are thermostatically controlled so that they switch off when the desired temperature is reached in the refrigerated compartment. The thermostat (not shown) is linked by a gas filled capillary tube (not shown) to the evaporator plate.

[0039] The lower compartment 6 of the vending machine contains a charge controller, battery and a refrigeration unit, each of which may be of conventional type. Louvred air vent grilles 36 are set into the side panels to provide a flow path for cooling air for the refrigeration unit.

[0040] The refrigeration unit (not shown) comprises a compressor and heat exchanger having a fan mounted thereon. Narrow bore tubes 28 are linked to the evaporator plate 26 in the upper insulated compartment to form a circuit around which a refrigerant can flow. In use, when the refrigeration unit is in operation, the fan in the lower compartment 6 draws air in through one air vent grille and past the compressor, and then expels the air through the other air vent grille. In this way, heat produced by the compressor and heat exchanger is removed efficiently before it can be conducted up into the insulated upper compartment containing the drinks.

[0041] The power for the refrigeration unit and the motorised dispenser are provided by a battery (not shown) which typically is a 12V battery (e.g. a valve regulated gel deep draw battery). The battery is supplied by current generated from a solar panel 38 mounted on top of the cabinet 2. A Marlec HRDX Charge Controller (not shown), located in the lower compartment 6, controls the supply of energy to the battery from the solar panel to ensure that the battery is kept at optimum charge level.

[0042] The operation of the vending machine is controlled by a control board (not shown) which is located on a side wall of the lower compartment and is linked electronically to the coin mechanism 24 and to the various electronically operated component parts of the vending machine. The control board may include, or be linked to, a GPRS modem which can dial out of the vending machine in the event of one or more alarm conditions being

detected. For example, if the temperature controls are malfunctioning, such information may be transmitted via the modem to the operators of the vending machine so that corrective action can be taken. The modem typically has its own back-up battery so that it can continue to function even when the main battery is low.

[0043] In the Figures 1 to 3, the arrangement of the solar panel is illustrated. As can be seen, the solar panel 38 is mounted on supports 40 so that it is inclined at an angle of about 10° relative to the top of the cabinet 2. In this embodiment, the area of the solar panel 38 exceeds the area of the top of the cabinet 2. The overlapping edges of the solar panel 38 provide a degree of shade to users of the vending machine. In this embodiment, the solar panels are of the type BP Solar, Model BP350U, Photovoltaic or equivalent, available from BP Solar of Sunbury, Middlesex, UK.

[0044] An alternative arrangement of the solar panel is illustrated in Figure 8 which is a view from above the vending machine. In this embodiment, the top of the cabinet 102 is provided with an upstanding peripheral rim 150 which defines a recess 152. A solar panel 154 is mounted inside the recess and is concealed from view by the upstanding peripheral rim 150. An advantage of this arrangement is that the solar panel 154 is hidden from view and may therefore be less susceptible to damage, for example by vandalism.

[0045] In addition to the solar panel, a further source of power may be provided by means of a wind turbine mounted on the cabinet. A suitable wind turbine is the Rutland 910 Series, 72 watts@22mph, available from Marlec of Corby Northants, UK.

[0046] The vending machine illustrated in Figures 1 to 8 is capable of operating without an external source of power in a variety of different locations and types of environment. By virtue of the forced air cooling system in the insulated upper compartment, stratification of the air within the upper compartment is prevented and the problem of the upper regions of the compartment becoming too warm, particularly when the vending machine is used in hot climates, is avoided. Furthermore, the arrangement of a thick-walled insulated upper compartment side by side with a dispensing compartment has been found to provide an effective means of minimising heat loss and hence power consumption. Field tests have shown that the vending machine is capable of maintaining drinks at a cool temperature for prolonged periods without the need for an external supply of mains electricity. Thus, it is envisaged that the vending machine shown will be capable of operation in hot outdoor locations such as golf courses, beaches and public utility areas.

[0047] The embodiment illustrated in Figures 1 to 8 represents merely one way of putting the invention into effect and it will readily be apparent that numerous modifications and alterations may be made to the specific embodiment shown without departing from the principles underlying the invention. All such modifications and alterations are intended to be embraced by this application.

Claims**1.** A vending machine comprising a cabinet having:

an insulated upper compartment bounded by insulated walls and an insulated access door; the insulated upper compartment having one or more dispensing devices therein for storing and dispensing a vendible product; a product dispensing compartment disposed laterally with respect to the insulated upper compartment; the product dispensing compartment communicating with the insulated upper compartment by means of an opening therebetween; and the product dispensing compartment having a closable outlet through which a user of the vending machine can extract a vendible product;

a lower compartment containing a refrigeration unit; the refrigeration unit being connected to a cooling element mounted in the insulated upper compartment; and

one or more solar panels capable of producing electricity to power the vending machine.

2. A vending machine according to claim 1 wherein an insulated flap is provided between the insulated upper compartment and the product dispensing compartment.**3.** A vending machine according to any one of the preceding claims wherein one or more fans (preferably one) are provided in the upper insulated compartment for circulating air past the cooling element.**4.** A vending machine according to claim 3 wherein a cover member is disposed over the cooling element, the cover member and a wall of the insulated compartment together defining a passage extending from a lower part of the insulated upper compartment to an upper part of the insulated upper compartment; and wherein each said fan is arranged to move air from top to bottom through the passage past the cooling element so that cooled air is expelled from the passage into the upper part of the insulated upper compartment.**5.** A vending machine according to any one of the preceding claims wherein the insulated walls and insulated door of the insulated upper compartment each comprise a solid foam insulating material having a thickness of at least 75 mm, and more preferably at least 100 mm..**6.** A vending machine according to claim 5 wherein the solid foam insulating material has a thickness of at least 100 mm.**7.** A vending machine according to any one of the preceding claims wherein the cooling element is an evaporator plate.**8.** A vending machine according to any one of the preceding claims wherein the lower compartment is un-insulated.**9.** A vending machine according to any one of the preceding claims wherein the lower compartment has one or more ventilation openings (e.g. grilles).**10.** A vending machine according to any one of the preceding claims wherein the lower compartment contains a battery for providing power to the vending machine, the battery being rechargeable by the solar panels.**11.** A vending machine according to any one of the preceding claims wherein at least one of the one or more solar panels is mounted on top of the vending machine.**12.** A vending machine according to claim 11 wherein a solar panel mounted on top of the vending machine is disposed in a recess on top of the cabinet.**13.** A vending machine according to claim 12 wherein the recess is defined by a peripheral wall around the top of the cabinet.**14.** A vending machine according to claim 11 wherein the solar panel has a greater area than the area of the top of the cabinet.**15.** A vending machine according to claim 14 wherein the solar panel extends laterally beyond one or more sides of the cabinet.**16.** A vending machine according to claim 15 wherein the solar panel extends laterally beyond two or more sides of the cabinet.**17.** A vending machine according to any one of the preceding claims comprising a coin-operating mechanism mounted in a side wall of the cabinet above the product dispensing compartment.**18.** A vending machine according to any one of the preceding claims wherein telemetry means are provided to enable remote monitoring of vending machine.**19.** A vending machine according to claim 19 wherein the telemetry means comprises a GPRS modem linked to a control board within the vending machine.**20.** A vending machine according to claim 19 or claim 20 wherein the telemetry means enables the remote

monitoring of any one or more parameters selected from stock levels, battery condition, temperatures within the first and/or second compartment, dispensing unit malfunction and coin-operating mechanism malfunction.

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- 21.** A vending machine substantially as described herein with reference to the accompanying drawings.

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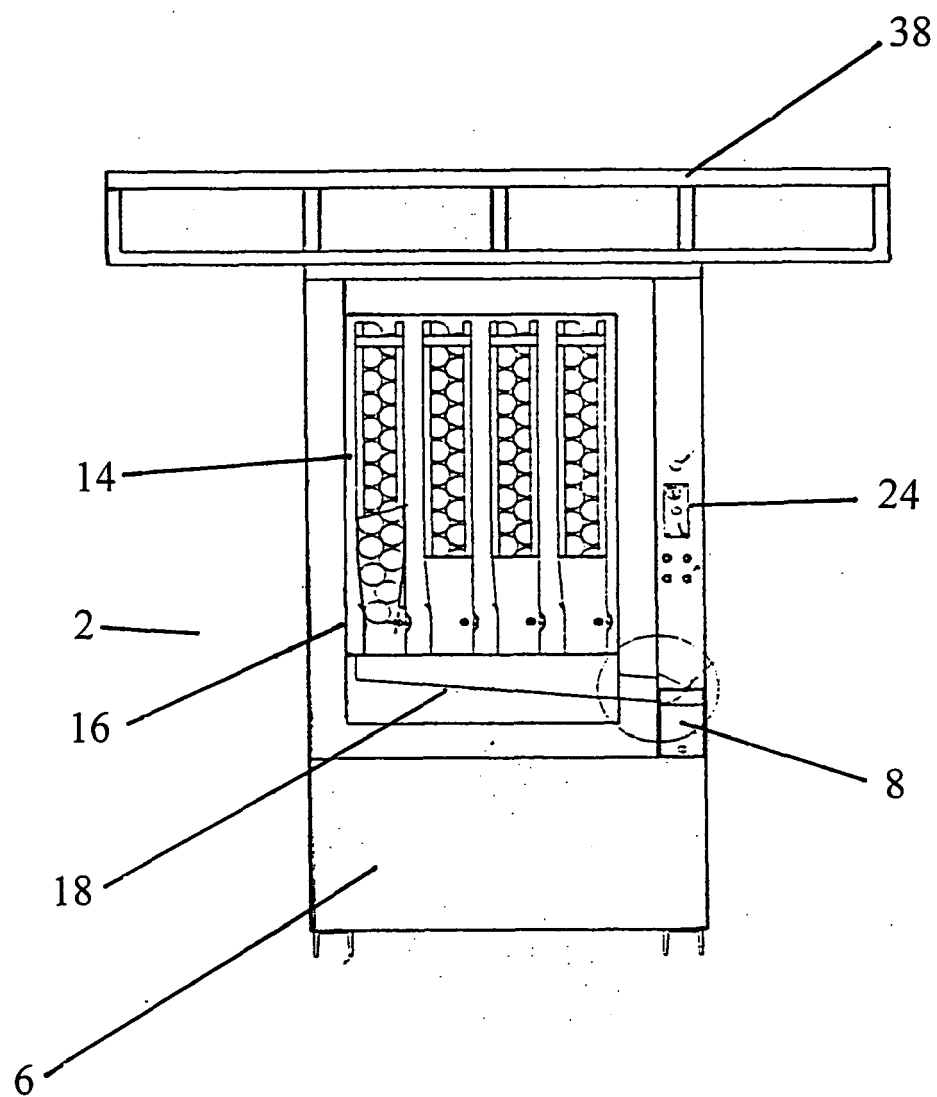


Figure 1

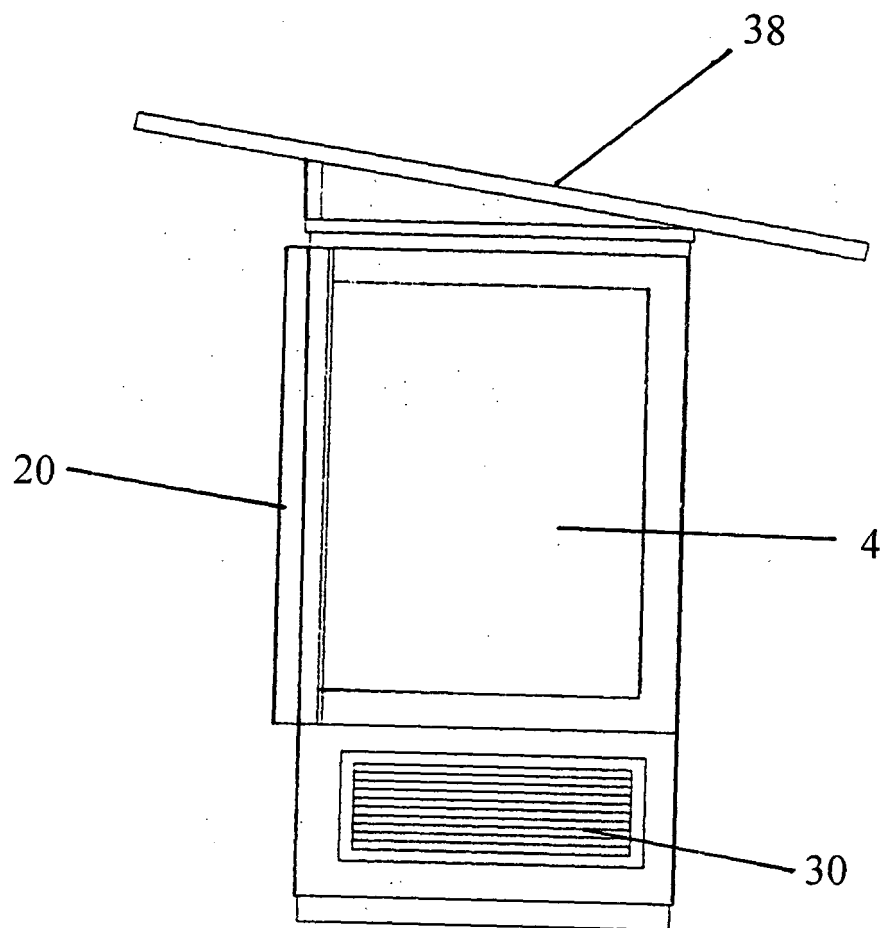


Figure 2

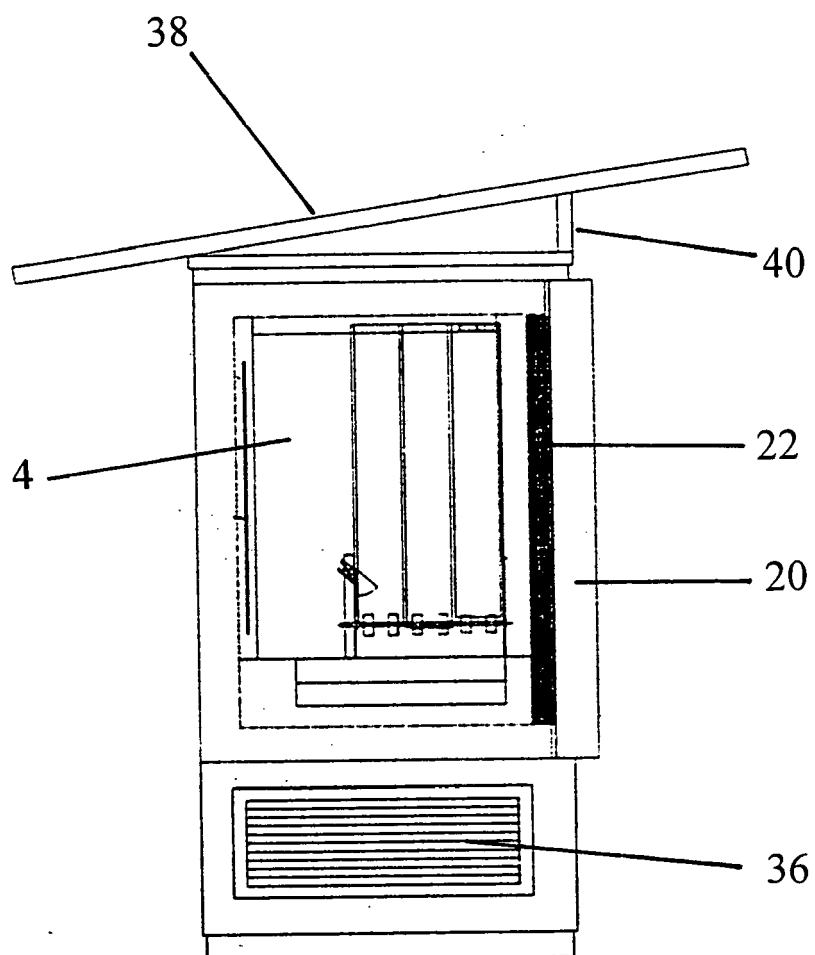


Figure 3

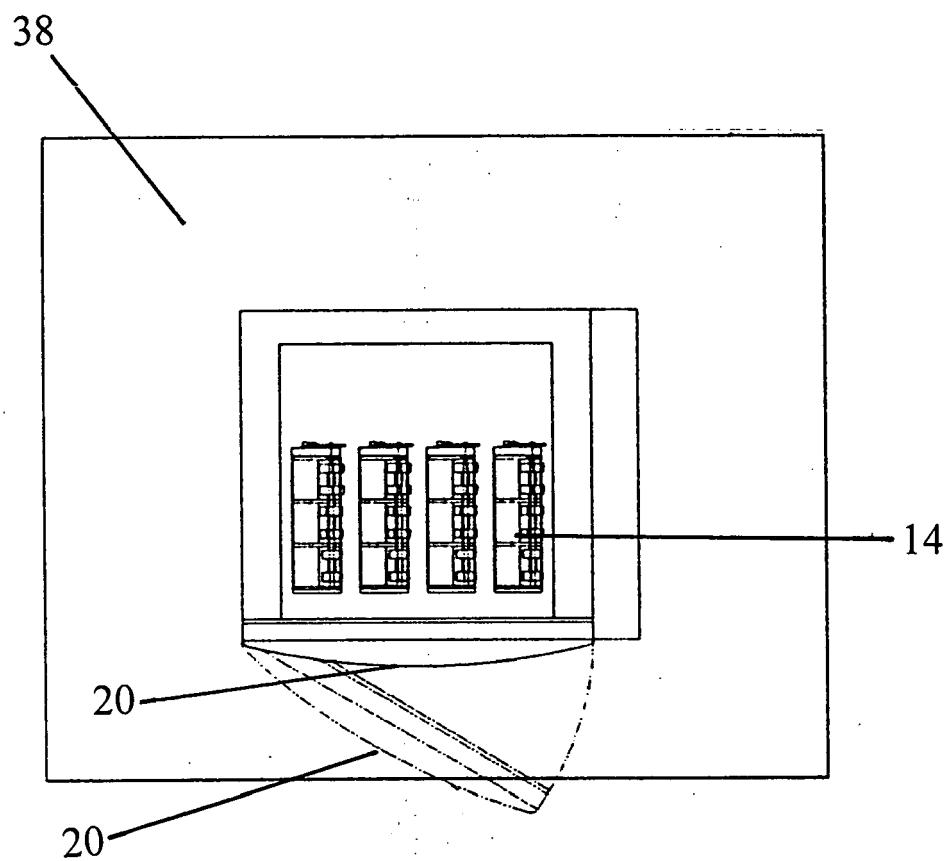


Figure 4

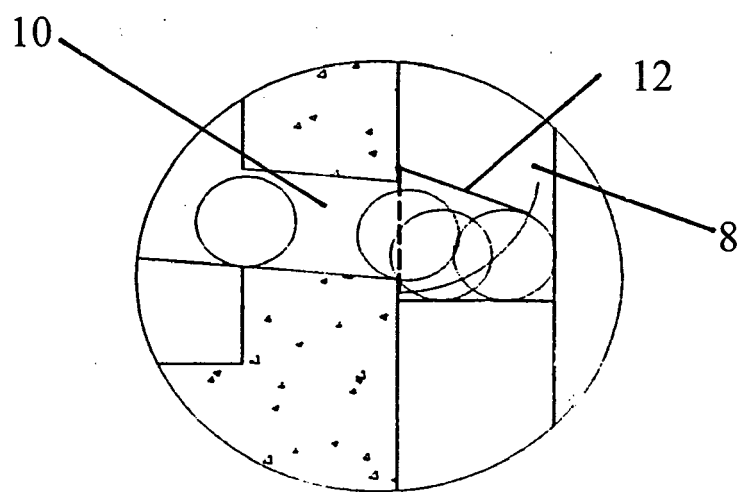


Figure 5

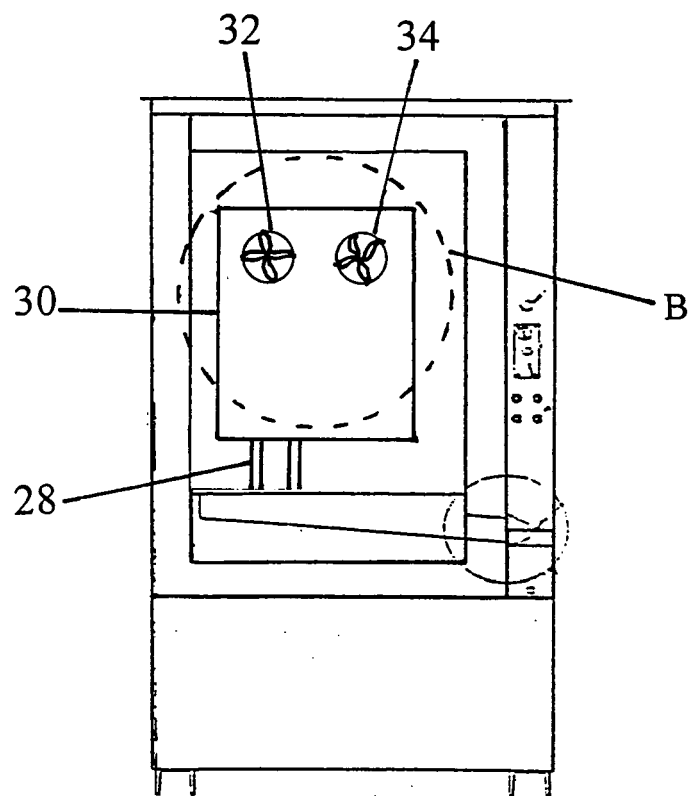


Figure 6

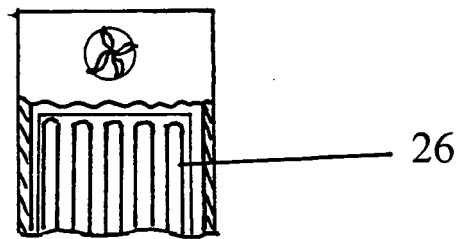


Figure 7

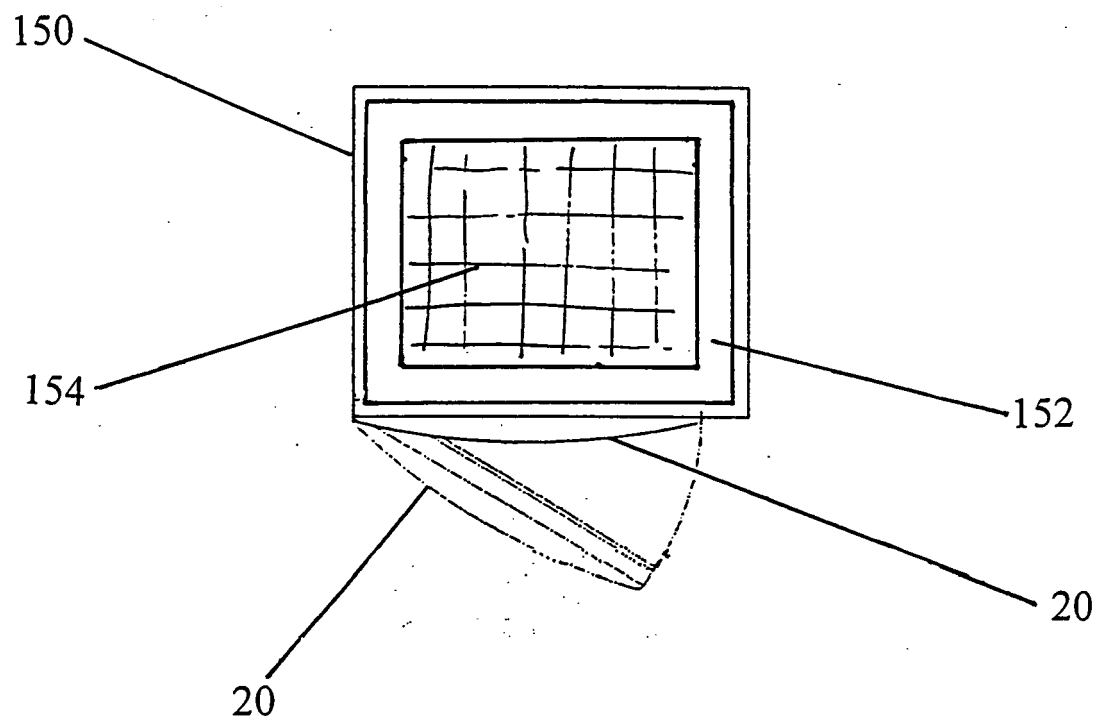


Figure 8



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 05 07 8066

DOCUMENTS CONSIDERED TO BE RELEVANT			
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Place of search The Hague		Date of completion of the search 8 March 2006	Examiner Rachkov, V
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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