

The Patents Act 1990PATENT REQUEST: CONVENTION PATENT

We, JAIME MARTI SALA being the person identified below as the Applicant, request the grant of a patent to the person identified below as the Nominated Person, for an invention described in the accompanying standard complete specification

Full application details follow:-

Applicant: JAIME MARTI SALA
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Nominated Person: Jaime Marti Sala
Address: C/- Emancipacion, 8
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Invention Title: Machine for Automatically positioning and aligning
containers.
Name(s) of actual Inventor(s): Jaime Marti Sala
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Convention Details

<u>Application Number</u>	<u>Country</u>	<u>Country Code</u>	<u>Date of Application</u>
9201508	Spain	ES	7 July 1992
9202274	Spain	ES	11 November 1992
9300301	Spain	ES	16 February 1993

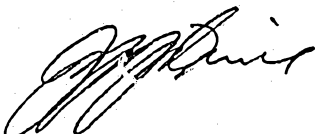
Drawing number recommended to accompany the abstract - Fig. 1

D A T E D this 7th day of JULY, 1993.

JAIME MARTI SALA

By his Patent Attorneys:

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This is a Multiple Use Form Covering:
Convention
Non-Convention
PCT National Phase

NOTICE OF ENTITLEMENT

Insert name of
applicant

I, JAIME MARTI SALA,

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being the applicant in respect of the Australian Patent Application
entitled "MACHINE FOR AUTOMATICALLY POSITIONING AND
ALIGNING CONTAINERS" state the following:-

Complete only for
non-PCT applications

The person(s) nominated for the grant of the patent:

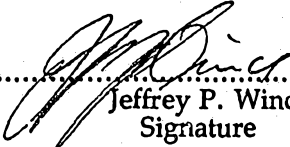
- (i) is/are the actual inventor(s); and
- ~~(i) has entitlement from the actual inventor(s) by virtue of~~
- (ii) is/are the applicant(s) of the basic application(s)
- ~~(ii) has entitlement from the applicant(s) of the basic application(s)
listed on the patent request form by virtue of~~

Complete for all
Convention cases

The basic application(s) listed:

- (i) on the request form
- ~~(i) in the declaration made under Article 8 of the PCT~~

are the first application(s) made in a Convention country in
respect of the invention.


.....
Jeffrey P. Winch
Signature

7 July 1993
.....
Date

Position held if
Corporate applicant *PATENT ATTORNEY*
.....



AU9341779

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MACHINE FOR AUTOMATICALLY POSITIONING AND ALIGNING CONTAINERS
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- (56) Prior Art Documents
AU 615778 39590/89 B65G 29/00
- (57) Claim

1. Machine for automatically positioning and aligning containers, such as plastic bottles, comprising:

a main hopper for receiving a plurality of randomly positioned containers and having a central part;
a side wall on said main hopper;
a bottom in said main hopper having a peripheral portion spaced from said side wall to provide a space through which containers on said bottom can pass;
container holder support means having a peripheral portion and supported below said hopper for movement of said peripheral portion thereof in a path adjacent said peripheral portion of said bottom;
means for driving said container holder support means in said path;
container holder means mounted on said container holder support means for movement therewith and having recesses therein for receiving and holding containers in a lying position from said peripheral portion of said bottom;
discharge opening in said container holder means for allowing containers to pass therethrough;

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-2-

(10) 658755

container support shelf means extending below said container holder means for supporting containers in a lying position in said recesses during movement of said container holder means;

a discharge section in said support shelf means for discontinuing support of containers at a predetermined location so that containers in said container holder means pass through said discharge openings at said discharge section;

tilting means on said container holder means engaging a part of each container for tilting each container into a predetermined position as each container passes through said discharge openings at said discharge section;

chute means mounted below and movable with said container holder means for receiving, orientating and guiding containers passing through said discharge openings into a predetermined position, each chute means having a lower exit portion, characterized in that:

said container holder means comprise a plurality of exchangeable hollow frame-shaped container holders each having inner dimensions forming one of said recesses so that each recess contains most of a container body therein;

each container holder includes a charging opening for passage of a container therethrough into said recess; and

an inclined plane means directed towards said central part of said main hopper is disposed between said bottom of said main hopper and said charging openings of said container holders.

658755

AUSTRALIA

PATENTS ACT 1990

COMPLETE SPECIFICATION

FOR A STANDARD PATENT

ORIGINAL

TO BE COMPLETED BY APPLICANT

Name of Applicant: JAIME MARTI SALA

Actual Inventor(s): JAIME MART SALA

Address for Service: CALLINAN LAWRIE, 278 High Street, Kew, 3101, Victoria, Australia

Invention Title: "MACHINE FOR AUTOMATICALLY POSITIONING AND ALIGNING CONTAINERS"

The following statement is a full description of this invention, including the best method of performing it known to me:-

1a

This invention relates to a machine intended for automatically positioning and continuously feeding containers, for example bottles or other hollow articles made from synthetic material, which may be of very different sizes and shapes. This machine is designed for continuous feeding of other machines such as high production filling machines or similar equipment and is able to carry out this function owing to the large number of containers which it can position correctly and feed per unit of time.

Known machines of the type to which the present invention relates include in general:

a) a hopper of any shape or dimension provided with an opening to receive in bulk containers that fall onto a bottom plane whose edges are at a distance from the side wall of the hopper providing a peripheral space allowing the passage of the containers;

b) a structure provided with displacement means in enclosed circuit, located below the bottom plane, including, fully or in part:

- a plurality of detachable container holding elements removable mounted at the periphery of the structure defining a series of recesses adapted to receive containers in a lying position and provided with retaining means for one part of the containers, namely their neck, in such a way as to release them in a predetermined position, usually with the neck upward;

- a plurality of discharge chutes provided under the recesses for receiving and

1b

transferring the containers, correctly oriented, towards an exit conveyor that feed, for example, a bottling line;

c) a plane or shelf, which may be adjustable in height, located below the recesses and over the discharge chutes, designed to support the containers when they are

5 conveyed by the



1 holding elements defining the recesses for receiving and
2 retaining them in a lying position, the plane or shelf
3 being provided with an opening in an unloading area through
4 which the containers drop when moved into position
5 thereover by the container holding elements.

6 Machines known to the applicant are the following
7 grouped by the function they perform:

8 a) Aidlin machine (U.S. Patent N° 3, 295, 659) relates to
9 a machine comprising a hopper into which the containers or
10 bottles which are to be sorted are randomly loaded, having
11 an inclined axis, an inclined disc constituting the bottom
12 of the hopper and adapted to rotate about the inclined
13 axis, a plurality of openings at the periphery of the disc
14 each adapted to receive and pass one container while
15 retaining the neck which is supported on the disc for
16 transporting them from a receiving zone to an unloading
17 zone, associated with a fixed plate beneath and parallel to
18 the rotatable disc providing a support for the container
19 bodies during their rotation and having a release opening
20 in an upper part of the plate aligned with the path of
21 movement of the containers as the disc rotates, so that the
22 containers fall, by gravity, one by one in an upright
23 position into a fixed chute or guideway located below the
24 opening;

25 AU 499,038 (HOEHN) which discloses the basic technical
26 rule which allows to carry out the function of aligning the
27 containers, previously oriented in upright position in the
28 same machine, according to a principle similar to the one
29 disclosed in above patent US 3,295,659, from a plurality of
30 falling chutes into which the containers fall, in an
31 upright position, arranged under each of the openings,
32 which are made from annular and radial elements located on
33 the periphery of a rotatory disc, rotating at same speed as
34 this later and associated to a fixed support and to a
35 recovery conveyor.

36 The bottom of the said machines and/or the said
37 rotatable disc or plane bearing the openings, is, in
38 general, inclined, though it can be constituted in a shape

1 of a cone or frustum having a vertical axis, as this
2 solution can be found in the state-of-the-art, and it
3 appears disclosed, for example, in patent DE 277347 (Polte)
4 and patent US 1,823,995 (Streby), which refers to machines
5 of the same type as the above stated, in whose case the
6 inclined plane of the rotatory element will move by its
7 slope upward the periphery the containers defining a
8 guiding duct which promotes the passage of the containers
9 toward the openings associated to the falling chutes. The
10 said bottom plane, according to above backgrounds, are
11 provided with a rotation movement in same or opposite sense
12 to the one of the openings for collecting and conveying the
13 containers.

14 On the other hand, the problem for adapting a machine
15 of this type to different container shapes and sizes
16 (length and cross section or thickness) was overcome in
17 several ways. We are stating below the most relevant
18 patents referring to this aspect:

19 GB 1,558,379 (Hoehn) which refers to a machine as the
20 disclosed in patent AU 499,038, of same applicant, in which
21 means have being devised to adjust the gap between the
22 internal and the external walls and/or between the end
23 walls of each opening to collect, housed, the containers,
24 to accommodate the space of the said openings to the
25 container size and shape, the said means comprising plates
26 with slides which provide a displacement allowing to adapt
27 the passageway of the opening, and which are locked to
28 bolts by nuts;

29 DE 26 51 495 (Rationator) which refers to a machine as
30 the one disclosed in patent AU 499,038, wherein the
31 openings are pierced on the edge of the disc, open at the
32 exterior, whose edge is formed by a series of continuous,
33 annular, peripheral, exchangeable segments fixed to the
34 periphery of the rotatable disc;

35 US. 4,681,209 (MARTI) which refers to a machine as the
36 one disclosed in patent AU 499,038, wherein the openings
37 are formed by radial, peripheral, detachable and
38 exchangeable parts, which define, two by two, the areas to

1 house the containers delimited between their sides, the
2 edge of a rotatable disc and the hopper wall.

3 However, none of above solutions is completely
4 satisfactory as much for the adaptability of the machine to
5 several sizes and/or formats of the containers, as for the
6 conditions in which the said containers are conveyed,
7 following drawbacks having to be pointed out:

8 - the solution disclosed in patents AU 499,038 and GB
9 1,558, 379 requires individual parts associated to each
10 opening being adjusted, which means a delicate adjustment
11 which must be carried out by skilled personnel; there
12 exists the risk that some mismatching or position-related
13 impairment of some of the parts occur due to impacts caused
14 by clogging of the containers during their movement;
15 summarizing, this solution requests handling a great number
16 of complex components with subsequent labour cost;

17 - the solution of patent DE 26 51 495, which requires
18 some continuous annular segments are changed, means
19 following drawbacks:

20 - the use of mechanized parts of a certain length and,
21 therefore, of a limited modularity, different for each
22 format of container;

23 - locking with screws the segments to the periphery of
24 the disc, which requests a delicate and time spending
25 handling at the installation point, and which, in general,
26 demands an access structure is provided at the top, within
27 the machine, and/or the use of lifting means for evacuating
28 the segments;

29 - frictions with the periphery of the receptacle, as
30 the openings are outwardly open, which can provoke damages
31 on the containers (namely, bearing in mind the thin
32 thickness of the wall, in a number of cases) as well as its
33 braking during their access to the openings and on the area
34 of fall downward the evacuation ducts;

35 - the solution of US. 4,681,209 patent has a risk
36 similar to the mentioned for the case of above Australian
37 and British patents, (HOEHN) that mismatching or
38 impairments of the position devised for the unit radial

parts, by accidental causes, and as the opening are outwardly open damages can likewise be produced to the containers, as well as problems of braking at the step of access of the containers within the opening and the unloading area.

Of course, a machine as the one disclosed in patent US 3, 295, 659 would request, for its adaptation to different formats of the containers, changing the whole disc provided with openings with the subsequent costs and labour for its execution.

It must be pointed out, in addition, that the conditions of container conveyance according to the principle of taking them housed in openings pierced in a rotatory element such as a disc, requires, for a drive stability, a significant thickness in the disc which allows to encompass, at least, a significant part of the thicker part of the containers as it is disclosed in the above patent US 3, 295, 659, with subsequent production costs, weight, power consumption and, in general, always a part of the container remains on the top and another under the drive element formed by the said openings with which it sustains a resistance to the forward move because of the atmosphere within the machine which can affect the positioning stability of slight containers such as plastic bottles treated in these machines, namely, at high speeds of the said drive element.

An object of this invention is to produce a machine of the above disclosed type with adaptation to several formats of the containers to be treated which overcomes or alleviates the above mentioned drawbacks, due to the use of:- a single rotatable annular element or disc which can be provided with openings

having fixed sizes in an area which corresponds to the peripheral portion of the container bottom;

- a plurality of hollow pieces as a container holder, frame-shaped significantly rectangular, detachable and exchangeable, through which containers can pass, which are engaged socketed in each of the openings of the rotatory annular disc or element, and within whose parts of the containers are virtually fully housed, these hollow parts having internal sizes compatible with the ones of the type of containers to uprightly position and external sizes compatible with those of the openings of the rotatory plane, which are fixed, whichever is the type of container, for a given machine;

Above hollow parts can be obtained through moulding in plastics material or metal.

In accordance with the present invention, therefore, there is provided machine for automatically positioning and aligning containers, such as plastic bottles, comprising: a main hopper for receiving a plurality of randomly positioned containers and having a central part; a side wall on said main hopper;

a bottom in said main hopper having a peripheral portion spaced from said side wall to provide a space through which containers on said bottom can pass; container holder support means having a peripheral portion and supported below said hopper for movement of said peripheral portion of said bottom; means for driving said container holder support means in said path; container holder means mounted on said container holder support means for movement therewith and

having recesses therein for receiving and holding containers in a lying position from said peripheral portion of said bottom;

discharge opening in said container holder means for allowing containers to pass therethrough; container support shelf means extending below said container holder

5 means for supporting containers in a lying position in said recesses during movement of said container holder means; a discharge section in said support shelf

means for discontinuing support of containers at a predetermined location so that containers in said container holder means pass through said discharge openings

at said discharge section; tilting means on said container holder means engaging
10 a part of each container for tilting each container into a predetermined position as

each container passes through said discharge openings at said discharge section;

chute means mounted below and movable with said container holder means for receiving, orientating and guiding containers passing through said discharge

openings in to a predetermined position, each chute means having a lower exit
15 portion, characterized in that: said container holder means comprise a plurality of

exchangeable hollow frame-shaped container holders each having inner dimensions forming one of said recesses so that each recess contains most of a container body

therein; each container holder includes a charging opening for passage of a container therethrough into said recess; and an inclined plane means directed

20 towards said central part of said main hopper is disposed between said bottom of said main hopper and said charging openings of said container holders.

movement therewith and having recesses therein for receiving and holding

containers in a lying position from said peripheral portion of said bottom;
 discharge opening in said container holder means for allowing containers to pass
 therethrough; container support shelf means extending below said container holder
 means for supporting containers in a lying position in said recesses during
 5 movement of said container holder means; a discharge section

In order that the invention may be more clearly understood and put into practical
 effect there shall now be described in detail preferred constructions of a machine
 for accordance with the invention. The description is given by way of non-
 10 limitature example only and is with reference to the accompany drawings, wherein:

Fig. 1 is a perspective view of a container holder support means in the
 form of a disc provided with peripheral openings aimed to receive socketed at least
 a part of the body of a single body hollow piece with a flange projecting
 upwarding illustrated before its positioning attached to the disc;

Fig. 2 is a view similar to that of Fig. 1 but showing a single body
 15 hollow piece without an inclined projecting flap;

Fig. 3 is a partial view similar to that of Fig. 1 and 2 with a disc
 provided with apertures open at the exterior along its edge;

Fig. 4 is a cross-sectional view of a longitudinal part development of the
 periphery of the disc showing the means holding the hollow pieces removably
 20 fitted to said disc's apertures;

Fig. 5 is a perspective view on an enlarged scale of a single hollow piece
 like the one in Fig. 2

Fig. 6 is a top plan view of an alternative embodiment of the single hollow piece with another attachment means to a disc like the one represented in Fig. 3;

5

Fig. 7 is a vertical central cross-sectional view of part of a machine according with the invention;

Fig. 8 is a view similar to that of Fig. 7 showing an alternative embodiment of the invention;

Fig. 9 is a cross-sectional view showing in an enlarged scale part of the machine with a means cooperating in the positioning of the containers into the single hollow pieces'

Fig. 10 is a top plan view showing a preferred structure of a container holder support means;

Fig. 11 is a perspective view of a machine according with the invention provided with radial rotary arms over the bottom of the hopper;

Fig. 12 is a vertical central cross-sectional view of part of the machine of Fig. 11;

Fig. 13 is a perspective view showing an alternative embodiment of the cited single hollow pieces and related falling chutes;

20

Fig. 14 is a part perspective view of another embodiment of the invention where the single body hollow pieces are attached to the edge of a rotatable disc; and

Fig. 15 is a cross-sectional view taken from lines XV-XV of Fig. 14

As can be seen in Fig. 11 the machine of this invention comprises a basic structure like the one in prior cited US 4, 681, 209 patent including a hopper 48 provided with an opening for loading in bulk containers 4 that fall onto a bottom member having edges spaced from the hopper outer wall to provide a peripheral space through which the containers can pass.

The invention is mainly based in an exchangeable frame shaped container holder, constructed by a hollow piece 1, forming recesses aimed to receiving and holding the containers 4 in a lying position from said peripheral space of said bottom, said single hollow pieces having an inner dimension matching the one of said containers 4 so that they can house most of the container body and external dimensions allowing that at least one part of its body fits in corresponding apertures 3 of a rotatable disc 2 (Figs. 1 to 4 and 7-13) placed under said hopper's bottom or in the peripheral portion of the hopper's bottom (Fig. 14). The containers 4 rest on a container support shelf 28 until reaching a discharge section (see Fig 4) according to the described technical rule for upright positioning.

As can be seen in Figs. 1 to 10 and 13, each single hollow piece 1 comprises:

- in its upper part a charging opening 1a for allowing the containers to pass therethrough and two external overhanging flanges 5 aimed to seat on the rotatable plane 2;

- in its lower part, a discharging opening 1b limited by two opposite complanar flanges 7, aimed to sustain the neck 4a of the containers 4, and

positioned beneath the rotatable disc 2 so that the center of gravity of said containers lies under the lower surface of said disc 2.

In the embodiment shown in Figs. 5 and 6, the charging opening of hollow piece 1 are limited by a further flange parallel to said coplanar flanges 7 opposing the bottom of the containers during the displacement avoiding their positioning over flange 7.

The hollow piece in fig. 6 has its discharge opening 1b limited at one of its ends by a rod 16 opposite to overhanging flange 7. This rod is aimed to enter the month of wide-mouthed containers such as cans, to support them and allowing upright positioning according to well known techniques described incited prior patents. The hollow pieces 1 also bear at their rear side a protruding rod 17 with a pointed end and an annular groove 17a near this end aimed to be incorporated socketed into a receptacle member comprising an aperture 18 and an elastic retaining ring 19.

As can be seen in Fig. 4, each of the single pieces 1 are removably held socketed within the apertures 2 of the rotatable disc 2, thanks to elastic catch fingers 8 fixed to said rotatable disc 2 by screws 10, and with its ends engageable in retaining grooves 9 on the outer side walls of hollow pieces 1.

In the embodiment illustrated in Figs 7 and 8 the bottom of the hopper is constituted by another rotatable disc revolving in an opposite direction as the disc 2, so as to return containers incorrectly positioned towards the periphery in the direction of a charging area. The disc 2 is advantageously provided with radial

members, such as roughness strips 13, in order to better draw the containers without damaging them.

An inclined plane directed towards the central part of the hopper joins the bottom's edge and the inner edge of the charge opening 1a of the single body hollow pieces 1.

Said inclined plane is constituted by a projecting flange 11, which extends upwardly from the inner edge of the charging opening 1a of the hollow piece 1.

As can be seen in Fig. 8, said inclined plane can alternatively be constituted by a frusto-conical wall 20 integral with the rotatable disc 2, whose lower edge lies adjacent to the inner border of the charge opening 1a of each of the hollow pieces 1.

In both cases (Figs. 7 or 8), said inclined plane converges with another upper plane pertaining to a wall 15 superimposed and fixed to the inner hopper wall 14 providing a channel which assists in the entrance of the containers 4 towards the recesses of said hollow pieces 1.

Fig. 9 shows an elongated pad profile 21 fixed to the inner hopper wall 14 covering the space between the outer edge of the charge opening 1a of each hollow piece 1 and said inner hopper wall 14 and extending over the outer peripheral portion of said single body hollow pieces 1, cooperating in the positioning of the containers 4 into the recesses of said hollow pieces 1.

Fig. 10 illustrates a preferred structure for the rotatable plane 2,

comprising a plurality of radial rods 22 connected to a central ring 23, and to an intermediate ring 24 and a peripheral crown constituted by two spaced rings 25 and 26 associated by partition walls 27 forming apertures 3 to receive socketed the hollow pieces 1.

5 In the machine illustrated in Fig. 11 the hopper's bottom member is constituted by an inclined fixed disc 29 attached through support 30 to the hopper inner wall. Over said disc 29 a device for removing the accumulated containers and/or for moving the incorrectly positioned containers towards a charging area is located. Said device comprises a plurality of radial arms 36 integral with a rotatable central bushing 38. Said radial arms 36 are connected to a disc 37 coaxial
10 and integral with the bushing 38, and comprise a first radially inner portion 36a, a middle resilient part 36b slightly curved and a third 36c extremely curved towards the back part with regard to the front of the rotating movement and constituted by smooth and flexible elements which extending during operation to
15 a position above said container holders.

Fig. 11 also shows a series of falling chutes 31 integral with said rotatable disc 2 and with a second parallel rotatable disc 32, placed at a lower level, as well as an intermediate fixed shelf which divides the falling of the containers in a double sequence as disclosed in cited US Patent 4,681,209. Said falling chutes
20 31 align the containers along a fixed bottom 34 from which they are evacuated by an exit conveyor 35.

The central bushing 38 is driven by a reversal rotating mechanism which

can clearly be understood from Fig. 12. This shows a central axis 44 bearing the rotatable disc 2 with peripheral apertures where the hollow pieces 1 are socket, said axis extending upwardly over said rotatable disc 2 and being connected to a first wheel 42a which is linked through an endless belt 43 to a second coplanar wheel 42b which is coupled to a first gearwheel 45b interlocked with a second coplanar gearwheel 45a fixed at one of the ends of the central bushing 38. Some bearings 39, 40 and 41 are interposed between the movable parts and the fixed ones as it clearly can be seen from Fig 12. This reversal rotating mechanism is supported by a bridge 46 sustained by brackets 47 integral with the wall of the hopper 48.

Fig. 13 shows another embodiment of the invention where a rotatable disc 2 like the one in Fig. 3 and removable retaining means as the ones detailed in Fig. 6 are used. In this case the single body hollow pieces 1, are connected through its rear wall to the falling and aligning chutes 31. Said falling chutes comprise a rear plate to which a first pair of side convergent plates 49 and a second pair of side parallel plates 50 with an upper convergent portion 50a are attached.

Fig. 14 shows still another embodiment of the invention where the single hollow pieces 1 are located adjacent the outer edge of a rotatable disc 2. Over said disc another disc (static or rotatable and not illustrated) will be arranged, the upwardly projecting flanges 11 joining its outer edge to the inner border of the charging opening of the pieces 1 as previously described.

As can be seen in Figs. 14 and 15 in this embodiment immobilising and positioning means have been foreseen preventing pivoting movement of the hollow pieces 1.

Said means are constituted by an enlarged prism shaped portion 52 at the starting part of an axial member 53 emerging from the rear side of said single body hollow pieces and removably attached to some female connector 54 (like the ones described in Fig. 6). The upper part of said enlarged portion 52 lies on the bottom of the disc 2, just under its outer edge. In addition to this, two protruding parts 55 emerge from there rear side of said single body hollow pieces 1, near its two ends, the upper part of them also lying on the bottom of the disc 2 just under its outer edge.

As can be seen in Fig. 15 the hollow pieces 1 located adjacent the outer of the disc 2 have between theirs ends a slight looseness avoiding jamming.

The machine with the features previously described is easily adaptable to different sizes and shapes of the containers to be handled and provides also a transport of the containers with a minimum of interference with the static parts therefore involving a careful handling. The conditions of the attachment between the container holder means employed and the support (rotatable disc) are also very stable.

1 The claims defining the invention are as follows:-

2 1. Machine for automatically positioning and aligning
3 containers, such as plastic bottles, comprising:

4 a main hopper for receiving a plurality of randomly
5 positioned containers and having a central part;

6 a side wall on said main hopper;

7 a bottom in said main hopper having a peripheral
8 portion spaced from said side wall to provide a space
9 through which containers on said bottom can pass;

10 container holder support means having a peripheral
11 portion and supported below said hopper for movement
12 of said peripheral portion thereof in a path adjacent

13 said peripheral portion of said bottom;

14 means for driving said container holder support means
15 in said path;

16 container holder means mounted on said container
17 holder support means for movement therewith and having
18 recesses therein for receiving and holding containers
19 in a lying position from said peripheral portion of
20 said bottom;

21 discharge opening in said container holder means for
22 allowing containers to pass therethrough;

23 container support shelf means extending below said
24 container holder means for supporting containers in a
25 lying position in said recesses during movement of
26 said container holder means;

27 a discharge section in said support shelf means for
28 discontinuing support of containers at a predetermined
29 location so that containers in said container holder
30 means pass through said discharge openings at said
31 discharge section;

32 tilting means on said container holder means engaging
33 a part of each container for tilting each container
34 into a predetermined position as each container passes
35 through said discharge openings at said discharge
36 section;

37 chute means mounted below and movable with said
38 container holder means for receiving, orientating and

1 guiding containers passing through said discharge
2 openings into a predetermined position, each chute
3 means having a lower exit portion, characterized in
4 that:

5 said container holder means comprise a plurality of
6 exchangeable hollow frame-shaped container holders
7 each having inner dimensions forming one of said
8 recesses so that each recess contains most of a
9 container body therein;

10 each container holder includes a charging opening for
11 passage of a container therethrough into said recess;
12 and

13 an inclined plane means directed towards said central
14 part of said main hopper is disposed between said
15 bottom of said main hopper and said charging openings
16 of said container holders.

17 2. Machine as claimed in Claim 1 characterized in that said
18 container holder support means comprises a rotatable disc
19 and plurality of apertures in said peripheral portion
20 thereof, and said container holders have external
21 dimensions to facilitate fitting at least part of one of
22 said container holders in one of said apertures in said
23 rotatable disc.

24 3. Machine as claimed in Claim 1 characterized in that
25 said container holder support means comprises a rotatable
26 disc having an outer edge, and said container holders are
27 disposed adjacent said outer edge of said rotatable disc.

28 4. Machine as claimed in Claim 1 characterized in that
29 said charging opening of each container holder has an inner
30 edge, and said inclined plane means comprises a flange
31 projecting upwardly from said inner edge of each charging
32 opening.

33 5. Machine as claimed in Claim 1 characterized in that
34 said charging opening of each container holder has an inner

1 edge, and said inclined plane means comprises a frustum
2 conical wall mounted on said container holder support means
3 and having a lower edge in adjacent spaced relation to said
4 inner edge of each of said charging openings of said
5 container holders.

6 6. Machine as claimed in Claim 1 characterized in that it
7 further comprises a second inclined plane means mounted on
8 said side wall of said main hopper and superimposed
9 relative to said container holders so that both inclined
10 plane means converge toward said container holders.

11 7. Machine as claimed in Claim 1 characterized in that it
12 further comprises:

13 an outer edge on said charging opening of each of said
14 container holders; and

15 an elongated pad profile mounted on said main hopper
16 side wall and protruding over at least a part of a
17 space between said outer edge of each charging opening
18 of said container holders and said main hopper side
19 wall.

20 8. Machine as claimed in Claim 2, characterized in that it
21 further comprises means for removably fitting said
22 container holders in said apertures.

23 9. Machine as claimed in Claim 8 characterized in that said
24 means for removably fitting said container holders in said
25 apertures comprise:

26 outer side walls on each of said container holders;
27 a retaining groove on each of said outer side walls;
28 and
29 resilient retaining means mounted on said container
30 holder support means and engageable in said retaining
31 grooves for holding said container holders in said
32 apertures.

33 10. Machine as claimed in Claim 3 characterized in that it

1 further comprises:

2 retaining openings in said outer edge of said
3 rotatable disc;

4 resilient retaining means in said retaining openings;
5 a mounting element projecting from each of said
6 container holders insertable in one of said retaining
7 openings; and

8 an annular groove on each of said mounting elements
9 engageable with said resilient retaining means for
10 removably retaining said container holders on said
11 rotatable disc.

12 11. Machine as claimed in Claim 1 characterized in that
13 said tilting means comprises:

14 two opposite ends in each of said discharge openings;
15 two coplanar flanges at said two opposite ends for
16 supporting a neck of a container received in a
17 container holder;

18 and

19 a further flange parallel to said coplanar flanges
20 limiting said charging opening adjacent one of said
21 opposite ends and engageable with a bottom of a
22 container.

23 12. Machine as claimed in Claim 1 characterized in that
24 said tilting means comprises:

25 two opposite ends in each of said discharge openings;
26 a rod at one of said ends and a flange at the other of
27 said ends for supporting a neck of a container when
28 received in a recess of a container holder.

29 13. Machine as claimed in Claim 2 characterized in that it
30 further comprises supporting flanges on each container
31 holder for supporting said container holders on said
32 rotatable disc adjacent said apertures therein.

33 14. Machine as claimed in Claim 3 characterized in that it
34 further comprises immobilizing and positioning means for

1 elastic portion backwardly curved with respect to the
2 rotating direction of said arms for engaging and
3 removing containers wrongly positioned relative to
4 said container holders towards a charging area for
5 said main hopper; and
6 means for driving said central bushing in a direction
7 of rotation opposite to the direction of movement of
8 said container holder means.

9 18. Machine as claimed in Claim 17 characterized in that
10 each of said radial arms comprises:

11 a first radially inner rectilinear and rigid part;
12 a middle resilient and curved part; and
13 radially outer curved part comprising a smooth and
14 flexible element extending during operation to a
15 position above said container holders.

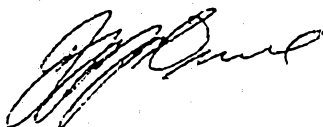
19. Machine for automatically positioning and aligning
containers, substantially as described herein with
reference to the accompanying drawings.

DATED this 7th day of JULY, 1993

JAIME MARTI SALA

By his Patent Attorneys:

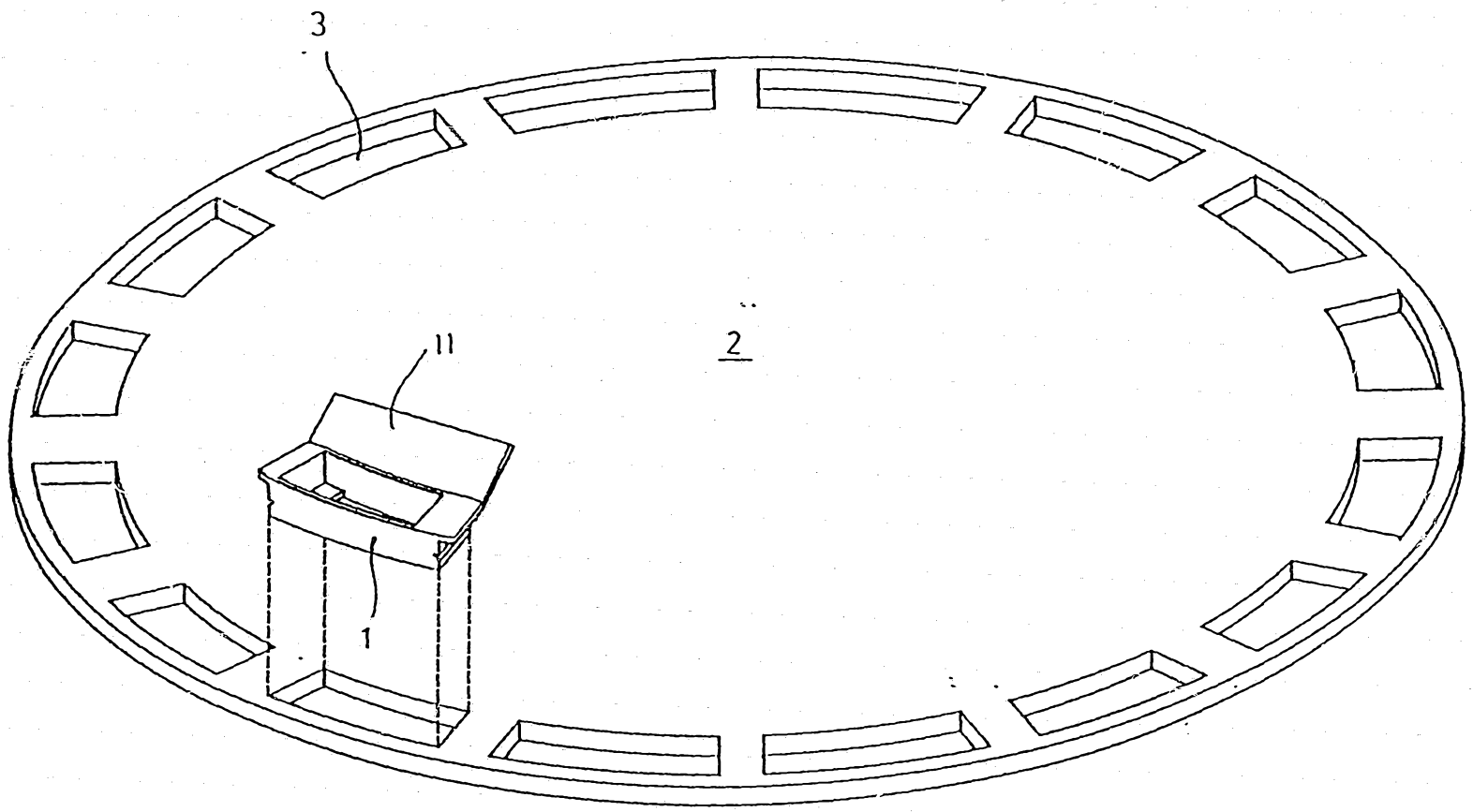
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ABSTRACT

1
2 Machine for automatically positioning and
3 aligning containers, such as plastic bottles, including a
4 hopper (48) for receiving randomly containers (4) to be
5 sorted, having a bottom (12,29) with a peripheral edge
6 portion at a distance from the side wall of the hopper (48)
7 to provide a space through which the containers can drop,
8 by gravity towards a lower section, a rotatable disc (2)
9 below said bottom and container holders associated to said
10 disc for movement therewith and having recesses therein for
11 receiving and holding containers in a lying position. A
12 container support shelf (28) with a discharge section
13 extends below said container holders for supporting
14 containers in said recesses during movement. The disc (2)
15 has a plurality of apertures (3) or an annular space in a
16 peripheral portion thereof and the container holders
17 comprise several exchangeable hollow frame-shaped pieces
18 (1) each having inner dimensions forming one of said
19 recesses so that each recess contains most of a container
20 body therein and an inclined plane (11, 20) directed
21 towards a central part of said hopper is disposed between
22 said hopper's bottom (12, 29) and a charging opening (1a)
23 of said pieces (1).

FIG.1

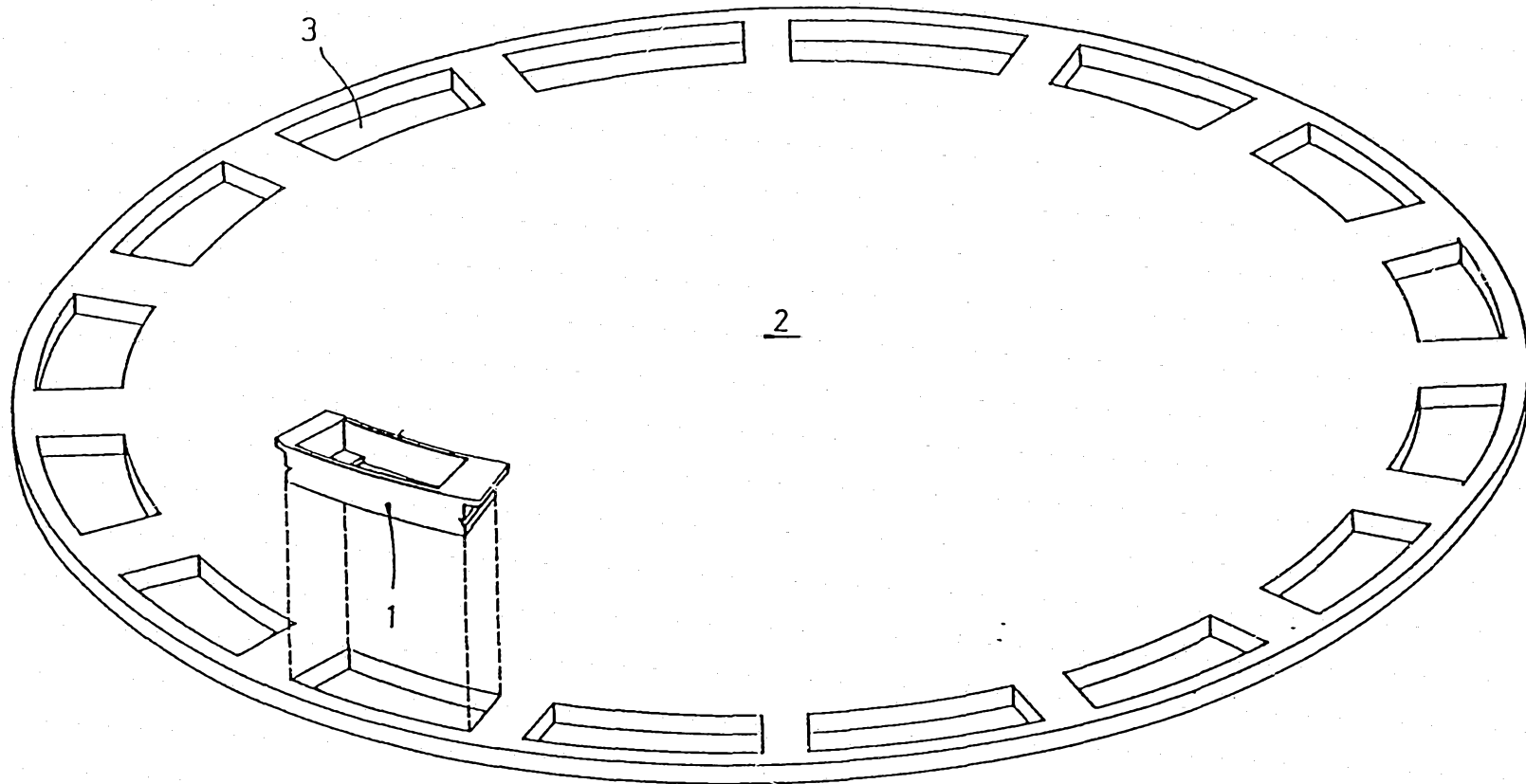


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FIG.2



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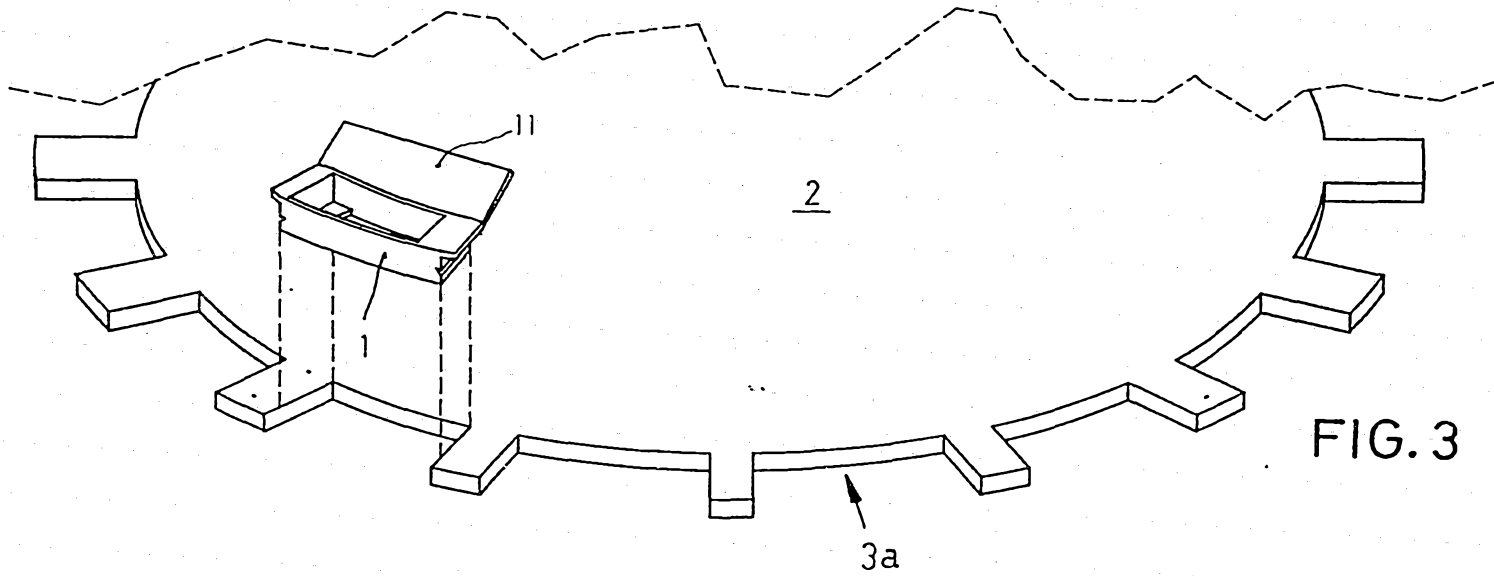
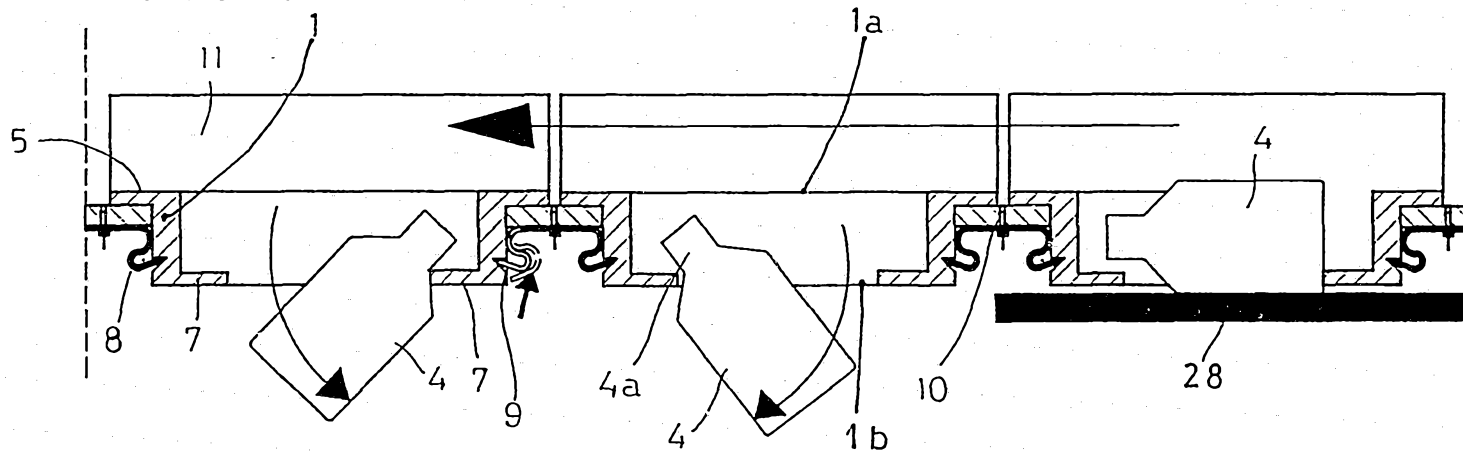


FIG. 3

FIG. 4



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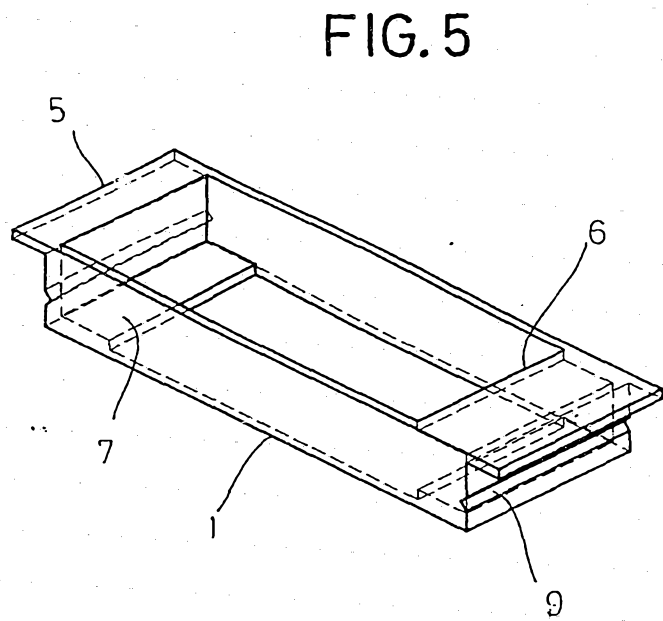
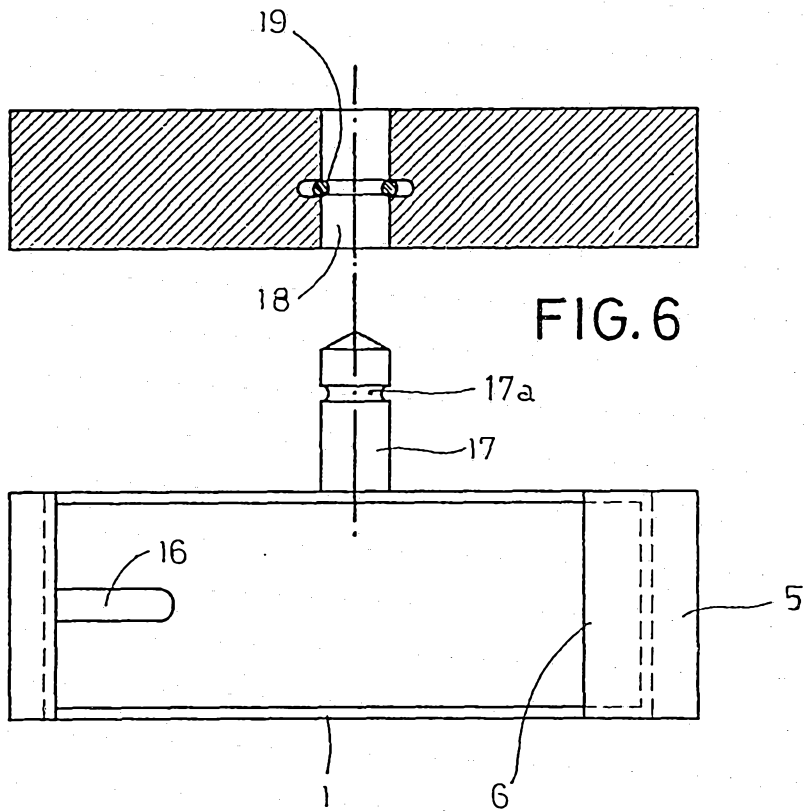


FIG. 7

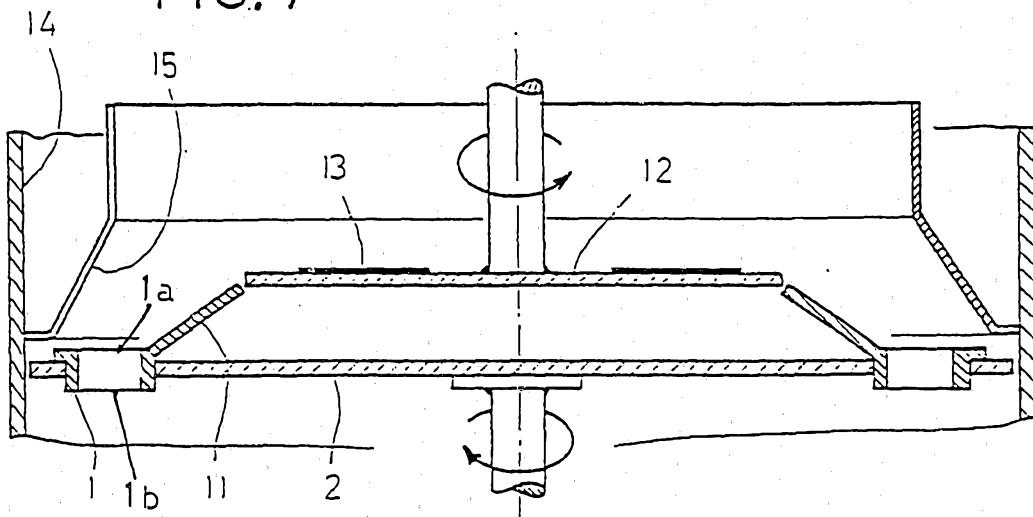
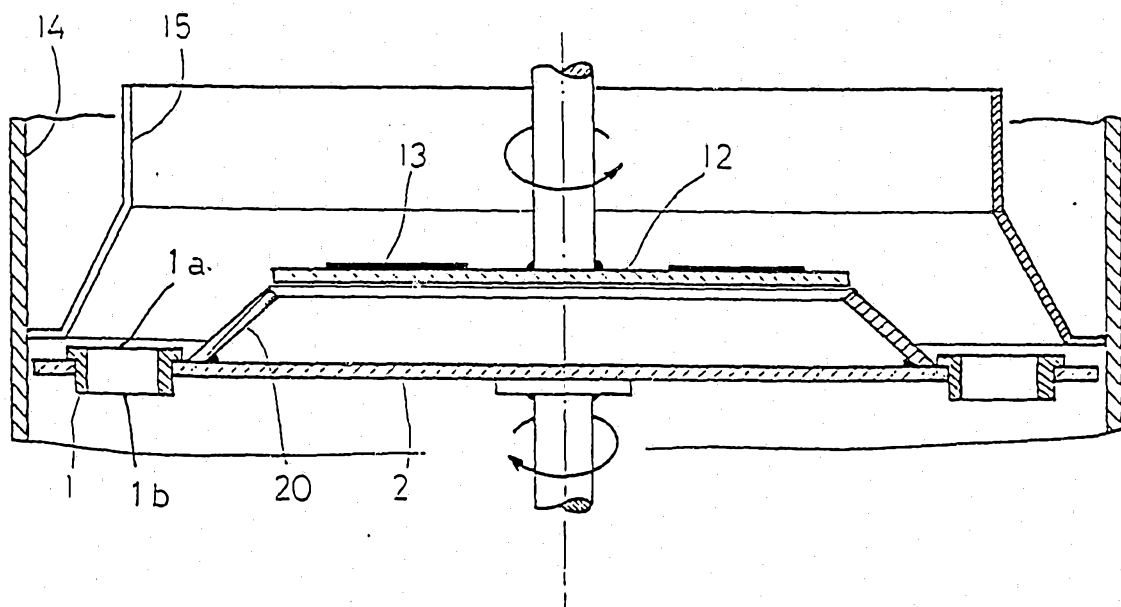


FIG. 8



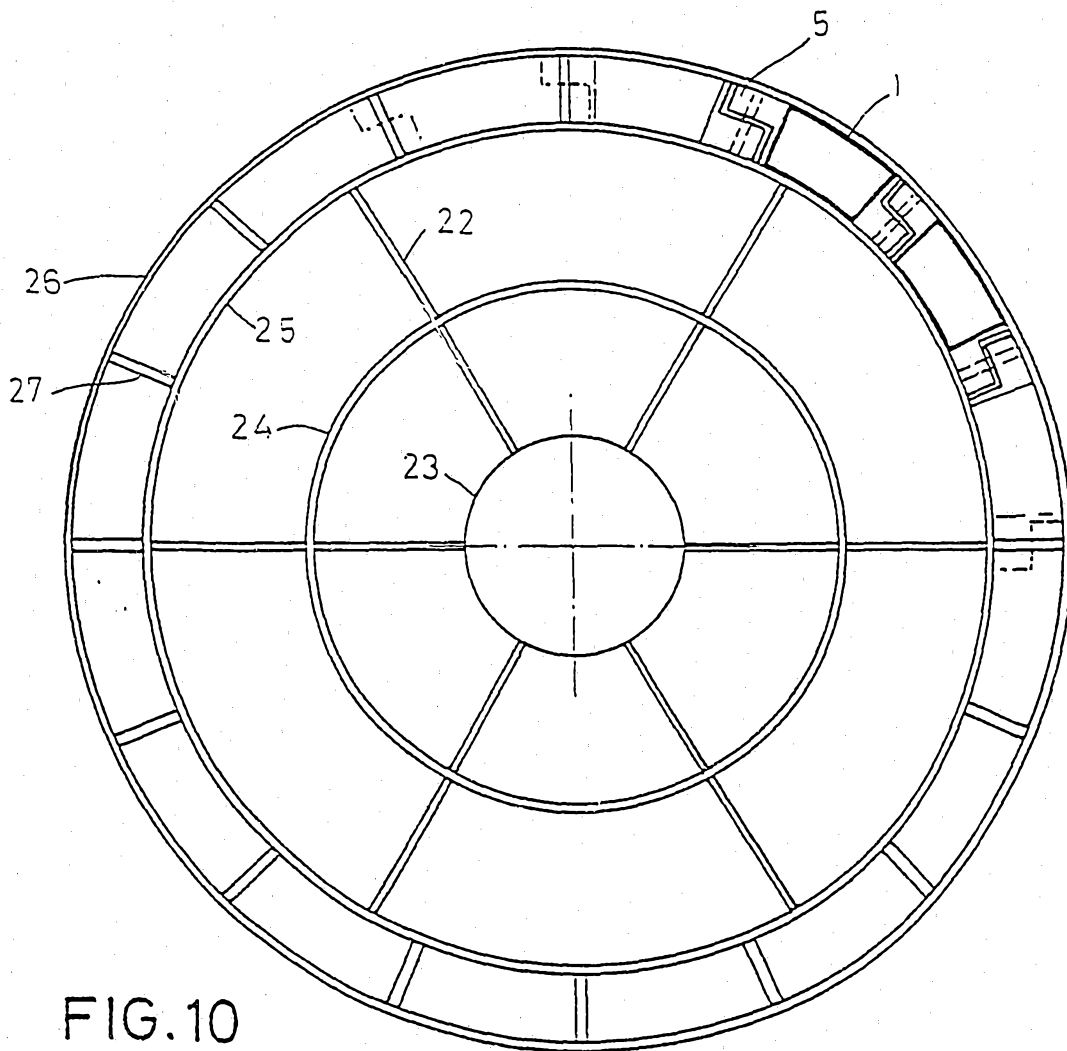
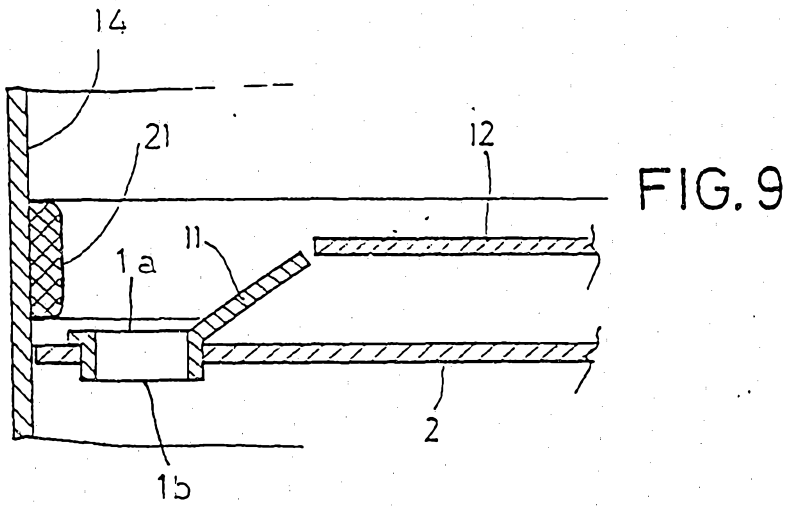


FIG.11

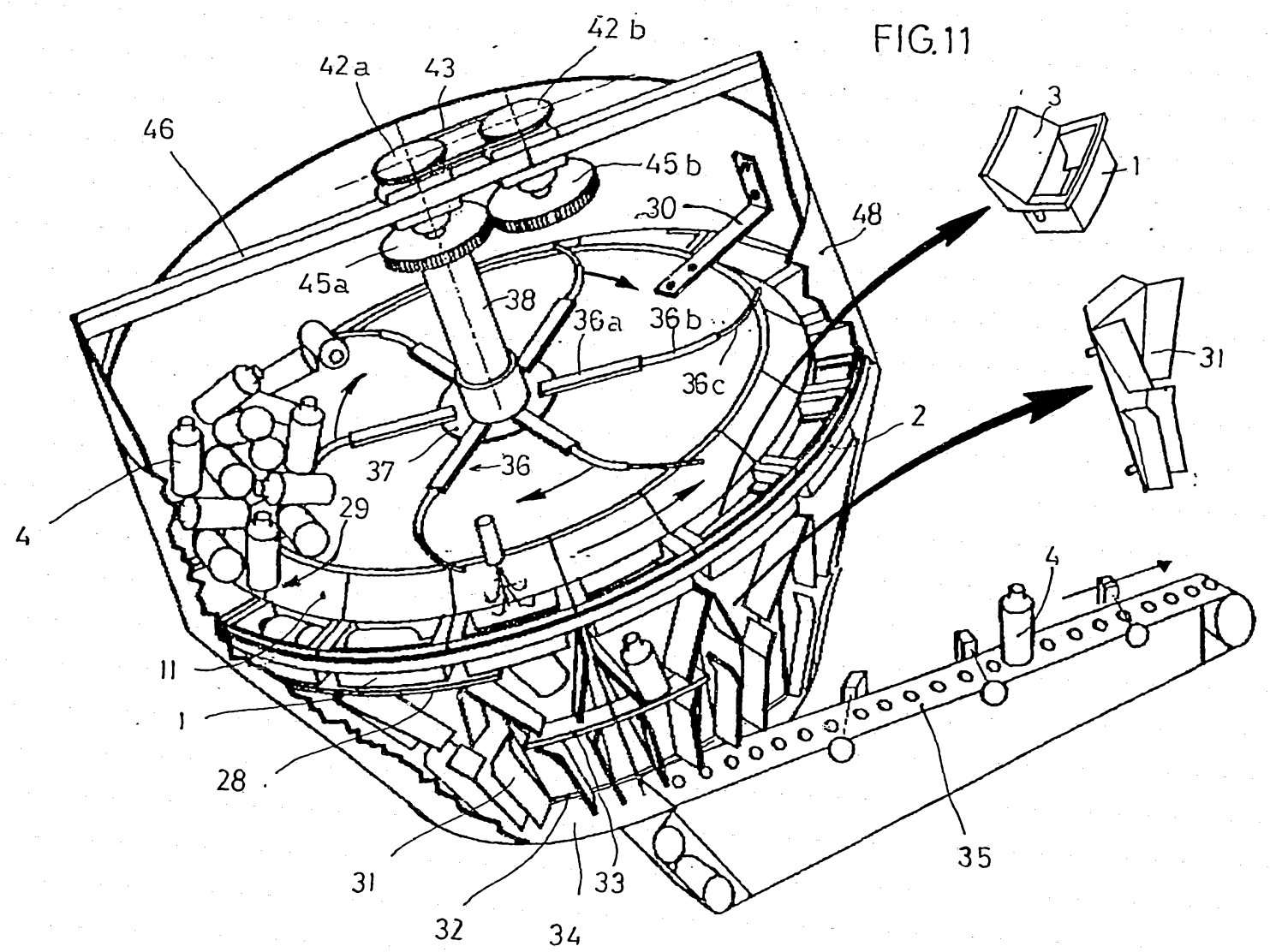
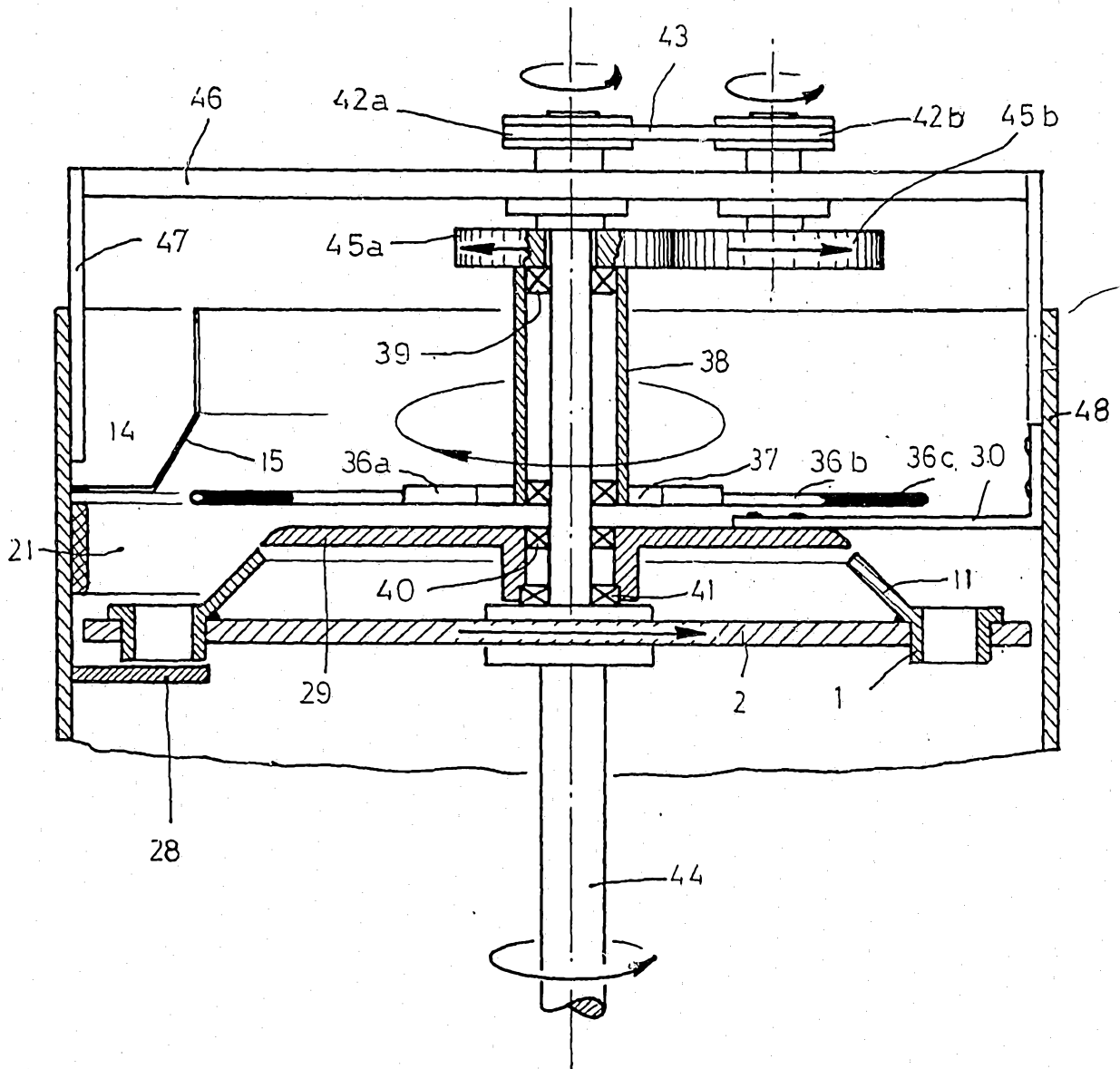


FIG. 12



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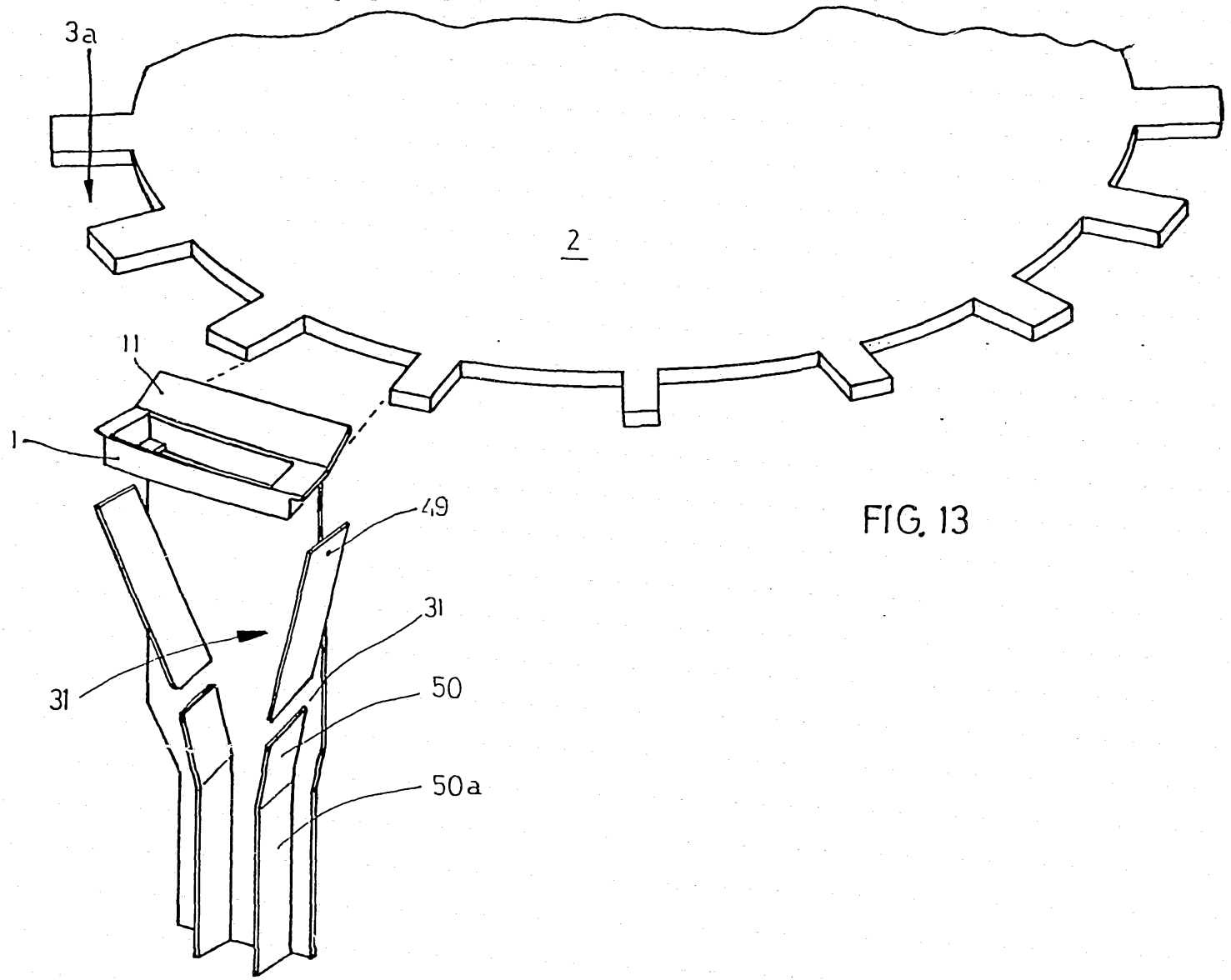


FIG. 13

FIG. 14

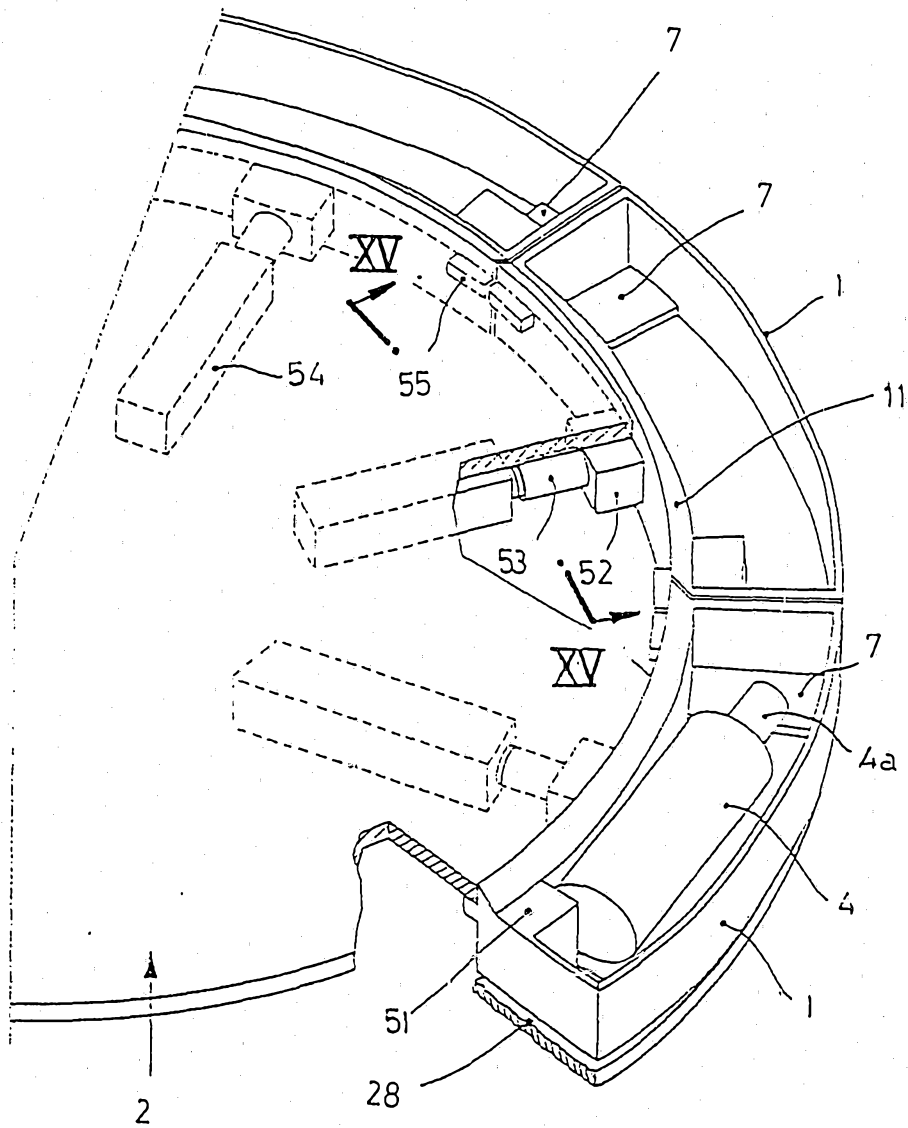


FIG. 15

