P/00/008b 12/11/91
Section 29 (1)
Regulation 3.1 (2)

AUSTRALIA

Patents Act 1990

NOTICE OF ENTITLEMENT

(To be filed before acceptance)

We, MARS G.B. LIMITED

of, 3D Dundee Road, Slough SL1 4LG, United Kingdom

being the applicant in respect of Application No. 78606/94 state the following:-

The Person nominated for the grant of the patent has entitlement from the actual inventor(s) by assignment.

The person nominated for the grant of the patent is the applicant of the application listed in the declaration under Article 8 of the PCT.

By our Patent Attorneys,
WATERMARK PATENT & TRADEMARK ATTORNEYS

.... 13 Feb 97
(Date)

Registered Patent Attorney

AU9478606

(12) PATENT ABRIDGMENT (11) Document No. AU-B-78606/94
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 677442

(54) Title
A CONTROLLED ENVIRONMENT CONTAINER

International Patent Classification(s)
(51)[6] A47F 003/04

(21) Application No. : 78606/94 (22) Application Date : 17.10.94

(87) PCT Publication Number : WO95/10964

(30) Priority Data

(31) Number	(32) Date	(33) Country
9321439	18.10.93	GB UNITED KINGDOM

(43) Publication Date : 08.05.95

(44) Publication Date of Accepted Application : 24.04.97

(71) Applicant(s)
MARS G.B. LIMITED

(72) Inventor(s)
BARRY WINGATE; KATHLEEN GAY PEEPLES; JOHN ANTHONY WICKMAN; PETER FRANCIS KENAGHAN; FRANK EDWARD MARS

(74) Attorney or Agent
WATERMARK PATENT & TRADEMARK ATTORNEYS , Locked Bag 5, HAWTHORN VIC 3122

(56) Prior Art Documents
US 2145892
US 4662186
CH 158778

(57) Claim

1. A controlled environment container comprising a pivoted drum for receiving items to be stored and a temperature control device for controlling the internal air temperature in the drum via an air flow path through the drum, access to items stored in the drum being obtained via an aperture in a side of the container, wherein the pivoted drum can rotate between a first position closing the aperture and opening the air flow path through the drum and a second position opening the aperture and closing the air flow path through the drum.

OPI DATE 08/05/95 APPLN. ID 78606/94
AOJP DATE 29/06/95 PCT NUMBER PCT/GB94/02266

AU9478606 T)

(51) International Patent Classification 6 :
A47F 3/04

A2

(11) International Publication Number: WO 95/10964

(43) International Publication Date: 27 April 1995 (27.04.95)

(21) International Application Number: PCT/GB94/02266

(22) International Filing Date: 17 October 1994 (17.10.94)

(30) Priority Data:
9321439.3 18 October 1993 (18.10.93) GB

(71) Applicant *(for all designated States except US)*: MARS G.B. LIMITED [GB/GB]; 3D Dundee Road, Slough SL1 4LG (GB).

(72) Inventors, and
(75) Inventors/Applicants *(for US only)*: WINGATE, Barry [GB/US]; 4934 Bel Escou Drive, San José, CA 95124 (US). PEEPLES, Kathleen, Gay [US/US]; 110 Stratford, Houston, TX 77006 (US). WICKMAN, John, Anthony [US/US]; 10319 Meadowlake Lane, Houston, TX 77042 (US). KENAGHAN, Peter, Francis [GB/GB]; 26 Hornbeam Place, Hook, Hampshire RC27 9RD (GB). MARS, Frank, Edward [US/US]; 6 Margaret Court, Glenmore, PA 19343 (US).

(74) Agent: JACKSON, Richard, Eric; Carpmaels & Ransford, 43 Bloomsbury Square, London WC1A 2RA (GB).

(81) Designated States: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SI, SK, TJ, TT, UA, US, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG), ARIPO patent (KE, MW, SD, SZ).

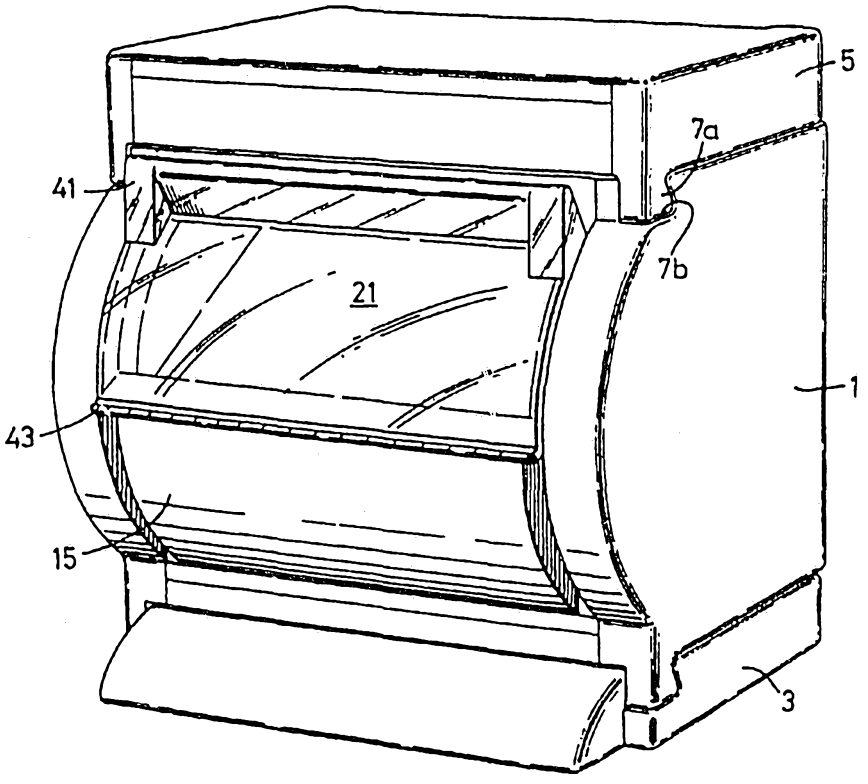
Published
Without international search report and to be republished upon receipt of that report.

677442

(54) Title: A CONTROLLED ENVIRONMENT CONTAINER

(57) Abstract

A controlled environment container comprising a base unit (3), a top unit (5) and a modular storage unit (1) disposed vertically between the base unit (3) and the top unit (5), wherein the base unit (3) or the top unit (5) or both includes a temperature control device for controlling the ambient air temperature in the modular storage unit (1) via an air flow path through the modular storage unit (1) and wherein access is obtained to items (25) stored in the container via an aperture in a side of the modular storage unit (1). Furthermore, seals (27, 35) and flanges (29, 37, 43) are provided, in conjunction with a rotating drum (15), to prevent unwanted egress of cool air, for example, from the container and the unwanted ingress of warm air, for example, from outside the container.



A CONTROLLED ENVIRONMENT CONTAINER

This invention relates to controlled environment containers, and in particular to a vertical modular container system for storing items in a controlled environment.

Prior art freezers or chill cabinets are well known for storing frozen products, such as ice cream, or simply fresh products which deteriorate in warm weather. Such fresh products may include confectionery, which can melt if overheated.

Known prior art freezers and chill cabinets tend always to have openings, possibly closed with doors, on top. This is to prevent the cold air within the container from "falling out" of the container each time the door is opened. In this way, energy can be conserved because cold air does not need to be replaced every time an item is removed from the container.

Although the aforementioned prior art containers are acceptable and widely used, they do not display the items within the container particularly well nor can they be readily enlarged in storage volume. Accordingly, the present invention aims to improve upon these prior art containers.

In the light of the foregoing, the present invention provides a controlled environment container comprising a pivoted drum for receiving items to be stored and a temperature control device for controlling the internal air temperature in the drum via an air flow path through the drum, access to items stored in the drum being obtained via an aperture in a side of the container, wherein the pivoted drum can rotate between a first position closing the aperture and opening the air flow path through the drum and a second position opening the aperture and closing the air flow path through the drum. As a result, any loss of conditioned air from the container is severely reduced.

The air flow path preferably passes through the drum when the aperture is closed and is re-directed via a by-pass

channel when the aperture is open.

The drum preferably includes an obstruction which closes the by-pass channel when the drum is in its first position and the aperture is closed. Furthermore, the obstruction preferably abuts against an upper seal when the drum is in its second position to prevent ambient air in the remainder of the container from escaping out of the open aperture.

The drum also preferably abuts against the upper seal when closed, thereby preventing external air from entering the container.

A lower seal is preferably provided for abutment by the drum to prevent internal air escaping from the container below the drum. Side seals are also preferably provided in the modular storage unit for abutment by flanges of the drum in both its first position and its second position to prevent the release of ambient air from within the container and the introduction of external air from outside the container.

The drum may include a removable product storage support for receiving items to be stored. By including the product storage support, which may remain stationary when in the modular storage unit, the items being stored are not rotated every time the drum is rotated.

The drum will preferably rotate automatically when released to close the aperture.

In a particular embodiment, the container may comprise a base unit, a top unit and a modular storage unit accomodating the pivoted drum disposed vertically between the base unit and the top unit, the base unit or the top unit or both including the temperature control device.

By being of modular construction, a container according to the present invention can be readily expanded simply by adding modular storage units between the base and the top unit. Accordingly, in a particular embodiment of the present invention, a plurality of modular storage units are stacked vertically between the base unit and the top unit.

Preferably the air flow path passes from the top unit through the or each modular storage unit into the base unit

and back to the top unit via a return passage at the rear of each modular storage unit.

A temperature control device is preferably situated solely in the top unit. If this is the case, cold air produced by the temperature control device may simply fall under gravity through the or each modular storage unit. Alternatively, the cold air may be driven through the air flow passage and return through the module storage units.

The temperature control device may be a thermo-electric cooling engine, a set of eutectic plates or cold packs, a modular chiller, freezer, warmer or heater. Any other appropriate temperature control device could equally well be used.

A surface seal is preferably provided between each unit of the container to isolate the air flow path from external air outside the container.

Each unit is preferably shaped to receive an adjacent unit in a locking formation, full locking of adjacent units being effected by one or more fastenings at the rear of the container.

A bracket may be provided at the rear of the container to enable the container to be mounted on a wall or other vertical support. Alternatively, the base unit may be filled with ballast or otherwise secured to increase the stability of the container when erected on a horizontal surface.

Although it is envisaged that a container according to the present invention will be used as a cooler for confectionery, the container could be used for storing any other goods or could be used as a freezer to keep frozen goods. Furthermore, the container could be used as a heater to keep items, such as pies and the like, hot during display. The use of the container will simply be dictated

by the type of temperature control device incorporated in the container.

A specific embodiment of the present invention is now described, by way of example only, with reference to the accompanying drawings, in which:-

Figure 1 is a perspective view of a modular cooler according to the present invention;

Figure 2 is a perspective rear view of a modular storage unit of the type shown in Figure 1;

Figure 3 is a sectional side view of a cooler as shown in Figure 1, except that two modular storage units are included;

Figure 4 is a cut away side view of a single modular storage unit as shown in Figure 2 essentially showing a side view of the drum.

With reference to the accompanying drawings, a container having a single modular storage unit 1 (cf. Figure 1) or two modular storage units 1 (cf. Figure 3) are shown. Each container has a base unit 3 and a top unit 5 stacked vertically in modular fashion with the storage unit(s) 1 positioned therebetween. If the container is intended to stand on a counter or the like, the base unit 3 may be filled with some form of ballast, or otherwise secured to provide stability to the container.

Adjacent units of the container inter-engage by means of locking formations 7a, 7b formed at the front corners of each unit and simple clips 9 acting between adjacent units at the rear of the units (cf. Figure 2). Surface seals (not shown) are provided between the units to prevent the ingress of external air into the container.

A thermo-electric cooling engine (not shown) is accommodated in the top unit 5 and is powered by an electrical supply (not shown). Any other suitable cooling system could equally well be used. Furthermore, since the type of thermo-electric cooling engine does not form a part of the present invention, it will not be described in any detail other than to say that it provides a supply of cool air which is either pumped or falls under gravity through

tne modular storage units 1 to the base unit 3 and recirculates via a return passage 11 back to the top unit 5. When the air returns to the top unit 5, it is slightly warmer and is either expelled from the device through rear vents or recirculated via the cooling engine back around the system.

Each modular storage unit 1 includes a wire basket 13 for receiving confectionery to be chilled. The wire basket 13 remains essentially stationery when positioned in the storage unit 1. A partially cut away drum 15 surrounds the basket 13 and is able to pivot about an axis 17. The drum 15 includes a plurality of apertures 19 on its lower side through which air may pass. A window 21, which closes an aperture 22, is integral with the drum 15 and rotates around the pivot axis 17 when the drum 15 rotates. As can be seen from Figure 3, when cool air is released from the top unit 5, it falls into the drum 15 through an upper opening 23 in the storage unit 1. The cool air therefore also falls into the basket 13 and cools the confectionery 25 stored therein. The air is then free to fall out of the basket 13 through the apertures 19 and on into an adjacent unit 1.

When the drum is in its closed position, its free end abuts an upper seal 27 mounted on a portion of the storage unit 1. This prevents any unwanted loss of cooled air. The cool air falls into the drum 15 because an obstruction 29 on the drum 15 prevents the air from passing down a by-pass passage 31 between the drum 15 and an internal wall 33 of the storage unit 1. A lower seal 35 is also provided mounted on a portion of the storage unit 1 against which a protrusion 37 of the drum 15 abuts when the aperture 22 is closed. In this way, cool air entering the storage unit 1 is used solely to cool the confectionery 25 within the basket 13 before leaving the storage unit 1 via a lower aperture 39. Furthermore, the warmer air outside the storage unit 1 cannot enter the storage unit 1 due to the inclusion of seals 27 and 35.

As can be seen from the lower portion of Figure 3, when a piece of confectionery is to be removed from the storage

unit 1, the aperture 22 is opened by rotating the drum 15 about pivot axis 17 by means of a handle 41. When the aperture 22 is opened, a protruberance 43 between the window 21 and the drum 15 abuts the lower seal 35 and the obstruction 29 of the drum 15 abuts the upper seal 27. When this occurs, the cool air leaving the upper storage unit 1 cannot enter the drum 15 of the lower storage unit 1 because the obstruction 29 directs the cool air into the by-pass channel 31. Thus, there is no pressure from the cool air falling from the upper storage unit forcing the cool air in the lower storage unit 1 out of the open aperture 22 of the lower storage unit 1. Hence, there is little loss of cool air from the lower storage unit 1. Furthermore, since the aperture 22 is only opened by rotation of the drum 15, there is no wafting of hot air from outside the storage unit 1 or cool air from inside the storage unit 1 out of the open aperture 22 during rotation of the drum 15. A significant reduction in the loss of cool air is thereby effected by means of the arrangement shown in Figure 3 of the drawings.

As will be appreciated, if the aperture 22 of the upper storage unit 1 was opened rather than the aperture 22 of the lower storage unit 1, the cool air from the top unit 5 would pass down the by-pass channel 31 of the upper storage unit 1 and then through the drum 15 of the lower storage unit 1 rather than vice versa as shown in Figure 3 of the drawings.

With reference to Figure 4 of the drawings, each side wall 45 of the drums 15 includes an outwardly extending flange 47 which abuts a side seal 49 to prevent loss of cool air from the storage units 1 along this edge. The drum 15 likewise abuts the side seal 49 to seal the storage device 1. When the aperture 22 is open, a different portion of the flange 47 abuts the side seal 49 and a different portion of the drum 15 also abuts the side seal 49, but once again a reliable seal is provided to prevent the ingress of warm air from outside the storage unit 1. Additionally, a concentric seal 51 is provided to close the small remaining gap between the side seal 49 and the drum 15 in either position. Other seal arrangements can, of course, alternatively be envisaged

or used.

Although modular containers having one or two storage units have been described and shown, any number of storage units 1 could be included in a single system, as appropriate. Furthermore, although a particular form of locking mechanism between the various units has been described herein, other forms of inter-engagement between the units, which are equally easy to use, can also be envisaged by a man skilled in the art.

It will of course be understood that the present invention has been described above purely by way of example, and that modifications of detail can be made within the scope of the invention.

CLAIMS

1. A controlled environment container comprising a pivoted drum for receiving items to be stored and a temperature control device for controlling the internal air temperature in the drum via an air flow path through the drum, access to items stored in the drum being obtained via an aperture in a side of the container, wherein the pivoted drum can rotate between a first position closing the aperture and opening the air flow path through the drum and a second position opening the aperture and closing the air flow path through the drum.

2. A container as claimed in claim 1, wherein the air flow path passes through the drum when the aperture is closed and is re-directed through a by-pass channel when the aperture is open.

3. A container as claimed in claim 2, wherein the drum provides an obstruction which closes the by-pass channel when the drum is in its first position and the aperture is closed.

4. A container as claimed in claim 3, wherein the obstruction abuts against an upper seal when the drum is in its second position to prevent the internal air in the remainder of the container from escaping out of the open aperture.

5. A container as claimed in claim 4, wherein the drum abuts against the upper seal when closed, thereby preventing external air from entering the container.

6. A container as claimed in any preceding claim, wherein a lower seal is provided for abutment by the drum to prevent internal air escaping from the container below the drum.

7. A container as claimed in claim 6, wherein the drum

abuts against the lower seal when closed, thereby preventing external air from entering the container.

8. A container as claimed in any preceding claim, wherein side seals are provided for abutment by flanges of the drum in both its first position and its second position to prevent the escape of internal air from within the container and the entry of external air into the container.

9. A container as claimed in any preceding claim, wherein the drum includes a removable product storage support.

10. A container as claimed in any preceding claim, comprising a base unit, a top unit and a modular storage unit accommodating the pivoted drum disposed vertically between the base unit and the top unit, the base unit or the top unit or both including the temperature control device.

11. A container as claimed in claim 10, wherein a plurality of modular storage units are stacked vertically between the base unit and the top unit.

12. A container as claimed in claim 10 or claim 11, wherein the air flow path passes from the top unit through the modular storage unit into the base unit and back to the top unit via a return passage at the rear of the modular storage unit.

13. A container as claimed in any one of claims 10 to 12, wherein the temperature control device is situated solely in the top unit.

14. A container as claimed in any preceding claim, wherein the temperature control device is a thermo-electric cooling engine, a set of eutectic plates or cold packs, a modular chiller, freezer, warmer or heater.

15. A container as claimed in any one of claims 10 to 14,

wherein a surface seal is provided between each unit of the container to isolate the air flow path from air external to the container.

16. A container as claimed in any one of claims 10 to 15, wherein each unit is shaped to receive an adjacent unit in a locking formation, full locking of adjacent units being effected by one or more clip at the rear of the container.

17. A container as claimed in any preceding claim, wherein a bracket is provided at the rear of the container for mounting the container on a wall or other vertical support.

18. A container as claimed in any preceding claim, wherein ballast is used to increase the stability of the container.

19. A container as claimed in any preceding claim, wherein the container is a cooler for confectionery.

20. A controlled environment container substantially as hereinbefore described with reference to and as shown in Figures 1, 2 and 4 or Figures 2, 3 and 4 of the accompanying drawings.

1/4

78606/94

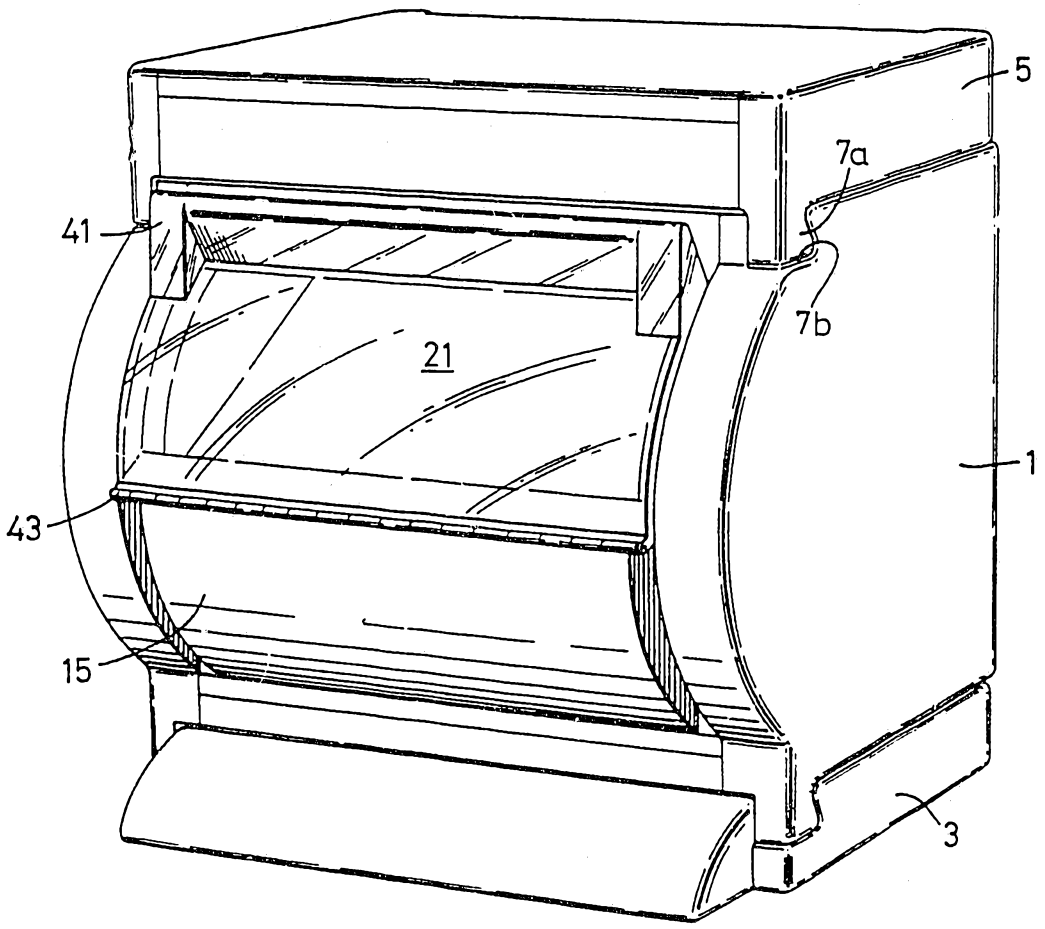


FIG. 1

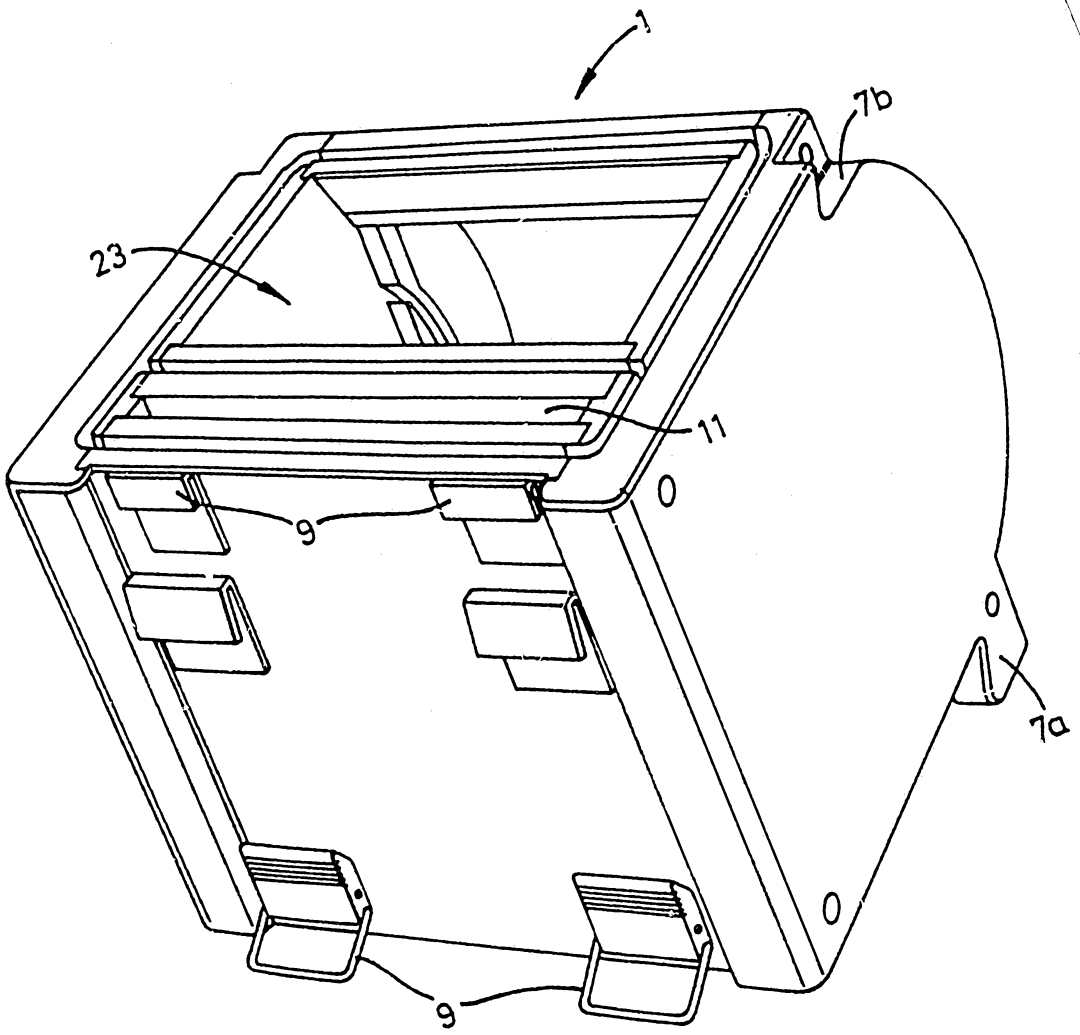
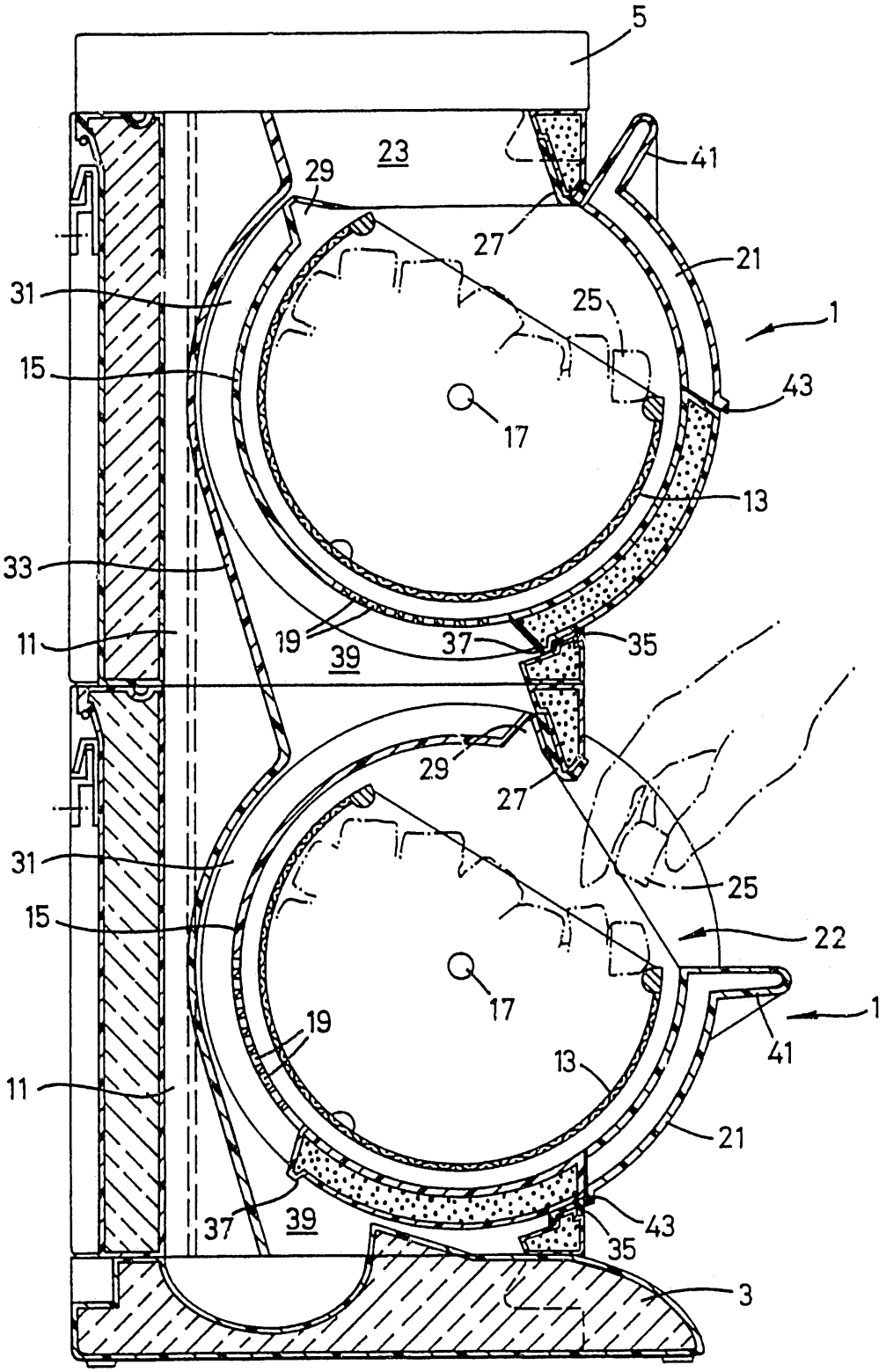


FIG. 2

FIG. 3


5
23
29
41
27
21
31
25
1
15
43
17
13
33
11
19
39
37
35
29
27
31
25
15
22
17
1
19
41
13
11
21
37
39
43
35
3

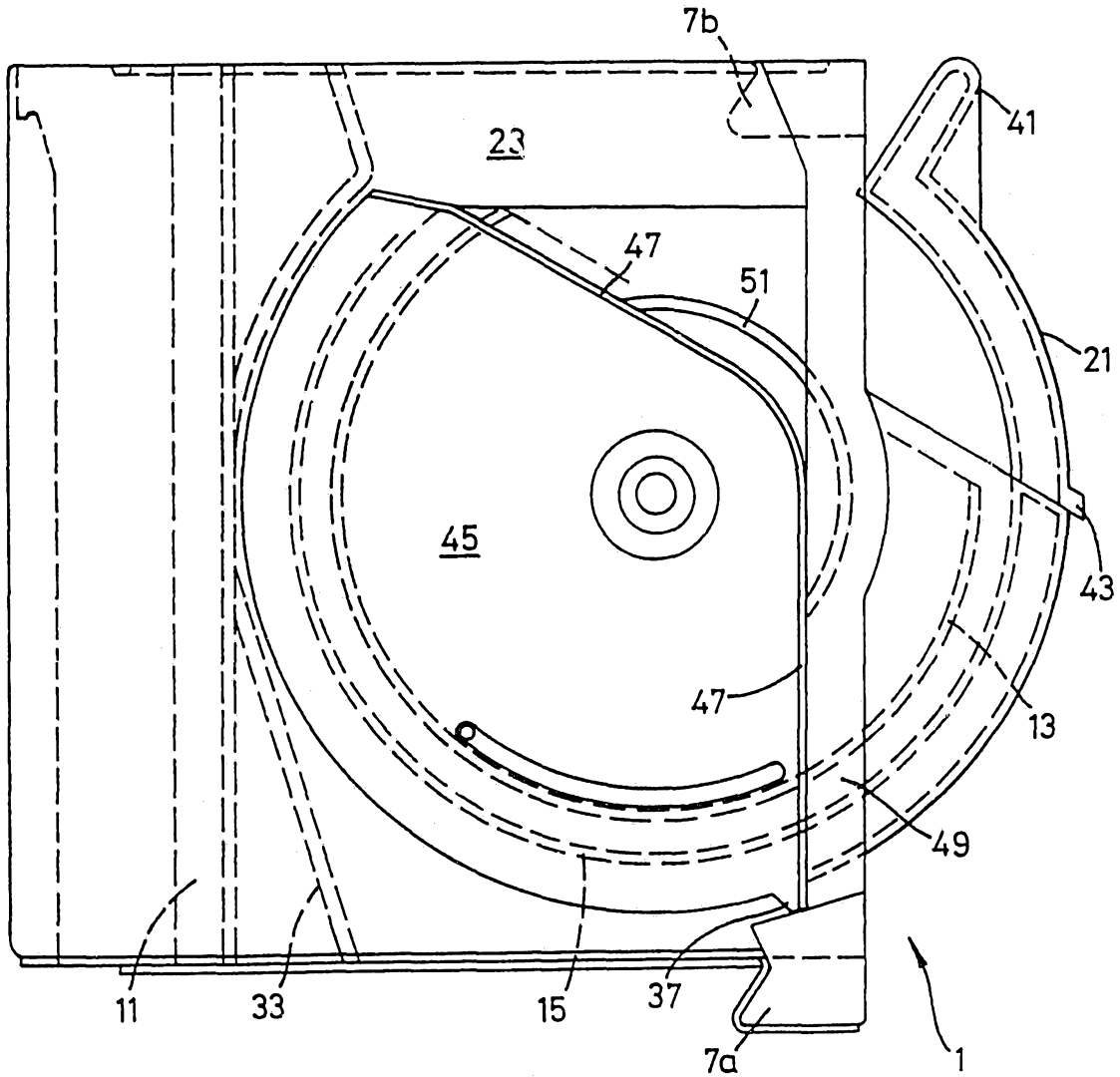


FIG. 4