

(12) PATENT
(19) AUSTRALIAN PATENT OFFICE

(11) Application No. **AU 199934213 B2**
(10) Patent No. **763445**

- (54) Title
Automatic vending machine and container for articles of frozen confectionery
- (51)⁶ International Patent Classification(s)
G07F 009/10
- (21) Application No: 199934213 (22) Application Date: 1999 . 04 . 06
- (87) WIPO No: WO99/54852
- (30) Priority Data
- | (31) Number | (32) Date | (33) Country |
|-------------|----------------|--------------|
| 9801015 | 1998 . 04 . 16 | ES |
| 9801875 | 1998 . 07 . 14 | ES |
| 9801826 | 1998 . 08 . 28 | ES |
- (43) Publication Date : 1999 . 11 . 08
- (43) Publication Journal Date : 2000 . 01 . 13
- (44) Accepted Journal Date : 2003 . 07 . 24
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- (56) Related Art
US 5027698
US 4863054
US 3215300

34213/99

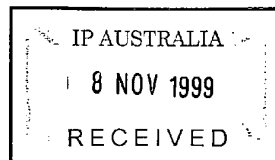


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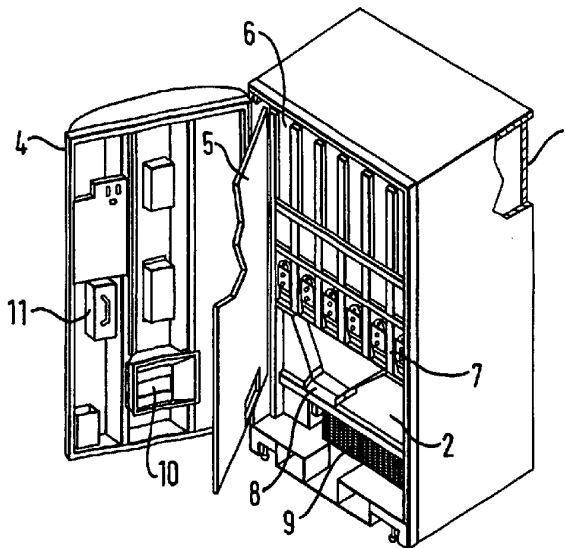
(51) International Patent Classification ⁶ : G07F		A2	(11) International Publication Number: WO 99/54852
			(43) International Publication Date: 28 October 1999 (28.10.99)
(21) International Application Number: PCT/EP99/02418		(81) Designated States: AU, BR, CA, MX, RU, US, ZA, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).	
(22) International Filing Date: 6 April 1999 (06.04.99)		Published Without international search report and to be republished upon receipt of that report.	
(30) Priority Data: U 9801015 16 April 1998 (16.04.98) ES U 9801875 14 July 1998 (14.07.98) ES P 9801826 28 August 1998 (28.08.98) ES			
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(54) Title: AUTOMATIC VENDING MACHINE AND CONTAINER FOR ARTICLES OF FROZEN CONFECTIONERY

(57) Abstract

Automatic vending machine for articles of frozen confectionery, comprising an outer body, an outer door and a controlled-environment chamber. Provision is made for the articles of frozen confectionery to be kept in containers of cylindrical, quasi-cylindrical or polyhedral shape. The machine has a controlled-environment chamber at -18 °C comprising insulating panels and an inner door, maintained by a refrigeration system and a defrosting system. Also within the chamber there are vertical compartments for the storage of stacked containers, a dispensing device and a discharge hopper leading to an outlet tray. In the outer door there are product selection and cash box mechanisms which monitor money inserted, change and articles of frozen confectionery stocks. In addition to this the machine can be connected by telephone to a central service to request restocking or communicate any damage. The mechanisms mentioned can be used to provide advertising and immediate prizes and an audio system.



**AUTOMATIC VENDING MACHINE AND CONTAINER FOR ARTICLES
OF FROZEN CONFECTIONERY**

DESCRIPTION

SUBJECT-MATTER OF THE INVENTION

5 This invention relates to an automatic vending machine for articles of frozen confectionery which incorporates appreciable innovations and advantages in comparison with existing similar machines on the market.

10 More specifically it relates to an automatic vending machine which does not need an employee or attendant and is operated by the user for the sale of ice-creams contained in cylindrical, quasi-cylindrical or polyhedral containers.

BACKGROUND TO THE INVENTION

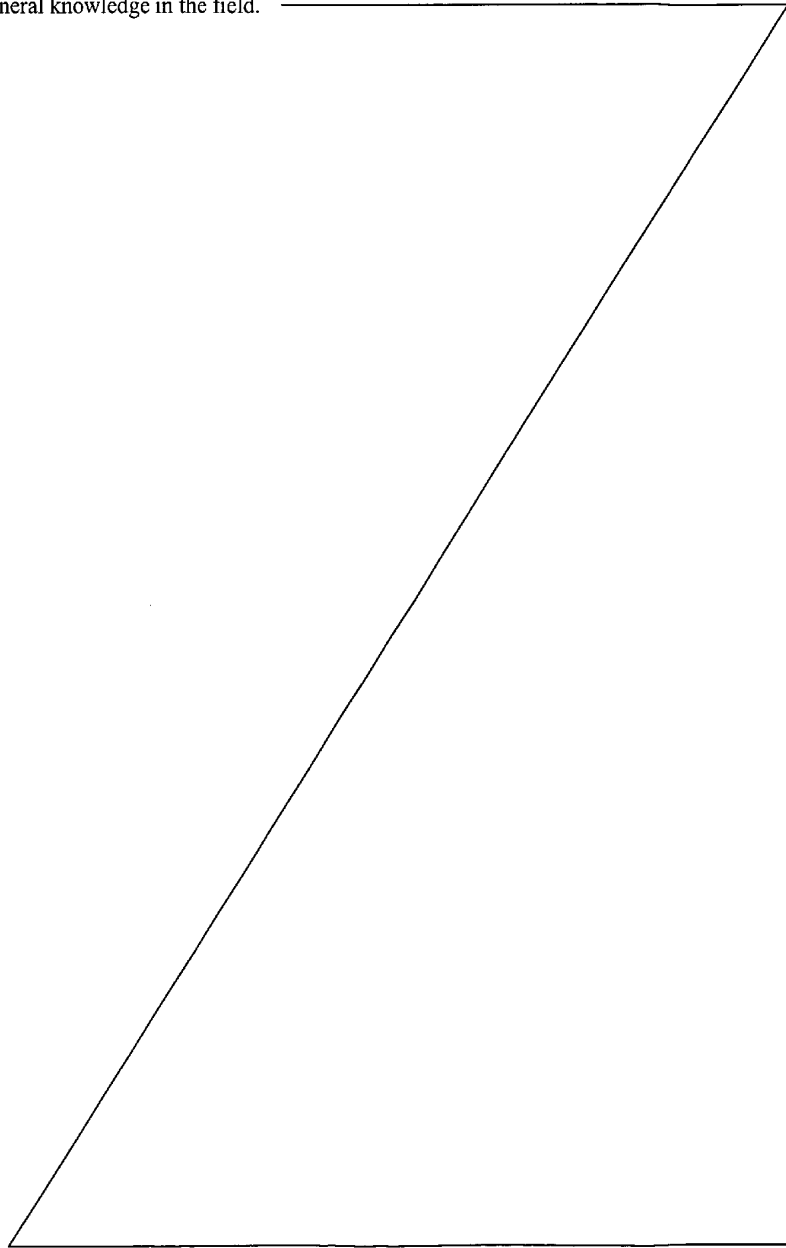
15 At the present time there are various types of machine for the automatic vending of products on the market, and among these the ones most similar to this invention are machines for the vending of packaged foodstuffs and refrigerated canned drinks, but there are very few designed for the vending of ice-creams in a frozen state.

20 This dearth of machines for the automatic vending of ice-creams is due to the fact that the machines are unreliable because of the irregular shape of the product which they handle, and the fact that they are at a temperature of around -18°C causes serious problems due to ice formation which results in much costly damage. Hence their poor success in comparison with machines operating under less exacting conditions such as machines for refrigerated canned drinks.

25 Previous designs of machines for the automatic vending of ice-creams have developed problems with ice formation mainly in the interior, resulting in obstruction of the product as various units stick together, and breakage of the delivery mechanisms, or the machines require laborious reloading because the ice-creams have to be placed in individual compartments.

30

Any discussion of the prior art throughout the specification should in no way be considered as an admission that such prior art is widely known or forms part of common general knowledge in the field.



DESCRIPTION OF THE INVENTION

The automatic vending machine for articles of frozen confectionery of the invention is capable of automatically delivering articles of frozen confectionery which have previously been placed in cylindrical, quasi-cylindrical or polyhedral containers, creating an appropriate environment for their conservation at a temperature of around -18°C in its interior, ensuring reliable and secure operation due to the special design of its components and permitting rapid reloading, avoiding one-by-one manual insertion into this type of machine. All this is performed in an original manner.

In the context of the invention, articles of frozen confectionery, hereinafter "ice creams", mean various ice confectionery products which can be moulded or extruded, including ice sticks, cups, cones, sandwiches or bars. Frozen confectionery is intended for ice cream, milk ice, water ice, sherbet, sorbet, which can be simple or composite, without or with inclusions or coatings.

The machine comprises an outer body which isolates it physically and thermally from the outside, with an outer front door in which the control mechanisms and the user's machine operating commands are located, and which prevents access to the interior of the machine. The said interior of the machine is protected from the outside by panels of special thermal insulating material in the walls which have the properties of maintaining the desired internal environment at -18°C, and an inner door, also of insulating material to complete the insulation of the interior, but allowing access to the person employed to replace the contents. Within the controlled-environment chamber there are columns for the storage of product, at the base of which are located the delivery mechanisms which by rotation release a cylinder with product from the said columns into a discharge hopper which delivers the said product to the access opening located in the outer door for collection by the user. The internal environment at -18°C is achieved by means of a refrigerating compressor of sufficient power, mounted outside the controlled-environment chamber.

To eliminate the problems of ice formation within the machine a design intended to simplify the delivery mechanisms and the storage structure is combined with the use of a heating system which removes any ice particles which might form.

5 The storage structure within the controlled-environment chamber consists of parallel vertical dividers which bound a space between them in which containers containing ice-creams located in a horizontal position can be stacked one upon the other. In this way each of the spaces between the dividers forms a compartment for a different type of product and as many parallel compartments as are required can be installed one alongside the other. The spacing between the said dividers is determined such that any surface frosting will not hinder descent of the stack of containers, and the said stack will nevertheless remain as vertical and as ordered
10 as possible.

At the base of each of the compartments formed by the dividers there is a dispensing device which when caused to rotate by an electric motor seizes the bottom container in the stack, allowing it to fall downwards, stopping in a position
15 in which it is ready to release the next unit in the stack. This mechanism is constructed of a material which is resistant to these temperatures, of simple construction and sensitive in operation, with a much reduced number of moving parts likely to suffer damage.

20 The unit collected by the delivery device falls into a discharge hopper which leads it to the collection tray located in the outer door, passing through an intermediate flap which separates the internal environment from the outside.

25 The outer door fulfils many functions in that it acts as a barrier to the interior of the machine, preventing direct access to its interior, contains all the mechanisms for product selection, control of the units contained in the machine and interaction with the user, contains an electronic cash device capable of collecting cash and delivering change, and finally constitutes an advertising medium to capture possible customers and the means required for mounting promotions and giving
30 prizes in situ. Thus the door constitutes a multimedia interface incorporating a display screen, digital controls and a voice synthesizer with the ability to produce preprogrammed spoken messages and musical backgrounds.

35 More specifically the cash device and electronic system have been designed so that they can control the general operation of the machine and monitor the quantity and type of money inserted, the quantity and type of change to be

returned to the user, the stocks of product in the machine, the stocks of cash in the box for inserted cash and the stocks of cash intended for change for the user. Furthermore, by an appropriate combination of electronic components this unit can be used to:

- Transmit the product and cash stock situation to a data processing centre by telephone. With these data the distribution of products from the central store to the various machines in use can be optimised.
- Report any damage which may have occurred to the machine to a data processing centre by telephone so that a rapid response can be provided from a centralized technical department.
- Provide a "user prize" system by a random combination of different images which deliver a prize/gift when three previously determined different images are aligned.

According to a first aspect, the present invention provides an automatic vending machine for articles of frozen confectionery, of the type comprising an outer body with a securely locked outer door which incorporates controls for product selection and interaction with the user, and a refrigeration system comprising an appropriate structure for delivery of the said articles in cylindrical or quasi-cylindrical containers, for which purpose outer body has a controlled-environment chamber formed of thermally insulating panels within the said outer body and an inner door, also of thermally insulating material, which can receive and conserve the articles of frozen confectionery at an approximate freezing temperature of -18°C , this environment being maintained constant by means of a refrigeration system of sufficient power for the purpose and preventing the formation of surface frost and ice in the container and mechanisms located within the controlled-environment chamber by means of a heating system, in which the structure permitting delivery of the articles of frozen confectionery within the controlled-environment chamber comprises parallel compartments which can receive the articles of frozen confectionery in cylindrical or quasi-cylindrical containers in an arched arrangement forming stacks, these compartments being formed of pairs of parallel

vertical dividers with a specified spacing which allows the said container cylinders or quasi-cylinders to fall easily, maintaining their vertical order, with, in the lower part of each compartment, a rotatory delivery device which seizes the bottommost cylinder or quasi-cylinder from the compartment and allows it to fall into a discharge hopper which
5 spans all-the compartments and which opens through a flap provided in the inner door into the product collection tray located in the outer door.

According to a second aspect, the present invention provides a container for accommodating inside articles of frozen confectionery, for use in automatic vending machines according to the first aspect, which comprises two cylindrical or quasi-
10 cylindrical symmetrical halves joined via a longitudinal edge by means of a weakened membrane acting in the manner of a joint or hinge and which has, on the side opposite said membrane, a pressure-fit closure, the edges corresponding to the perimeters of the bases of each half-cylinder or half-quasi-cylinder being rounded.

According to a third aspect, the present invention provides a container for
15 accommodating inside articles of frozen confectionery, for use in automatic vending machines according to the first aspect, which comprises an elongated hollow cylindrical or quasi-cylindrical rigid body which is open at one end or at both ends, in which the open end or ends are closed off by means of a lid(s) of frustoconical shape, which are closed over the end walls of the body using any rapid-closure system, such as by means
20 of pressure-coupling thereof, and wherein the frustoconical shape of the lids enables its stacking-up in such a way that the space occupied during transportation and storage thereof is minimized.

Unless the context clearly requires otherwise, throughout the description and the claims, the words 'comprise', 'comprising', and the like are to be construed in an
25 inclusive sense as opposed to an exclusive or exhaustive sense; that is to say, in the sense of "including, but not limited to".

To supplement the description provided below and to assist better understanding of its features this description is accompanied by a set of illustrative and non-restrictive figures showing the most significant details of the invention.

30 **BRIEF DESCRIPTION OF THE DRAWINGS**

Figure 1. Shows a perspective view of the machine with the doors open.

Figure 2. Shows a perspective view of the machine when closed.

Figures 3, 4 and 5. Show a preferred embodiment of an ice-cream container in front elevation, lateral profile and perspective views respectively.

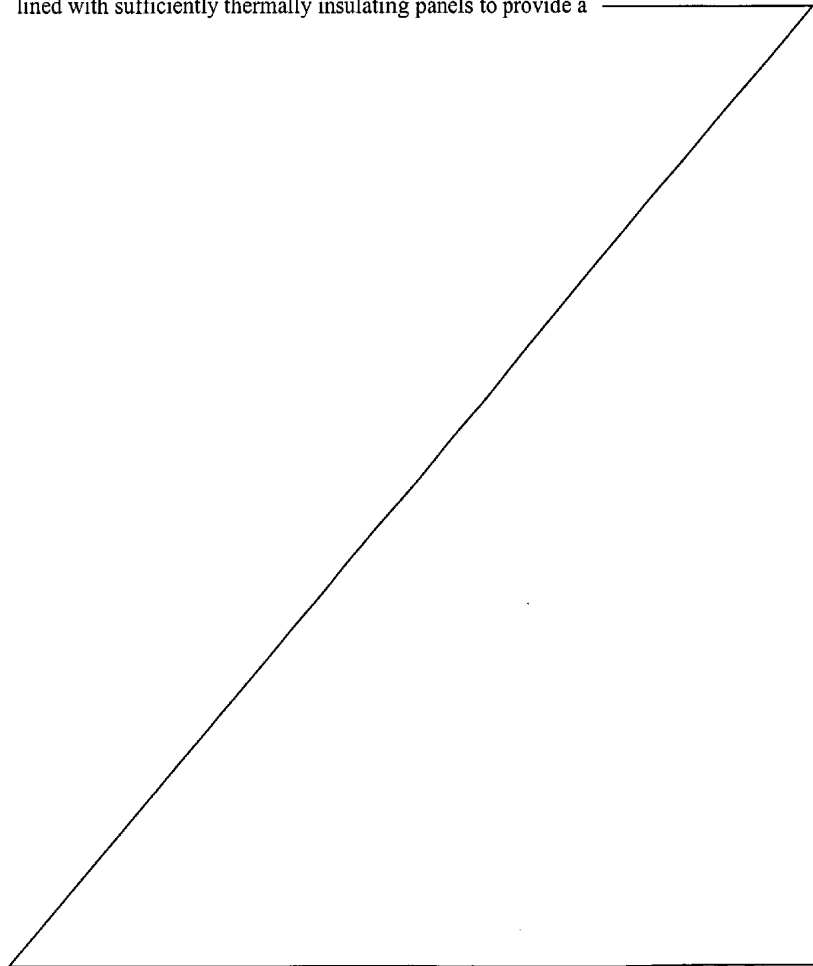
Figures 6, 7, 8, 9 and 10. Show an alternative embodiment of an ice-cream container in plan view, in elevation, a plan view of a lid thereof, a view in elevation of the lid and of a method of coupling between lids, which makes possible to minimize the space occupied during the storage thereof, respectively.

- 5 Figure 11. Shows a perspective view of a stack of stored ice-cream containers of a further embodiment.

DESCRIPTION OF A PREFERRED EMBODIMENT

A preferred but non-restrictive embodiment of the invention can be seen in the figures mentioned and, in accordance with the numbering adopted, comprises an automatic

10 vending machine for ice-creams in cylindrical, quasi-cylindrical or polyhedral containers, hereinafter "cylinders", comprising an outer body 1 whose inner walls are lined with sufficiently thermally insulating panels to provide a



controlled-environment chamber 2 at a temperature of -18°C , except at the front where there is an inner door 5 also of insulating material which completes controlled-environment chamber 2 which is equipped with a lower flap, and a securely locked outer door 4 on which advertising and promotional information can be placed and which houses the controls 3 for selection and interaction with the user, which include the corresponding buttons, a screen and an audio system for the production of spoken messages and background music, and which is capable of carrying out promotions in situ, these controls being connected to the delivery devices 7 and to a cash box device 11 with the ability to receive cash and give change and also to monitor stocks at all times, with the ability to communicate by telephone to report incidents affecting the machine such as e.g. when stocks of a particular product have run out, or other incidents.

Within controlled-environment chamber 2 lie compartments 6 for stacking the containers containing the ice-creams, these being bounded by parallel vertical dividers so that the cylinders are located between the arched dividers with their axes parallel to the horizontal plane, one above the other, thus offering an option for selection, there being as many parallel compartments 6 in chamber 2 as there are selection options with which it is desired that the machine should be provided. At the base of each stacking compartment 6 there is a rotating delivery device 7 operated by an electric motor which takes the bottommost cylinder from the stack of cylinders and by rotating drops the said cylinder into the discharge hopper 8 and remains ready to collect the next cylinder which takes up the original position of the cylinder delivered.

Discharge hopper 8 is located beneath delivery device 7, spanning them all and emptying into a collection tray 10 through the flap mentioned provided in inner door 5, the said collection tray 10 being located in outer door 4 with access from the outside.

To maintain controlled-environment chamber 2 there is provided externally to it a refrigerating compressor of sufficient power to produce a temperature of around -18°C at all times, and a heating system for the periodical operation of melting any particles of ice which may have formed on the walls, thus maintaining the interior of chamber 2 and the mechanisms of dispenser device 7 free from ice.

It is provided that the ice-cream containers are of cylindrical, quasi-cylindrical or polyhedral shape, and the polyhedral shape may include rectangular, hexagonal or octagonal bodies.

5 In the embodiment of a container illustrated in Figures 3, 4 and 5 it will be seen that the said container is formed of two symmetrical half-cylinders 12 joined by a membrane 13 along a longitudinal edge and there is a tongue-and-groove closure 14 on the side opposite this membrane, the edges corresponding to the perimeters of the bases of each half-cylinder being rounded and the said bases having a
10 projection 16 formed of two inclined planes 15 so that the container can slide easily within the machine.

In another alternative embodiment illustrated in Figures 6, 7, 8, 9 and 10, the container may comprise an elongated hollow cylindrical body 17 which is open at
15 one end or at both ends, in which the open end or ends are closed off by means of a lids 18, 18' of frustoconical shape, which are closed over the end walls of the body 17 using any rapid-closure system such as, for example, by means of pressure-coupling thereof. The frustoconical shape of the lids 18, 18' enables it to be stacked up in the form indicated in Figure 10, minimizing the space occupied
20 during transportation and storage thereof.

In a further alternative embodiment of the container shown in Figure 11, the container consists of two identical symmetrical halves 19 joined via a longitudinal edge by means of a weakened membrane 20, a pressure-fit closure which is
25 preferably of the slot 21 and tongue 22 type, said package, when folded, forming a cylinder without ridges and with rounded edges, so that it can slide easily inside the dispensing machine. During the container's storage prior to use, provision has been made for it to be possible for the container units to be stacked, open, one inside another, in order to prevent too tall a stack being formed.

30 Said above arrangements of the containers allow suitable protection for the ice-cream in the dispensing machine, guaranteeing its suitable hygiene and preservation conditions both during its storage and its supply, so that it reaches the user in perfect condition.
35

Obviously the ice-cream container may take different forms and embodiments without going beyond the spirit of the invention, and the ice-cream container may comprise an elongated cylindrical body which is open at one or both ends which can be closed off by means of a cylindrical cover.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. Automatic vending machine for articles of frozen confectionery, of the type comprising an outer body with a securely locked outer door which incorporates controls
5 for product selection and interaction with the user, and a refrigeration system comprising an appropriate structure for delivery of the said articles in cylindrical or quasi-cylindrical containers, for which purpose outer body has a controlled-environment chamber formed of thermally insulating panels within the said outer body and an inner door, also of thermally insulating material, which can receive and conserve the articles of frozen
10 confectionery at an approximate freezing temperature of -18°C , this environment being maintained constant by means of a refrigeration system of sufficient power for the purpose and preventing the formation of surface frost and ice in the container and mechanisms located within the controlled-environment chamber by means of a heating system, in which the structure permitting delivery of the articles of frozen confectionery
15 within the controlled-environment chamber comprises parallel compartments which can receive the articles of frozen confectionery in cylindrical or quasi-cylindrical containers in an arched arrangement forming stacks, these compartments being formed of pairs of parallel vertical dividers with a specified spacing which allows the said container cylinders or quasi-cylinders to fall easily, maintaining their vertical order, with, in the
20 lower part of each compartment, a rotatory delivery device which seizes the bottommost cylinder or quasi-cylinder from the compartment and allows it to fall into a discharge hopper which spans all the compartments and which opens through a flap provided in the inner door into the product collection tray located in the outer door.
2. Automatic vending machine according to Claim 1, which comprises an outer
25 door to prevent access to the interior by the user, provided externally with controls for product selection by the user and a cash box mechanism suitable for payment in cash for the product delivered and the return of change, wherein among the controls mentioned there is an interactive screen with the ability to conduct promotions and provide instant prizes to the user and an audio information system equipped with preprogrammed
30 spoken messages and musical backgrounds, the said door being suitable for carrying static advertising or promotional panels and moving decoration, the cash box system being capable of monitoring the articles of frozen confectionery present within the

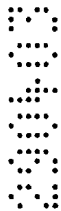
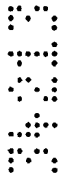
machine and communicating its needs for restocking, or any other fault which needs to be notified, to a remote centre by telephone.

3. Container for accommodating inside articles of frozen confectionery, for use in automatic vending machines according to claim 1 or claim 2, which comprises two
5 cylindrical or quasi-cylindrical symmetrical halves joined via a longitudinal edge by means of a weakened membrane acting in the manner of a joint or hinge and which has, on the side opposite said membrane, a pressure-fit closure, the edges corresponding to the perimeters of the bases of each half-cylinder or half-quasi-cylinder being rounded.
4. Container according to Claim 3, wherein the pressure-fit closure is of the tongue
10 and groove or slot and tongue type.
5. Container according to Claim 3 or Claim 4, wherein the bases of each half-cylinder or half-quasi-cylinder have a projection formed of two inclined planes, so that the container can slide easily within the machine.
6. Container according to any one of Claims 3 to 5, wherein for operational
15 purposes, said containers are arranged so as to be stacked in open position, one inside another, thereby reducing the need for space and preventing too tall a stack being formed in the store.
7. Container for accommodating inside articles of frozen confectionery, for use in automatic vending machines according to claim 1 or claim 2, which comprises an
20 elongated hollow cylindrical or quasi-cylindrical rigid body which is open at one end or at both ends, in which the open end or ends are closed off by means of a lid(s) of frustoconical shape, which are closed over the end walls of the body using any rapid-closure system, such as by means of pressure-coupling thereof, and wherein the frustoconical shape of the lids enables its stacking-up in such a way that the space
25 occupied during transportation and storage thereof is minimized.
8. An automatic vending machine for articles of frozen confectionery, substantially as herein described with reference to the examples and accompanying drawings.

9. Container for accommodating inside articles of frozen confectionery, according to claim 3 or claim 7 and substantially as herein described.

DATED this 29th Day of April 2003

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Attorneys for: SOCIETE DES PRODUITS NESTLE S.A.



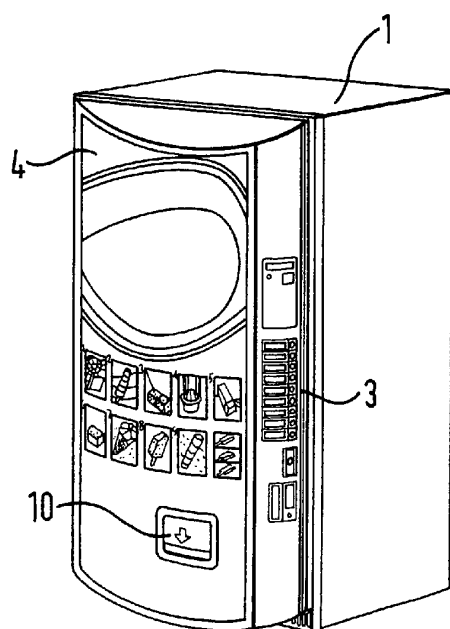
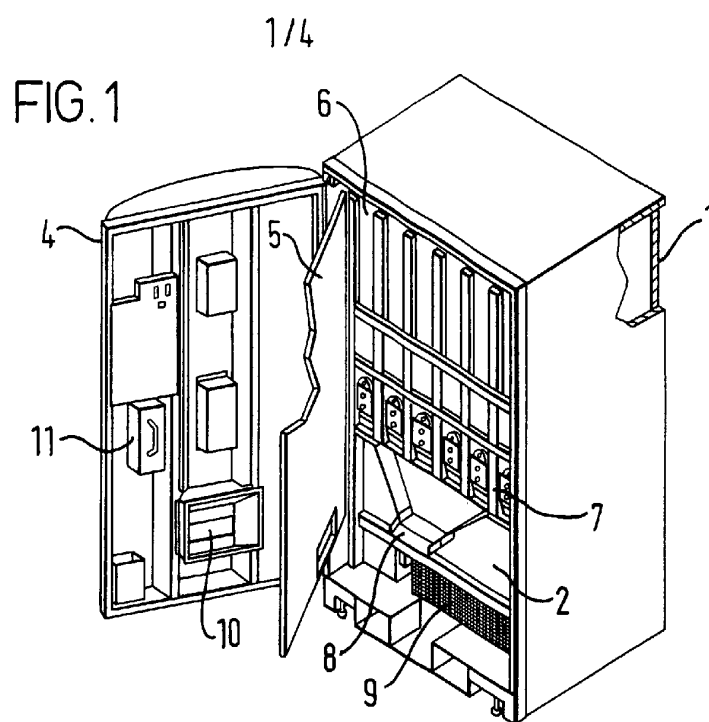


FIG. 2

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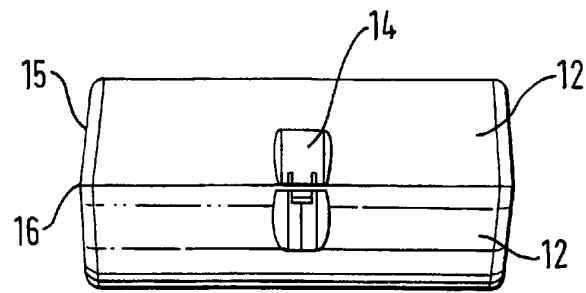


FIG. 3

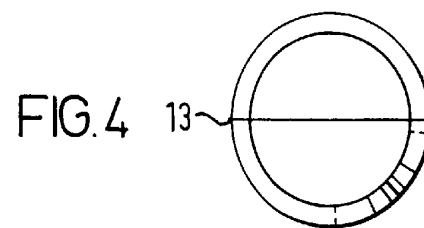


FIG. 4

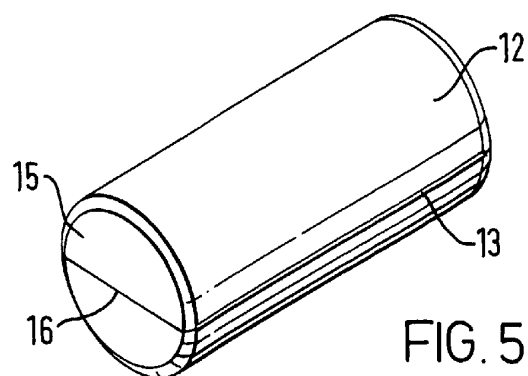


FIG. 5

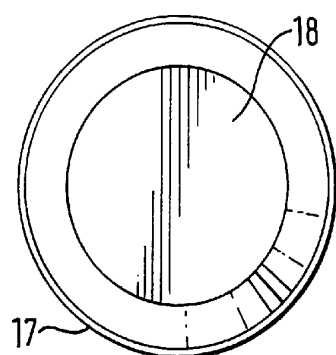


FIG. 6

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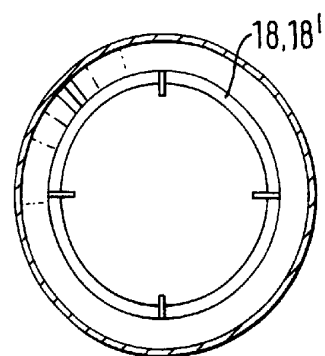


FIG. 8

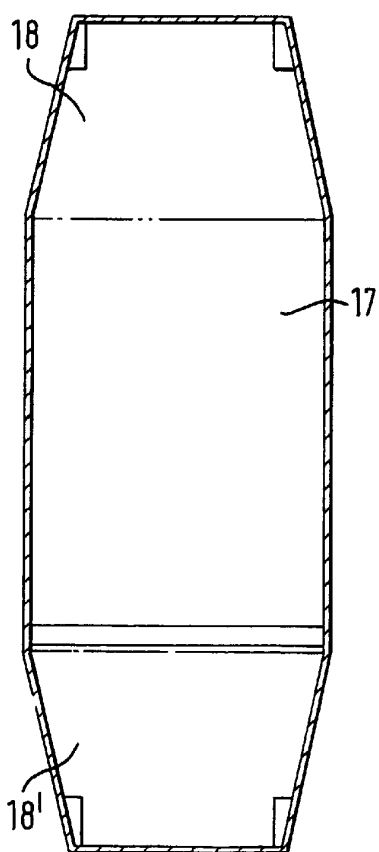


FIG. 7

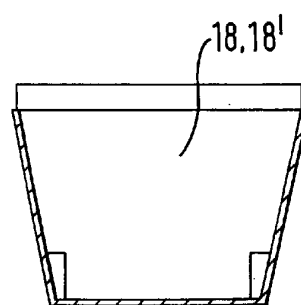


FIG. 9

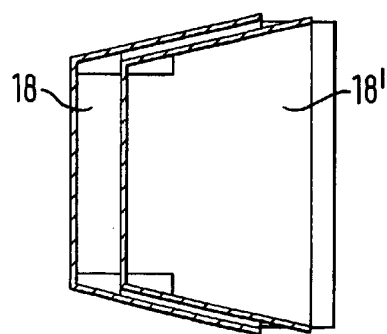


FIG. 10

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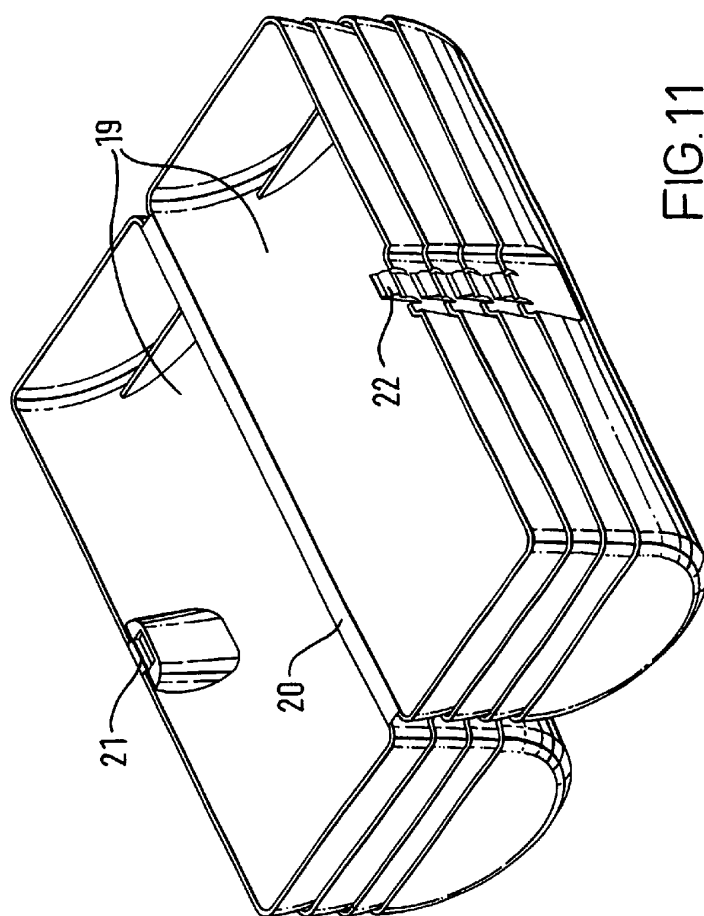


FIG. 11