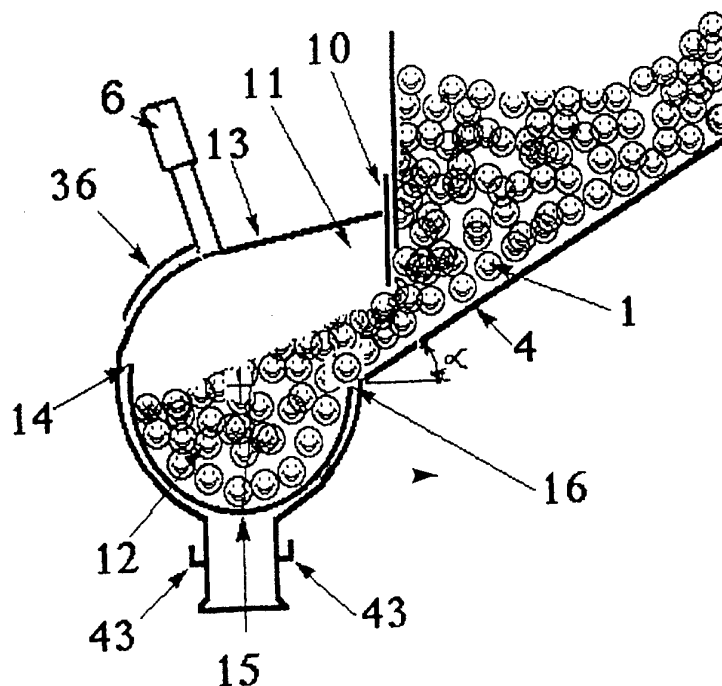




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(54) Title: A METHOD AND AN APPARATUS FOR DISTRIBUTING A BULK ARTICLE



(57) Abstract

A bulk product such as cornflakes and similar breakfast products is distributed from the manufacturer to the consumer with at least one intermediate distribution link. The bulk product is supplied by the manufacturer in a bulk package and is divided into subamounts which are packaged to exclusively cover the package requirement until a subsequent division into subamounts. The method is performed by means of an apparatus having a reservoir for the bulk product and dosing means which are adapted to meter and dose a predetermined amount of the bulk product which is conveyed directly to a selected package.

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A method and an apparatus for distributing a bulk article

5 The invention concerns a method and an apparatus for distributing a bulk article, in particular fragile, particulate goods, such as breakfast products of the cornflakes type and the like, where the distribution takes place in a distribution chain from the manufacturer to the consumer with at least one intermediate distribution link.

10 With the present invention the manufacturer supplies his product in large containers containing many sales portions to the point of sale, where the buyer himself dispenses and packages a given purchase amount in a selected package without any risk of drop infection of the product.

15 It is well-known that a breakfast package for cornflakes and the like is disposable, and that it constitutes a considerable part of the price of the product. This means that the consumer is troubled with the disposal of the
20 empty package, which has an impact on the environment, and which also adds to the costs of the product, and it is likewise well-known that manufacturers and sellers are reluctant to introduce unusual solutions if these involve a risk to the turnover.

25 Usually the package from the manufacturer to the consumer consists of the following operations/components:

30 Portioning from the production store in sales amounts and packaging in bags.

Insertion of the filled bags into carton boxes.

35 Placing of the filled and closed boxes on handy transport trays.

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Fixing of the boxes on the trays by shrink plastics or a paper wrapper.

Placing of the trays on a transport pallet.

5

Fixing of the trays on the pallet by plastics film tying.

10

Unpacking at the point of sale of the transport pallet and the transport trays, as well as disposal of plastics film, shrink plastics or cardboard as well as transport tray.

15

Line-up of the boxes on the display shelves.

Tidy-up on the shelves.

Customer selection on the shelves.

20

Payment at the check-out and placing of bought box in carrier bag.

Disposal of carrier bag.

25

Placing of box in refrigerator.
(Optionally pouring the product into a re-use container).

30

Use of the product directly from the box (the container).

Empty box into refuse bin.

Emptying of refuse bin.

35

- 3 -

This usual method involves a great amount of handling of the packaged sales amount, so that the package must be of a particularly strong and thus expensive structure. For the filled bags to be placed in the boxes, these must have a smaller volume than the volume of the boxes, and since the repeated handling involves a certain shaking and breakage, many customers find the low box filling degree unacceptable, which has been the cause why the manufacturers usually provide the boxes with a text stating that the boxes have been filled by weight, and that the apparent unutilized package is due to product collapse during transport.

A plurality of measurements have been made of the filling degree of various breakfast products, which show that the boxes are usually just filled up to two thirds.

Another drawback of the commonly used box system is that the boxes take up relatively much shelf space in the stores, and that it is a time-consuming operation to keep the shelves tidy.

It is a problem to the consumer that the boxes are unnecessarily large, and that just two boxes fill a carrier bag.

There is a known method of avoiding the drawbacks of the resource-consuming and badly utilized disposable box package, viz. by omitting putting the bag with the portioned amount into a box, while maintaining the other functions and packages. The drawback of this approach is that without the protection of the box the product is subjected to a much greater physical load during handling from portioning at the production site to the final place of consumption, which causes great breakage of the product, and moreover bags on the shelves are not attractive

eye-catchers.

5 The present invention provides a method of handling as well as storage packaging, portioning and use packaging, enabling a reduction of the package-amount, while just causing a minimum of breakage as well as reducing the space requirement for a given amount in the store and providing the possibility of an attractive eye-catcher. The method of the invention is of the type wherein portioning into purchase amount is made by the customer directly in connection with the purchase, optionally in a customer selected package, which may be a specially constructed re-use container, or in a simple disposable bag solely intended for withstanding the handling from the point of purchase to the point of use. And the invention is embodied so as to co-exist with usually lined-up corresponding products, thereby offering a choice to the customer, and so that the sales risk of the manufacturer and the seller is not affected by the form of package chosen by the customer.

25 The method of the invention may be used in connection with any type of product that lends itself for portioned metering. Thus, the product may also be a mixture of various types of goods, provided that the mixture lends itself for the portioned metering. The product can also consist of separately packaged subportions, provided that these can be portioned in accordance with the method.

30 The method of the invention can also consist of several successive subportionings, wherein e.g. a manufacturer portions an amount for a wholesaler who portions this into subamounts for retail shops, in which the customers portion the subamount into the desired purchase amount, and finally the purchase amount can be portioned at the point of use into meal portions for direct consumption.

- 5 -

Portioning may be effected as one or more successive sub-portionings and may be a portioning according to volume as well as according to weight.

5 According to the invention the portioning may be designed so as to coexist in practice with the traditionally packaged products so as to offer to the customer a choice between this and the traditional package form, or the portioning may be provided side-by-side with other corresponding ones, thereby forming a bar to offer to the customer a choice of various products distributed according to the invention.

15 The invention also concerns a dosing apparatus for use in the performance of the method described above in connection with a product reservoir, so as to effect volume portioning, which subjects the product to a minimum of physical impact, and which does not subject the product or particles of the product to shearing. When the portioning unit is provided with the mechanical and/or electronic devices shown in the drawing, the dosing apparatus can also portion by weight.

25 The invention will be explained more fully below with reference to the drawing, in which

Figs. 1A-1F show a schematic example of the method.

Figs. 2 and 3 show an embodiment of the portioning unit.

30 Figs. 4, 5, 6, 7 show the function of the portioning unit.

Figs. 8-9 show the filling of the portioning unit.

35 Fig. 10 shows portioning units lined up as a bar.

Fig. 11 shows a portioning unit intended for portioning meal portions.

Figs. 12 and 14 show a re-use container.

5

Fig. 13 shows how the re-use container is incorporated as an element in the portioning unit.

10

Figs. 15 and 16 show an embodiment in which portioning is effected by volume.

Figs. 17 and 18 show another embodiment.

Figs. 19-24 show other embodiments.

15

The method schematically shown in figs. 1A-1F illustrate (A) how a given product (1) is portioned directly from the production machine in a handy bulk package (2) and (B) transport to the point of sale.

20

Fig. 1C shows how the contents of the bulk package are filled into the reservoir (4) which has been rotated to its lower filling position.

25

Fig. 1D shows how the customer (7) positions his re-use container below the portioning unit which is operated by pulling a lever (6). Position (5) indicates that the customer is offered the choice of a disposable bag instead of using the re-use container which (7) may have forgotten.

30

Fig. 1E shows the re-use container (8) arranged as a reservoir in a portioning unit dimensioned as a meal portioning unit, the consumer (7) operating the lever (6) which releases a portion on the plate (9), and which is served immediately thereafter (position F).

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- 7 -

Fig. 2 shows the portioning unit with products (1) in the reservoir (4) whose lower face forms an angle (α) which is at least the slide angle of the product, the inlet to the portioning housing (13) being defined by the throttle valve (10). The product slides by its own force down into a portioning element (15) which is suspended rotatably about its axis in the portioning housing (13). A lever (6) is rigidly connected to the metering element (15) so that the portioning element (15) is rotated by actuation of the lever in a downward direction (fig. 3), whereby the edge (16) moves up through the product (1) in the air gap (11), and whereby the product particles fall away from the edge during the upward movement, thereby separating the metered amount (12) from the storage amount (1) without physical damage to the product. Continued rotation of the metering element (15) moves its edge (14) past the downwardly directed outlet in the portioning housing (13), thereby providing free passage for the metered amount (12) to freely drop out of the portioning housing and down into a package.

It will be seen from figs. 2 and 3 how the lever (6) is provided with a cover plate (36) so that the area (37) below it (fig. 3 (37)) is made visible upon rotation of the lever (6) to the emptying position to uncover a message to the operator written at position (37) on the portioning housing.

Fig. 4 shows a portioning housing (13) with a reservoir (4) placed on a frame (17) which is attached to a transport platform (18). A holder for disposable bags (5) is mounted above the handle.

The bag supporting plate (38) is positioned so as to precisely support the bag (5) when it is filled. Fig. 5, section A-A shows that the capacity of the metering ele-

ment (15) of the dosing apparatus is determined partly by the diameter and partly by the length, and that the capacity can be adjusted by displacing the throttle valve (10) in a vertical plane (fig. 2), thereby changing the filling degree (12) of the metering element (15).

Fig. 6 shows a section of the portioning unit in a filled position with a bag secured to the outlet of the portioning housing at the hooks (43).

Fig. 7 shows the same section in the emptying situation where the product (1) has been separated from the metered amount (12), which drops down into the bag (5), upon rotation of the metering element (15).

Fig. 8 shows the portioning unit (13, 5, 4, 38) rotatably secured to the frame (17) in the center line (20) of the metering element (15), and that the frame (17) is secured to a transport platform (18) having a recess that permits a rotation of 180°, as will be seen from fig. 9, which shows how the filling of the reservoir (4) with products (1) from the bulk sack (2) takes place through the opening in the bottom of the reservoir after the gate (19) has been opened.

Fig. 10 shows several portioning units lined up side-by-side so as to constitute a "bar".

Fig. 11 shows portioning units lined up as a bar, so that the frame (17) is provided with a bracket (22) for suspension, while the horizontal part of the frame is combined with the function of the supporting plate as a support for the selected package, in this case a plate (9). The portioning housing (13) is here provided as a fixed part of the frame (17), and so as to constitute elements for horizontal fixing as well as downwardly vertical fix-

- 9 -

ing of the product reservoir (8), which is provided with a throttle valve (10) to adjust the metering.

5 Fig. 12 shows the product reservoir (8) with a throttle valve (10).

Fig. 13 shows the product reservoir (8) being removed from the frame (17).

10 Fig. 14 shows the throttle valve of the product reservoir in a position in which it is opened so much (24) as to constitute a filling gate (19) for refilling.

15 Fig. 15 shows the metering element (15) positioned in the portioning housing so as to provide for a certain movement (25) in a vertical plate to activate a mechanical or electronic weighing function.

20 Fig. 16, section B-B shows the metering element (15) arranged on weighing cells (31) which are connected to a calculating unit (28) via lines (27 and 31). The clamp (33) keeps the bag (5) or the re-use container fixed between it and the movable clamp (32), so that the deflection of the movable clamp is registered by the sensor (30) which communicates with the calculating unit (28).

25

At a given registration by the calculating unit it applies a pulse via the line (27) to a coupling (26) which connects the lever (6) with the metering element (15), which can then be rotated to the emptying position, and the calculating unit can write out a statement of weight.

30

Figs. 17 and 18 show a somewhat amended embodiment of the dosing apparatus of the invention, in which the parts having the same functions as the parts shown in the preceding figures have the same reference numerals, and only the

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parts having new functions will be mentioned in detail.

Figs. 17 and 18 show a metering element (15) which is box-shaped and provided with an inlet opening (39) defined
5 downwardly by the lower face (4) of the reservoir and the lower edge of the adjusting element (10). The product (1) thus slides down the lower face of the reservoir under the action of gravity, said face having an inclination " α " which is greater than the slide angle of the product, down
10 into the metering element (15), until said element has been filled. The capacity of the metering element (15) can be adjusted by rotation of the rear face (41) of the metering element about its upper edge (16) by adjusting the screw (42). The lower limitation of the metering element (13) is a throttle valve (34), which is connected
15 with a vertical curve guide (35) so that the valve opens when following the curve. Figs. 17 and 18 show the dosing function as exerted, after the bag (5) or a re-use container has been arranged around the outlet (40). Fig. 17 shows the metering element in the filled state. Activation
20 of the lever (6) of the metering element in an upward direction displaces the metering element vertically and moves the upper edge (16) of the rear side (41) up through the product (1), thereby separating the product (1) from the metered amount (12). The edge (16) is sharp and the
25 vertical wall of the reservoir is displaced with respect to the plate (41), so that the vertically upward movement of the metering element creates an air gap (11) between said element and the wall of the reservoir, causing the product particles that might be pushed upwards when the
30 edge (16) moves through the product, to fall freely from the edge. Fig. 18 shows the metering element in the upper position in which the emptying valve (34) is displaced via the curve guide (35), after the plate (41) has separated the product (1), and has thus opened so that the metered
35 product (12) can freely fall down into the package (5).

Figs. 19 and 20 show a version of the dosing apparatus in which the package (5) is an integral part of the metering element. The spring (46) ensures that the starting position of the metering element is in the upper position in which the box-shaped metering element side (41) constitutes the boundary for the product (1), fig. 20). The metering function is performed in that a specially sized bag having handles (5) is suspended from the hooks (30) of the metering element so that the lower part of the metering element is inside the bag. Activation of the lever (6) in a downward direction lowers the rear boundary (41) of the metering element until its upper edge (16) is at the same height as the lower edge of the reservoir (4), following which the product (1) freely flows down through the metering element (15) into the bag (5). When the bag has been filled to the lower edge of the lower boundary of the metering element and the metering element has been filled, the lever (6) is released, and the spring returns the metering element to the starting position, thereby moving the edge (16) on the plate (41) up through the product to separate the product from the metered amount (12). The bag (5) can now be unhooked and be released from the metering element, whereby the portion of the metered amount (12) present in the tubular part of the metering element drops down into the bag. To ensure that the bag is not removed while the metering element is in the lowest position to provide access to the reservoir (4), the holder (38) mounts a clamp (44) which, when the metering element is in a low position, surrounds the hooks (43), but gives access for removing/mounting the bag in the upper position.

Another embodiment of a dosing apparatus according to the invention, in which the package is an integral part of the metering element and the product is divided without shearing, is shown in figs. 21 and 22.

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The outlet opening of the reservoir is located immediately above a slidable plane, here indicated as a manually operated conveyor belt (47) which stops the outflow of the product (1) from the reservoir (4). The plane (47) is surrounded by a portioning housing (13) which ensures that the entire out-flowing product from the reservoir will land on the plane. At the end of the plane the portioning housing is constructed as a downwardly facing tube (48) which catches the product which overflows the plane (47) upon movement thereof and drops down through the tube into a special container (5) surrounding the tube. The tube (48) has a smaller volume than the surrounding special package volume so that the amount of product present in the tube (48) can be contained in the package (5) when this is removed.

The slidable plane (47) may be replaced by a vibration plane or a plane horizontally rotatable about its one edge fig. 23, which in its horizontal position prevents outflow of the product from the reservoir and allows, in its downwardly rotated position fig. 24, the product to slide from the reservoir down the inclined plate into the metering means. The lever (6) moving the plane (49) is provided with a clamp (44) which prevents removal of the package in the lower position of the plane.

EXAMPLE

A dosing apparatus like the one shown in figs. 4, 5, 8 and 9 may be adapted to portion a given amount (12) of the product (1), which may be cornflakes, from the reservoir (4) to the package (5), which may be a simple disposable bag with handles permitting it to be suspended below the outlet of the portioning housing. The width of the portioning mechanism including the reservoir may be about 300 mm, and the depth of the reservoir about 800 mm. The in-

- 13 -

side diameter of the portioning housing (13) may be about 150 mm, and the inside diameter of the metering element (15) may be about 140 mm. The lower inclined face of the reservoir (4) can join the horizontal diameter of the portioning housing at an angle α of about 30° , and the adjustable element (10) may be adjusted so as to provide an opening of about 50 mm through which the product (1) can slide by its own force. Downward rotation of the lever (6) through about 120° separates the metered amount (12) from the product (1), and the metered amount drops down into the package (5) in which the metered amount will fill about 3 liters and weigh about 500 gr. The dosing apparatus is secured rotatably to the frame (17) in the axis (20) of the metering element at a height above the floor that may be about 1100 mm, and so that the distance from the center of rotation to the top of the reservoir is about 1050 mm, such that the dosing apparatus including the reservoir can be rotated 180° , thereby enabling the reservoir to be filled with about 35 kg of cornflakes through a gate (19).

It is clear that the embodiments shown in the drawing may be modified in different ways within the scope of the invention. For example, the cross-section formed by the defining edge (16) of the metering element and the access area to the metering element may have a different shape, and the edge (16) may be ring-shaped so that the metering element is a tubular element separating the metered amount from the product by moving up through a product amount.

It is also possible to provide the various embodiments with expedient automatic devices which automatize the manual operation.

It is moreover possible to provide the metering element (13) with lip seals which ensure air-tight storage of the

product (1) in the reservoir.

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- 15 -

P a t e n t C l a i m s :

1. A method of distributing a bulk product in a distribution chain comprising a manufacturer and a consumer and at least one intermediate distribution link between the manufacturer and the consumer, wherein the product is divided into subamounts in at least one distribution link, characterized in that in connection with the division into subamounts the product is packaged to exclusively cover the package requirement until a subsequent division into subamounts.
2. A method according to claim 1, characterized in that a buyer of a subamount himself meters the subamount.
3. A method according to claim 2, characterized in that the buyer packages the subamount.
4. A method according to claim 3, characterized in that the buyer is offered an option between at least two types of packages.
5. Use of the method according to claims 1-4 for the distribution of food products.
6. Use of the method according to claim 5 for the distribution of a breakfast product of the cornflakes type and the like.
7. Use of the method according to claim 6 for the metering of a meal portion which is dispensed directly to a plate or the like.

8. A dosing apparatus for performing the method according to claims 1-4, said apparatus comprising a reservoir for a bulk product as well as dosing means adapted to dose the bulk product, c h a r a c t e r i z e d in that the dosing means are adapted to meter and dose a predetermined amount of the bulk product and to convey the dosed amount directly to a selected package.

9. A dosing apparatus according to claim 8, wherein the dosing means are arranged at the bottom of the reservoir, and the downwardly defining faces of the reservoir form an angle with the horizontal which is at least the product slide angle on the faces so that the product is conveyed to the dosing means by the action of gravity, c h a r a c t e r i z e d in that the dosing means comprise a downstream element having an upper edge which has a lowered, open position in which the product can flow across the upper edge of the element, and a raised, closed position in which the element prevents the product from flowing.

10. A dosing apparatus according to claim 9, c h a r a c t e r i z e d in that the dosing means comprise an upstream element having an upper edge which has a lowered, open position in which the product can flow across the upper edge of the downstream element, and a raised, closed position in which the upstream element prevents the product from flowing.

11. A dosing apparatus according to claim 10, c h a r a c t e r i z e d in that the upper edges of the downstream and upstream elements move up through the product when moving from the open position to the closed position, so that product particles which get into contact with one of the upper edges drop down on one or the other side of the element concerned.

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12. A dosing apparatus according to claim 11, c h a -
r a c t e r i z e d in that the upper edges of the down-
stream and upstream elements are spaced from others of the
parts of the dosing means by a distance at least corres-
5 ponding to the greatest particle size of the bulk product
during the entire movement from the open position to the
closed position.

13. A dosing apparatus according to claims 10-12, c h a -
10 r a c t e r i z e d in that the movements of the down-
stream and upstream elements are mutually controlled so as
to be oppositely directed.

14. A dosing apparatus according to claim 13, c h a -
15 r a c t e r i z e d in that the downstream and upstream
elements are interconnected and form a trough that can be
tilted about an axis located between the elements.

15. A dosing apparatus according to claims 8-14, c h a -
20 r a c t e r i z e d in that it has means for detecting
the presence of a package for filling with the product,
and that the dosing means are adapted to dose the product
only when a package is present.

25 16. Use of a dosing apparatus according to claims 8-15 for
the dosing of food products.

17. Use according to claim 16 for the dosing of a directly
edible breakfast product of the cornflakes type and the
30 like.

18. Use according to claims 16-17 for the dosing of a meal
portion directly on a plate or the like.

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Fig. 1A

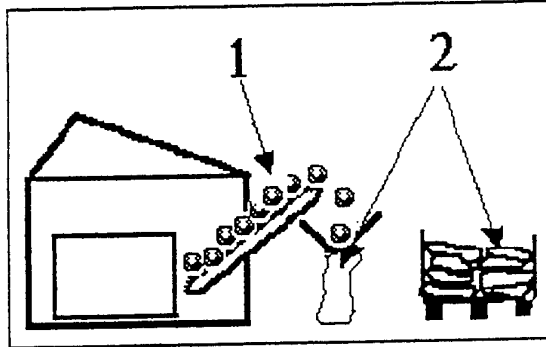


Fig. 1B

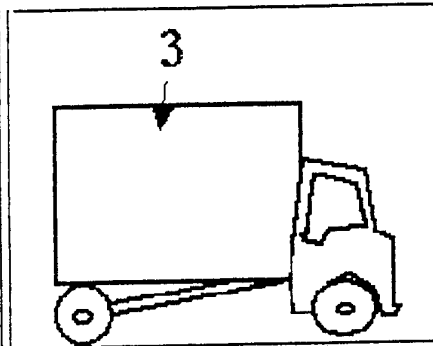


Fig. 1C

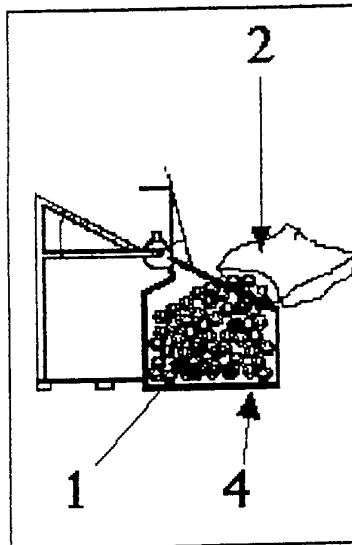


Fig. 1D

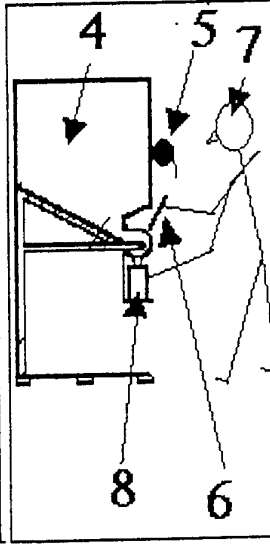


Fig. 1E

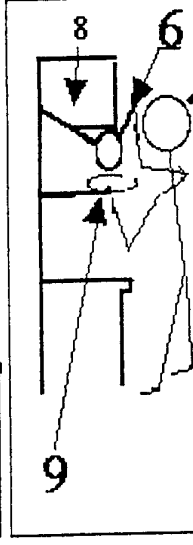


Fig. 1F

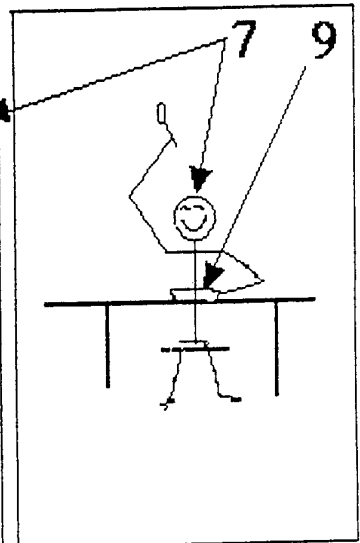


Fig.2

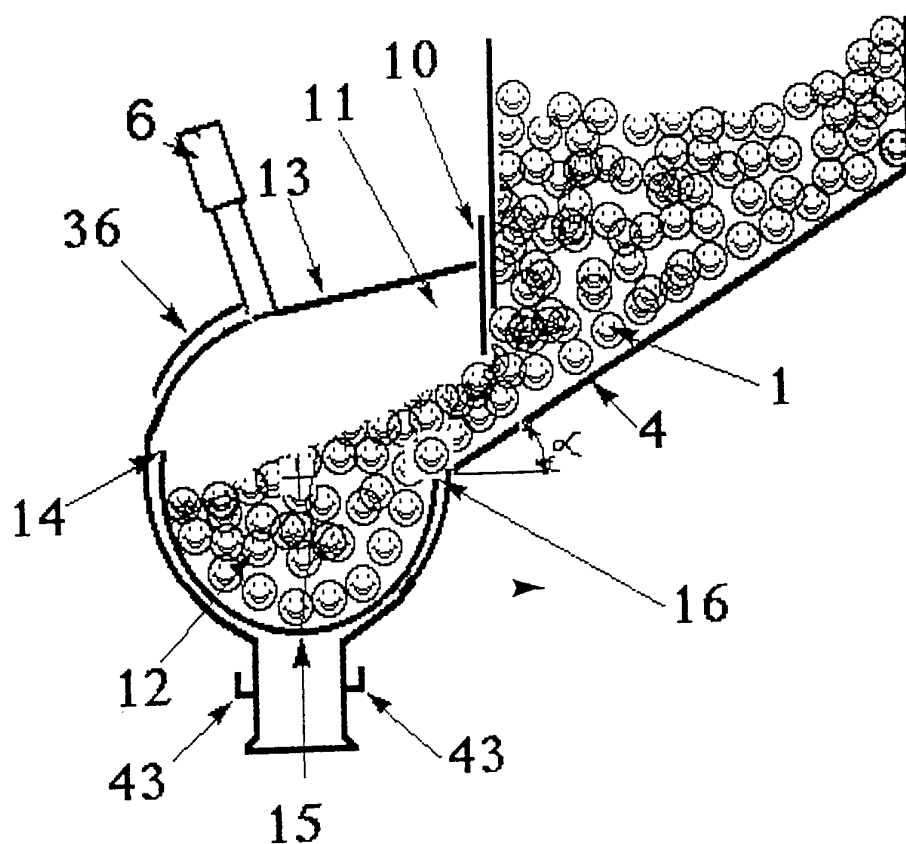
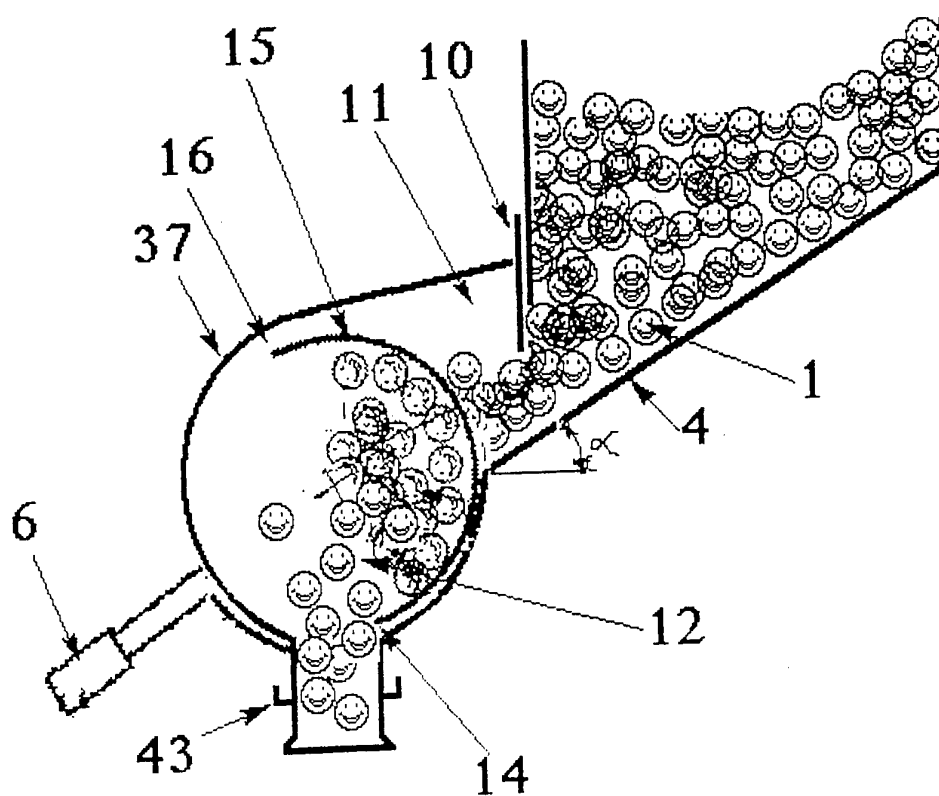


Fig. 3



REPLACEMENT SHEET

fig. 4

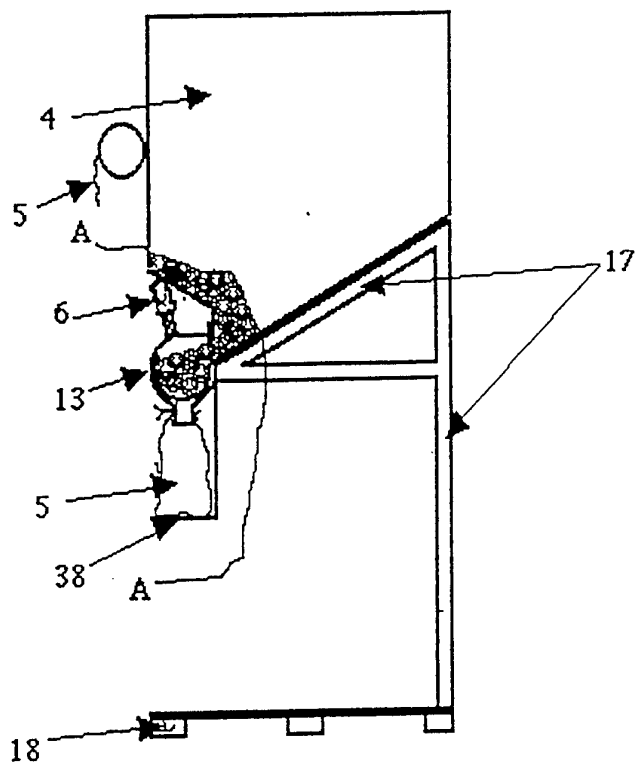


Fig. 5

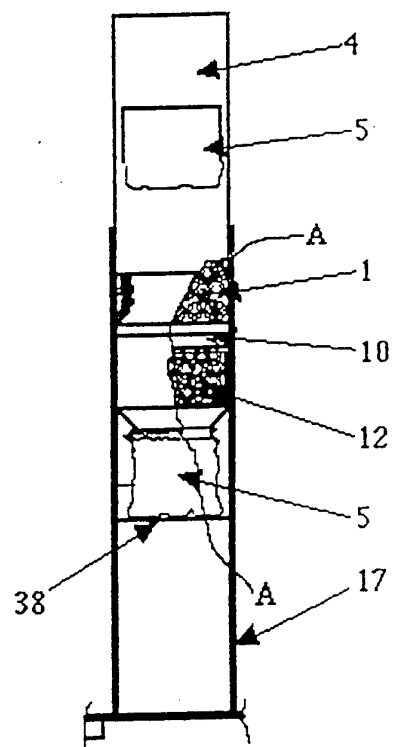


Fig. 6

SECTION A-A / Filling

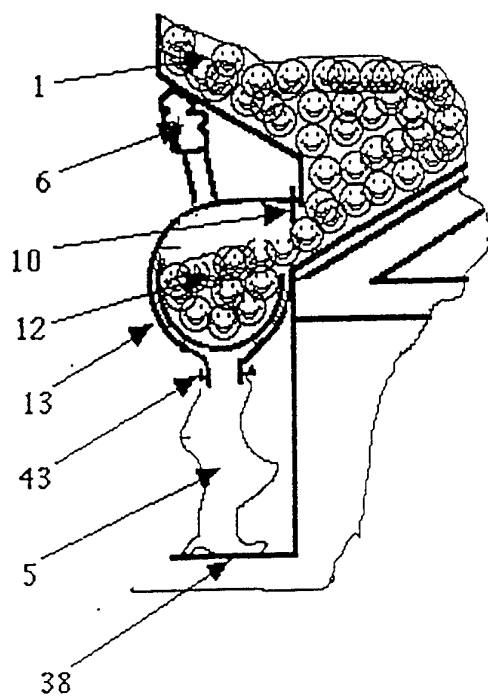


Fig. 7

SECTION A-A / Emptying

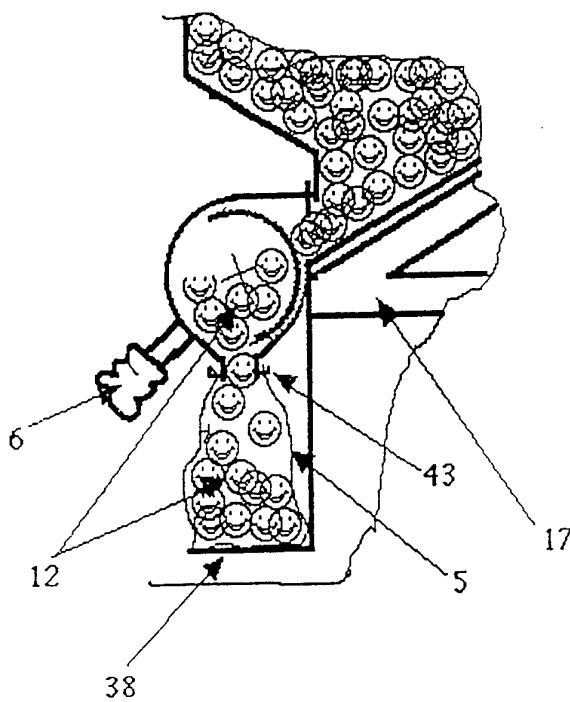


Fig. 8

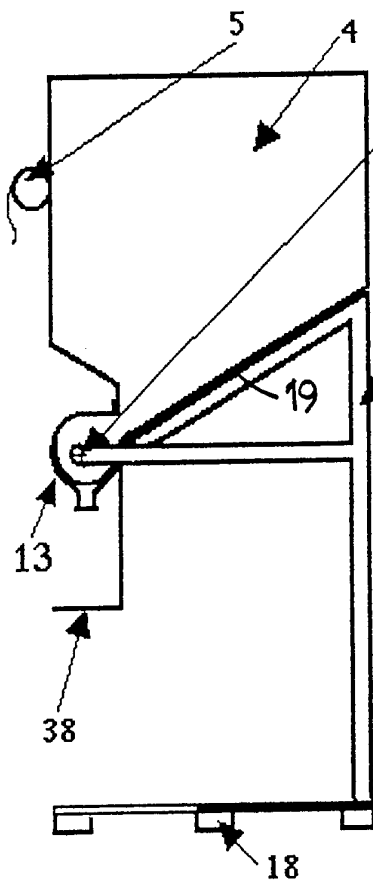


Fig. 9

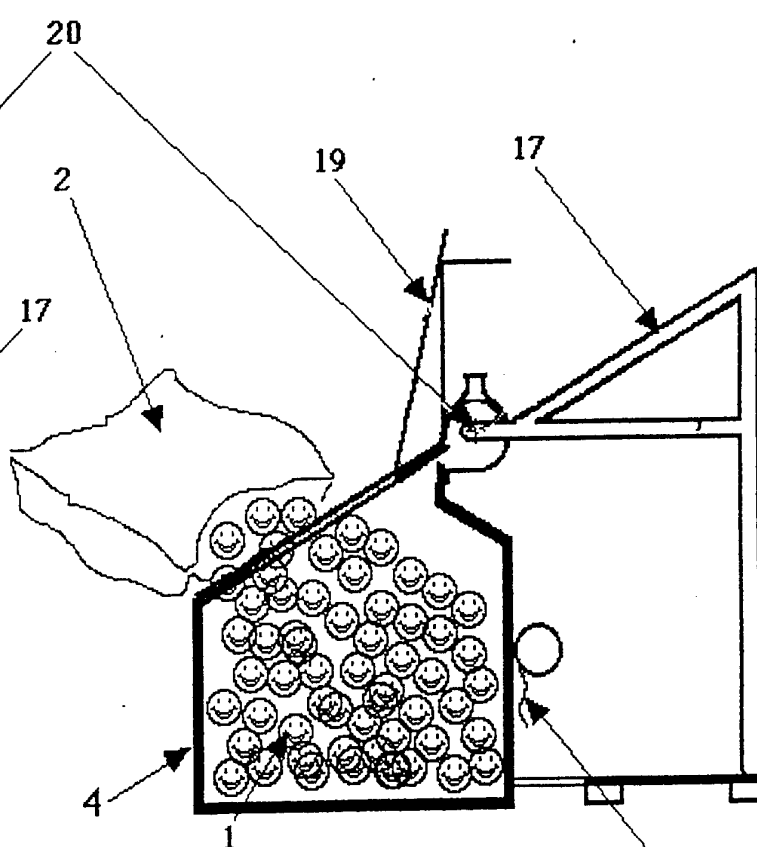
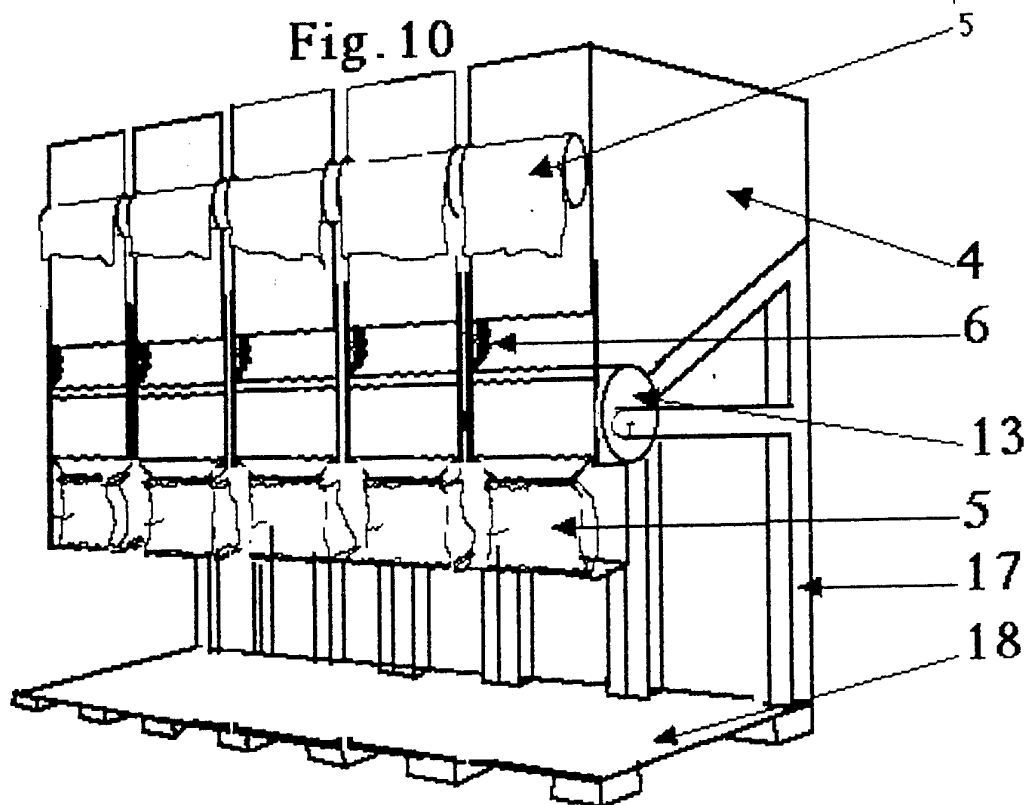


Fig. 10



REPLACEMENT SHEET

Fig. 11

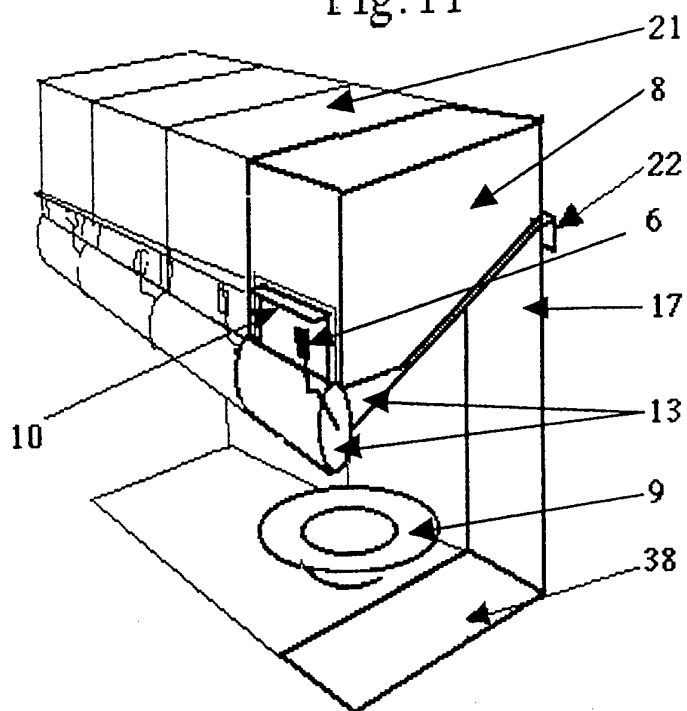


Fig. 12

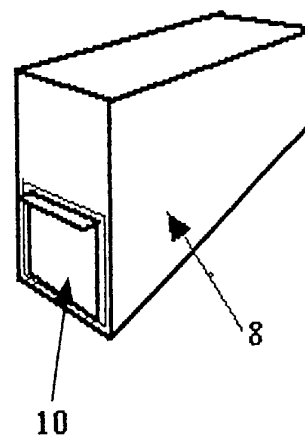


Fig. 13

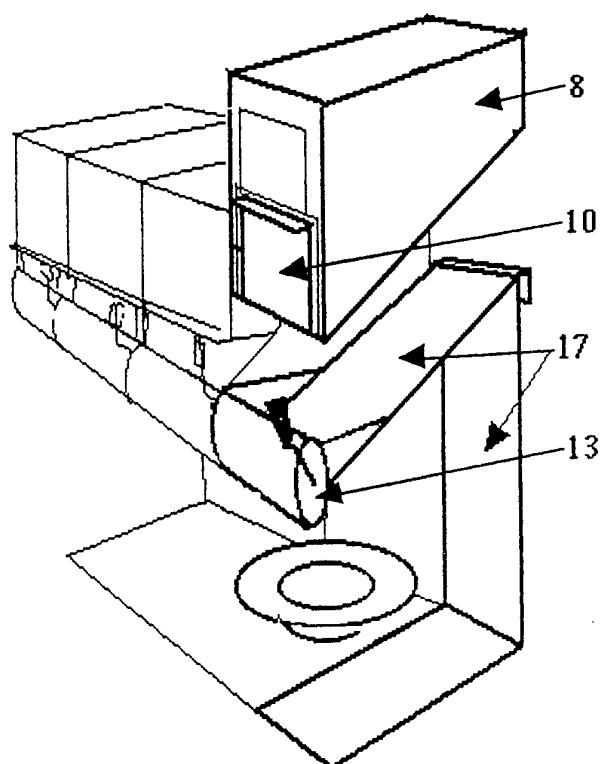


Fig. 14

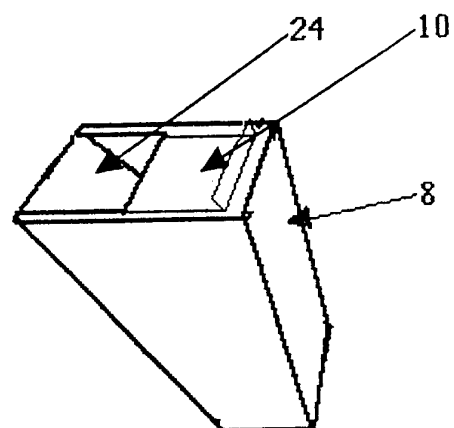


Fig. 15

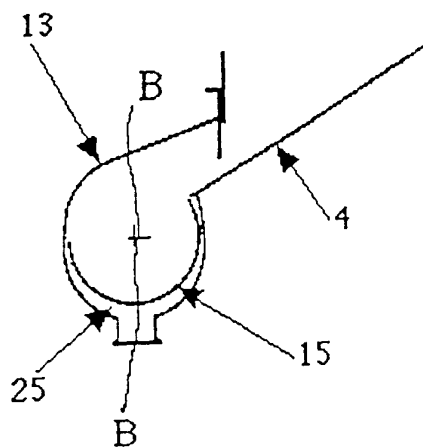


Fig. 16

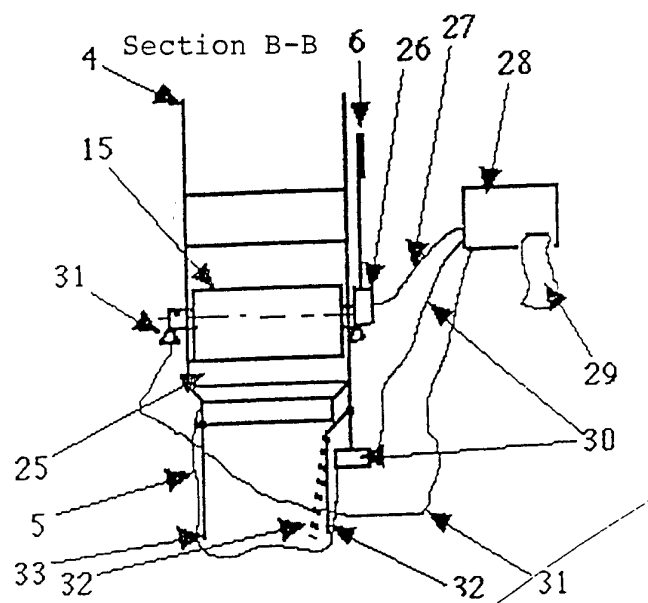


Fig. 17

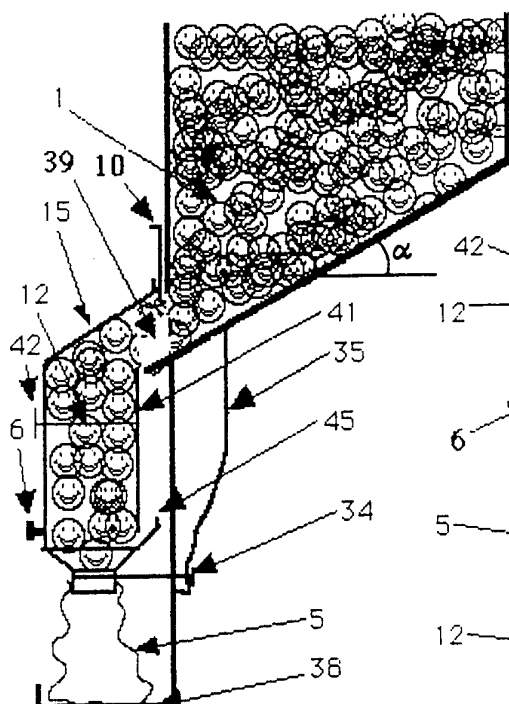


Fig. 18

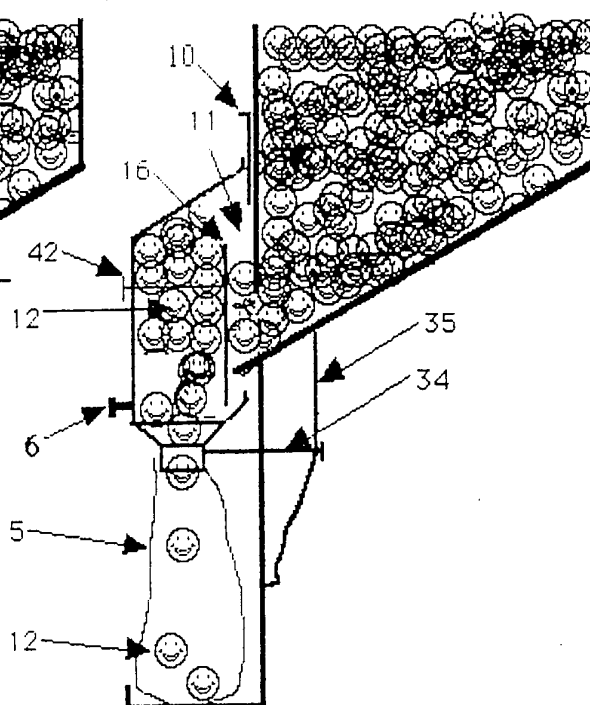


Fig. 19

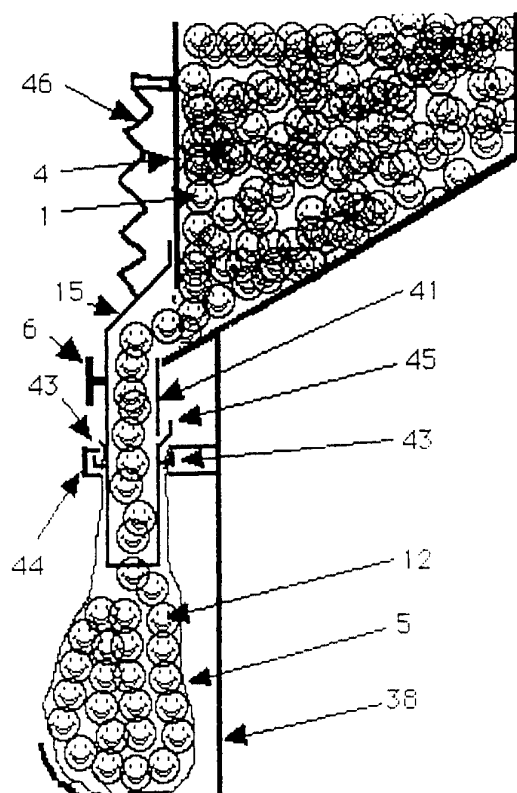


Fig. 20

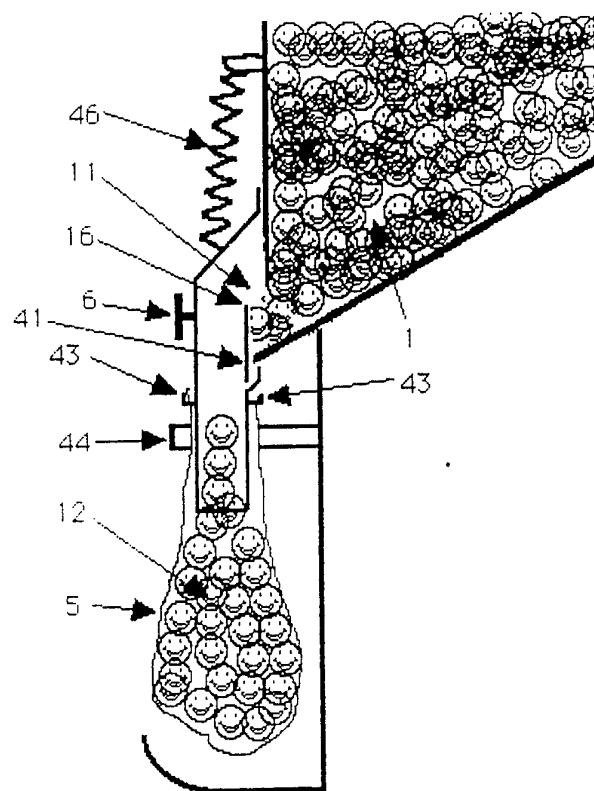


Fig. 21

Section F-F

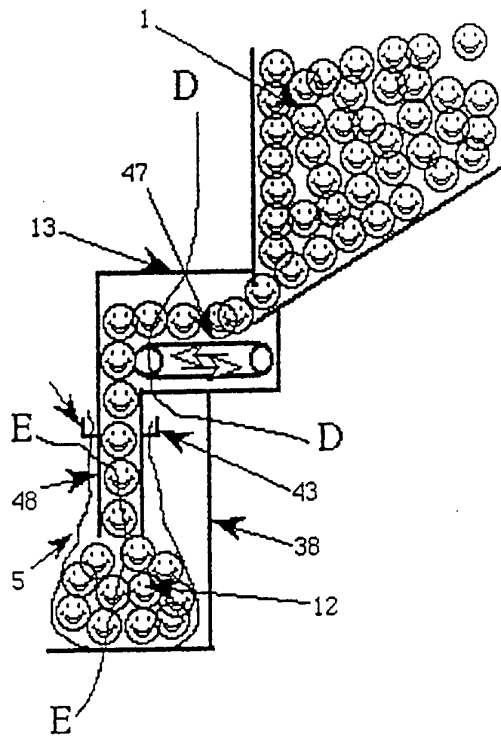


Fig. 22

Section D-D and E-E

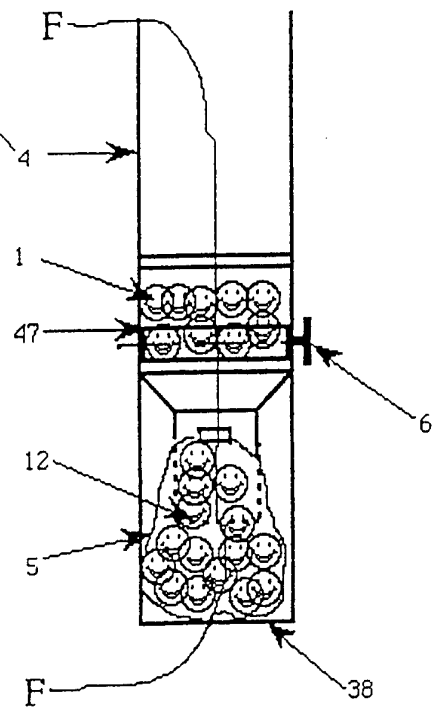


Fig. 23

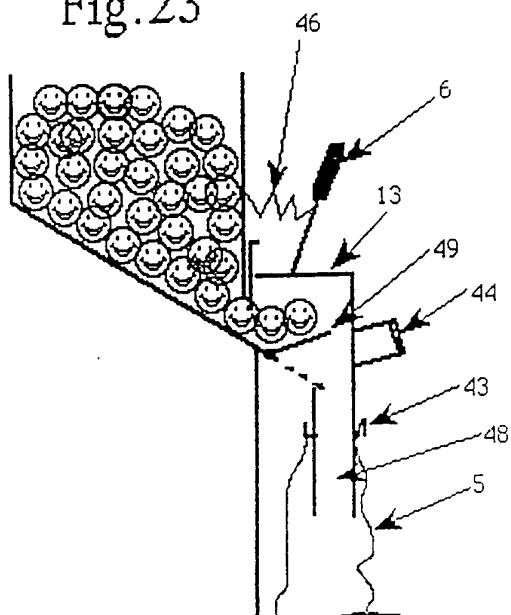
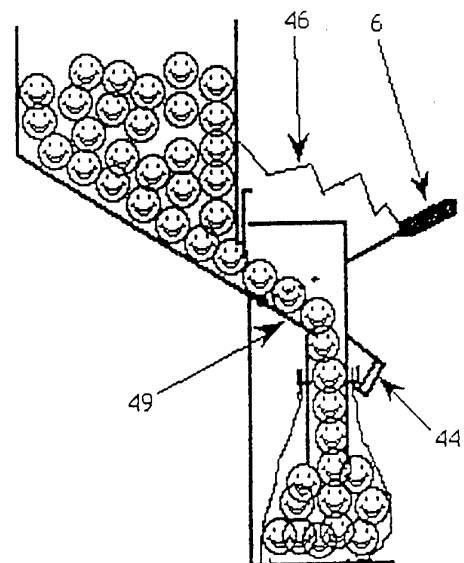


Fig. 24



INTERNATIONAL SEARCH REPORT

International application No.

PCT/DK 93/00419

A. CLASSIFICATION OF SUBJECT MATTER

IPC5: B65B 1/06, A47F 1/035, G01F 11/12

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC5: A47F, B65B, B65D, G01F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

DIALOUT, WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP, A1, 0497737 (MULTIFORSA AG), 5 August 1992 (05.08.92)	1-6,8,16,17
Y	--	7,9,10,18
Y	US, A, 4491249 (HARMATZY-SIMON ET AL.), 1 January 1985 (01.01.85)	7,18
Y	EP, A1, 0197342 (ING. ERICH PFEIFFER GMBH & CO. KG), 15 October 1986 (15.10.86)	9,10
A	GB, A, 2072143 (SCOTTISH AGRICULTURAL INDUSTRIES LIMITED), 30 Sept 1981 (30.09.81)	1,8

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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Date of the actual completion of the international search

9 March 1994

Date of mailing of the international search report

24-03-1994

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/DK 93/00419

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US, A, 1723211 (JOHN SCHMIDT), 6 August 1929 (06.08.29) --	9-14
A	WO, A1, 8807483 (BRAMLAGE GESELLSCHAFT MIT BESCHRÄNKTER HAFTUNG), 6 October 1988 (06.10.88) -- -----	9-13

INTERNATIONAL SEARCH REPORT

Information on patent family members

28/01/94

International application No.

PCT/DK 93/00419

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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US-A- 4491249	01/01/85	DE-A- 3120879 EP-A,B- 0066132	05/01/83 08/12/82
EP-A1- 0197342	15/10/86	DE-A- 3511507	09/10/86
GB-A- 2072143	30/09/81	NONE	
US-A- 1723211	06/08/29	NONE	
WO-A1- 8807483	06/10/88	DE-U- 8704248 EP-A,B- 0357615 SE-T3- 0357615	21/07/88 14/03/90