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(54) **Title:** CONTAINER TRANSFER DEVICE HAVING A TRANSFER GUIDING MEMBER

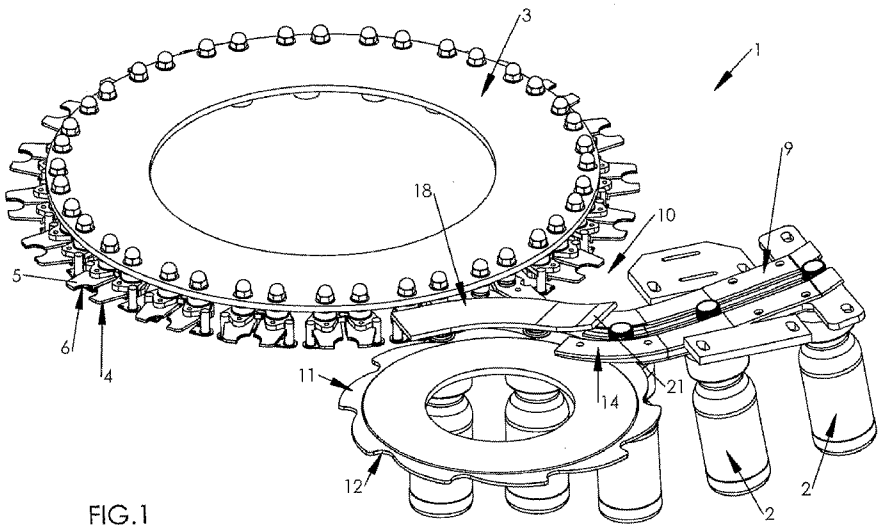


FIG.1

(57) **Abstract:** Device (10) for transferring containers (2) from a feed rail (9) to a rotary star wheel (3), said device (10) comprising: a transfer wheel (11) provided, on its periphery, with a plurality of recesses (12) for engaging containers (2) under their neck (7) and moving the containers (2) along a transfer path (15) extending from a loading point (13) at an end of the feed rail (9) to an unloading point (16) at the periphery of the rotary star wheel (3), - a guiding member (18) having a flat lower surface (19) extending at least partly above said transfer path (15) at a distance from the transfer wheel (11) substantially equal to the height of the container neck (7).

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Container transfer device having a transfer guiding member

FIELD OF THE INVENTION

The invention relates to the container handling, and more precisely to a device for transferring containers from a feed rail to a starwheel. Such a transfer device may be part of a filling machine, wherein blow-molded containers are conveyed from a blow molding unit to a filling unit and a capping unit, before they are grouped and packed for transportation.

BACKGROUND OF THE INVENTION

Usually, blow-molded containers are transported by the neck in a row along a feeding rail, where they slide freely by gravity or in which they are forced to move by a compressed air stream.

Before they are gripped by a starwheel in order to be moved to a filling unit at a predetermined rate, the containers must be spaced apart at a predetermined pitch. This is why there is generally provided a transfer wheel connecting the feed rail to the starwheel. The transfer wheel comprises, at its periphery, a plurality of recesses equally spaced apart. Each recess engages a container at a loading point located at an end of the feeding rail, and releases it at an unloading point located at a periphery of the starwheel. Containers follow an arc-of-circle path from the loading point to the unloading point.

Such a structure is disclosed in Italian patent application IT 1 260 380 (Parmatec). One can also refer to US patent application No. 2003/0106779 (Stocchi) and to US patent No. 6,591,967 (Doudement).

During the transfer, containers are subjected to acceleration and deceleration forces, both tangential and radial. As the containers are suspended by their necks, such forces may cause container misalignment, thereby resulting in wrong positioning of the containers on the starwheel and possibly causing damages to the filling machine.

In order to prevent such damages, a classical solution consists in providing the machine with means for sensing wrong positioning and means for ejecting wrongly positioned containers from the starwheel.

As long as machine safety is the only concern, such a solution is unquestionably efficient. However, it is complex to set up and does not prevent reduction of production rates.

SUMMARY OF THE INVENTION

It is one object of the invention to provide a transfer device which reduces the risk of container misalignment.

The proposed transfer device comprises:

- a transfer wheel provided, on its periphery, with a plurality of recesses for engaging containers under their neck and moving the containers along a transfer path extending from a loading point at an end of the feed rail to an unloading point at the periphery of the rotary starwheel, and
- a guiding member having a flat lower surface extending at least partly above said path at a distance from the transfer wheel substantially equal to the height of the container neck.

The above and other objects and advantages of the invention will become apparent from the detailed description of preferred embodiments, considered in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top perspective view showing part of a filling machine comprising a feed rail, a starwheel and a device for transferring containers from the one to the other.

FIG. 2 is a side perspective view of the container transfer device.

FIG. 3 is a side elevation view of the container transfer device.

FIG. 4 is a top plan view of the container transfer device, without the guiding member.

FIG. 5 is a top plan view of the container transfer device, with the guiding member.

FIG. 6 is an enlarged side elevation cut view showing the container transfer device.

DESCRIPTION OF PREFERRED EMBODIMENTS

Referring to **FIG.1**, there is partly shown a machine **1** for handling containers **2**, comprising a rotary star wheel **3** provided, all along its periphery, with a plurality of gripping elements **4**. Each gripping element **4** comprises a pair of jaws **5** pivotally mounted on the star wheel **3** and having a cut-out **6** wherein the containers **2** are clipped and held.

Each container **2** has a neck **7** at the base of which a collar **8** is provided to permit container sustentation during the handling thereof. Empty molded containers **2** are fed from a container molding unit (not shown) trough a feed rail **9** wherein the containers **2** are suspended by their collar **8** and in which they slide in a single row. As depicted on **FIG.1**, the feed rail **9** is inclined, in order to accelerate the containers **2** approaching the star wheel **3**.

In the feed rail **9**, the distance between successive containers **2** is not constant. It is therefore required that the containers **2** be spaced apart at a predetermined pitch before they are loaded on the star wheel **3**.

This is why the container handling machine **1** further comprises a device **10** for transferring the containers **2** from the feed rail **9** to the rotary star wheel **3**. As depicted on **FIG.1**, the transfer device **10** comprises a transfer wheel **11** adjacent both to the star wheel **3** and the feed rail **9**.

The transfer wheel **11** is pivotally mounted around an axis of rotation parallel to the axis of rotation of the star wheel **3**. The transfer wheel **11** is provided, on its periphery, with a plurality of recesses **12** for engaging containers **2** under their collar **8** at a loading point **13** at an end of the feeding rail **9**.

It can be seen on **FIG.4** that an end portion **14** of the feeding rail **9** is curved so that the end of the feeding rail **9** opens tangentially with respect of the transfer wheel **11**.

The containers **2** engaged by the transfer wheel **11** at the loading point **13** are moved along an arc-of-circle transfer path **15** extending from the loading point **13** to an unloading point **16** at the periphery of the star wheel **3**, at which point **16** the transfer wheel **11** is tangent to the star wheel **3** and where the containers **2** are clipped into the gripping elements

4, unloaded from the transfer wheel **11** and loaded onto the star wheel **3**. In the depicted example, the transfer path **15** extends over about 45°.

As depicted on **FIG.4**, the transfer wheel **11** is asymmetric and shaped like a blade of a circular saw, each recess **12** having a short portion **12a** which extends radially, and a long portion **12b** which extends peripherally, in order to facilitate smooth tangent loading of each containers **2**, the neck **7** of which slides, once reached the loading point **13**, against the long portion **12b** before it is grabbed by the short portion **12a**.

The transfer device **10** further comprises an external curved guide **17** which extends in a concentric way with respect of the transfer wheel **11**, between the feed guide **9** and the star wheel **3**. The guide **17** is substantially coplanar with the transfer wheel **11** and spaced therefrom at a distance substantially equal to the diameter of the container neck **7**, whereby each container **2**, while being moved along the transfer path **15**, is suspended by its collar **8** between the corresponding recess **12** and the curved guide **17**.

In a preferred embodiment, the end of the feed guide **9** overlaps both the transfer wheel **11** and the curved guide **17** – which are located vertically beneath the feed guide **9** – in order to minimize lateral movement of the containers **2**.

In addition, the transfer device **10** further comprises a top guiding member **18** provided with a flat lower surface **19** extending at least partly above the transfer path **15** at a distance from an upper surface **20** of the transfer wheel **11**, at the level of the recesses **12**, substantially equal to the height of the container neck **7**.

In a preferred embodiment, as depicted on the drawings (except on **FIG.4** where the top guiding member **18** has been removed in order to allow visual access to the transfer path **15**), the guiding member **18** is comprised of a flat plate made of metal (such as stainless steel) or a synthetic resin (such as polyamide) extending all along the transfer path **15**, i.e. over about 45°.

As depicted on **FIG.4**, guiding member **18** has a curved shape when seen from the top and comprises a back portion or tail **21** which overlaps the feed guide **9** at the loading point **13**. In a preferred embodiment, the

tail **21** is turned up with respect of a horizontal plane, in order to facilitate introduction of the containers **2** under the lower surface **19** when transferred from the feed rail **9** onto the transfer wheel **11** at the loading point **13**.

Accordingly, each container **2** is tightly held between, on the one hand, the transfer wheel **11** and the curved guide **17** on which the container **2** rests by its collar **8** and, on the other hand, the guiding member **18** which is located immediately above an opening **22** of the container **2** with a small clearance (e.g. 1/10 mm). Each container **2** is therefore held in a position where its main axis **A** remains vertical, thereby minimizing risks of misalignment at the unloading point **16**. And, since smoothness of the movement is increased, so can also be the speed rate of the machine **1**.

CLAIMS

1. Device (**10**) for transferring containers (**2**) from a feed rail (**9**) to a rotary star wheel (**3**), said device (**10**) comprising:

- a transfer wheel (**11**) provided, on its periphery, with a plurality of recesses (**12**) for engaging containers (**2**) under their neck (**7**) and moving the containers (**2**) along a transfer path (**15**) extending from a loading point (**13**) at an end of the feed rail (**9**) to an unloading point (**16**) at the periphery of the rotary star wheel (**3**),

said device (**10**) being characterized in that it further comprises:

- a guiding member (**18**) having a flat lower surface (**19**) extending at least partly above said transfer path (**15**) at a distance from the transfer wheel (**11**) substantially equal to the height of the container neck (**7**).

2. Device according to claim 1, wherein said guiding member (**18**) extends all along the transfer path (**15**).

3. Device according to claim 1 or 2, wherein said guiding member (**18**) extends over about 45°.

4. Device (**1**) according to any of claims 1-3, wherein said guiding member (**18**) is comprised of a flat plate.

5. Device (**1**) according to any of claims 1-4, wherein said guiding member (**18**) has a curved shape.

6. Device (**1**) according to any of claims 1-5, wherein said guiding member (**18**) has a back portion turned up at the loading point (**13**).

7. Device (**1**) according to any of claims 1-6, further comprising an external guide (**17**) substantially coplanar with the transfer wheel (**11**) and spaced therefrom.

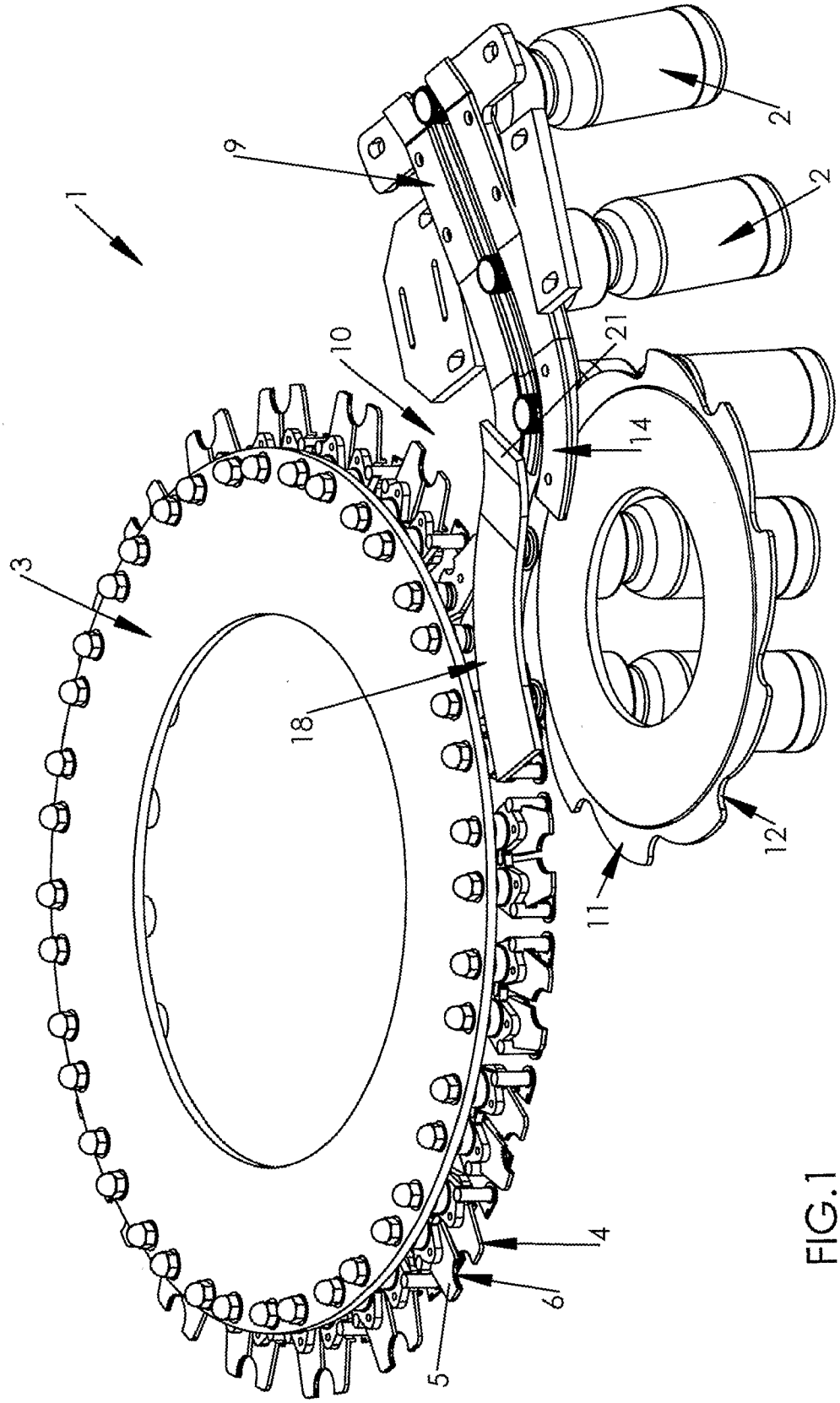


FIG.1

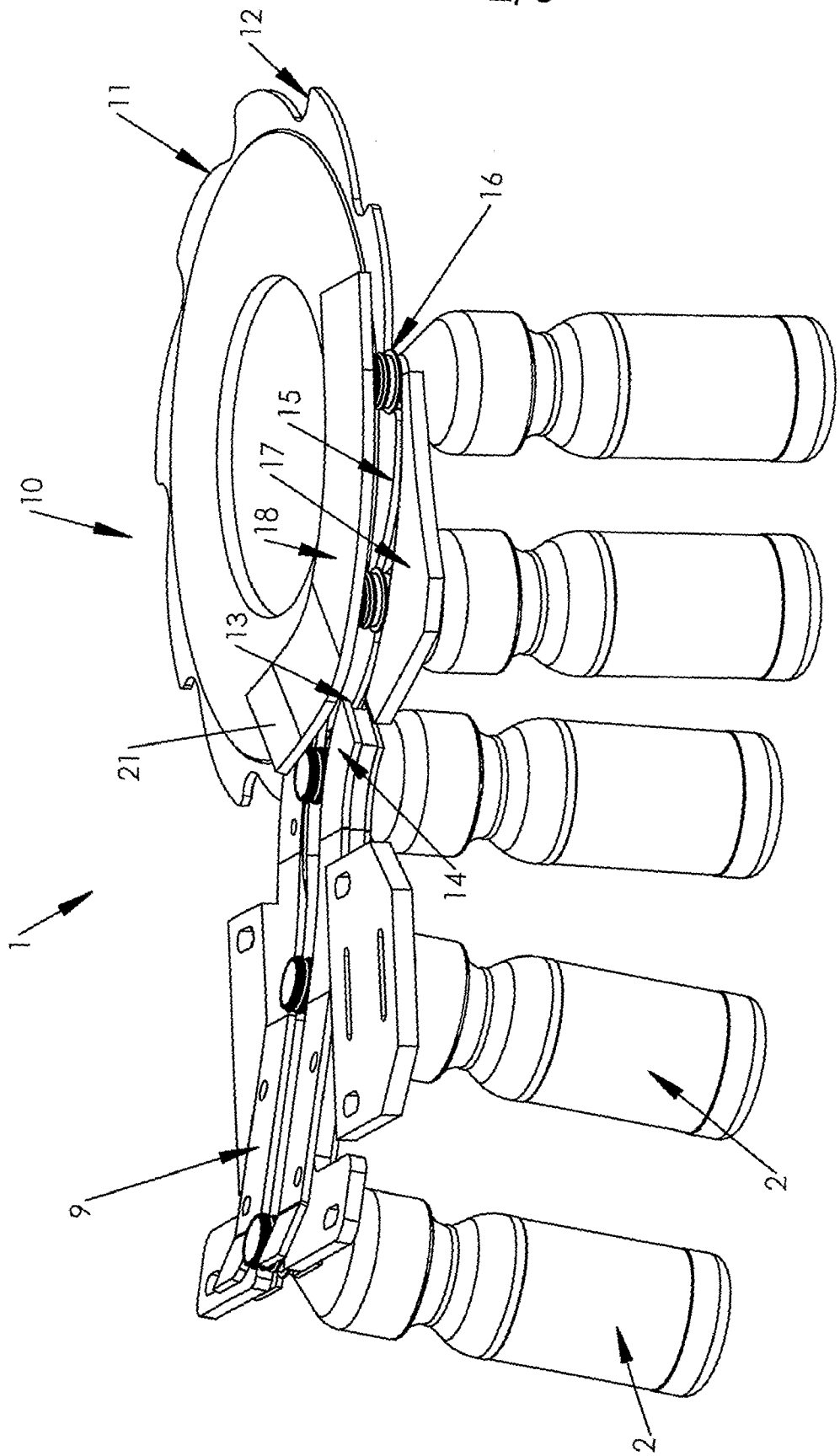


FIG.2

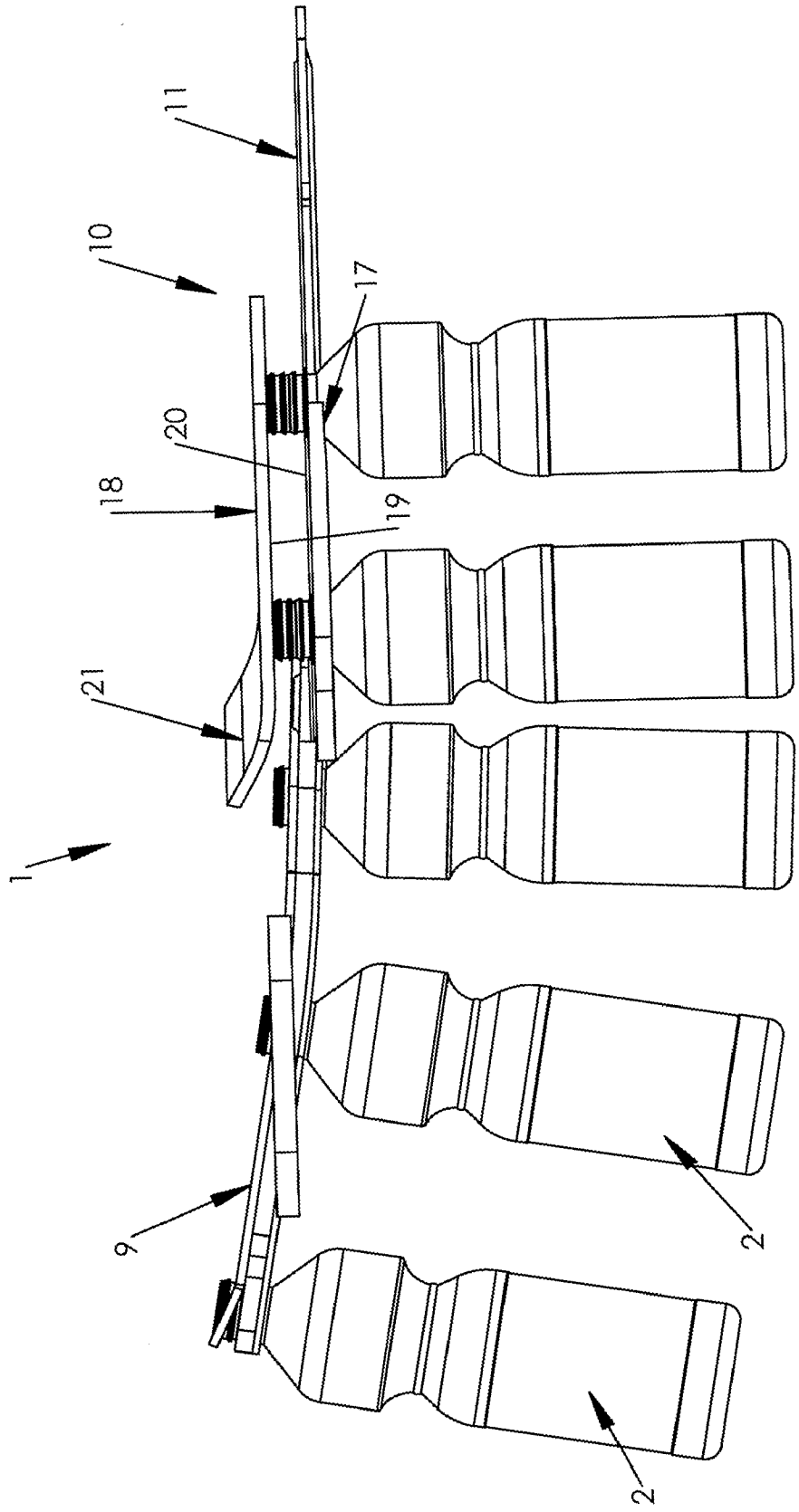


FIG.3

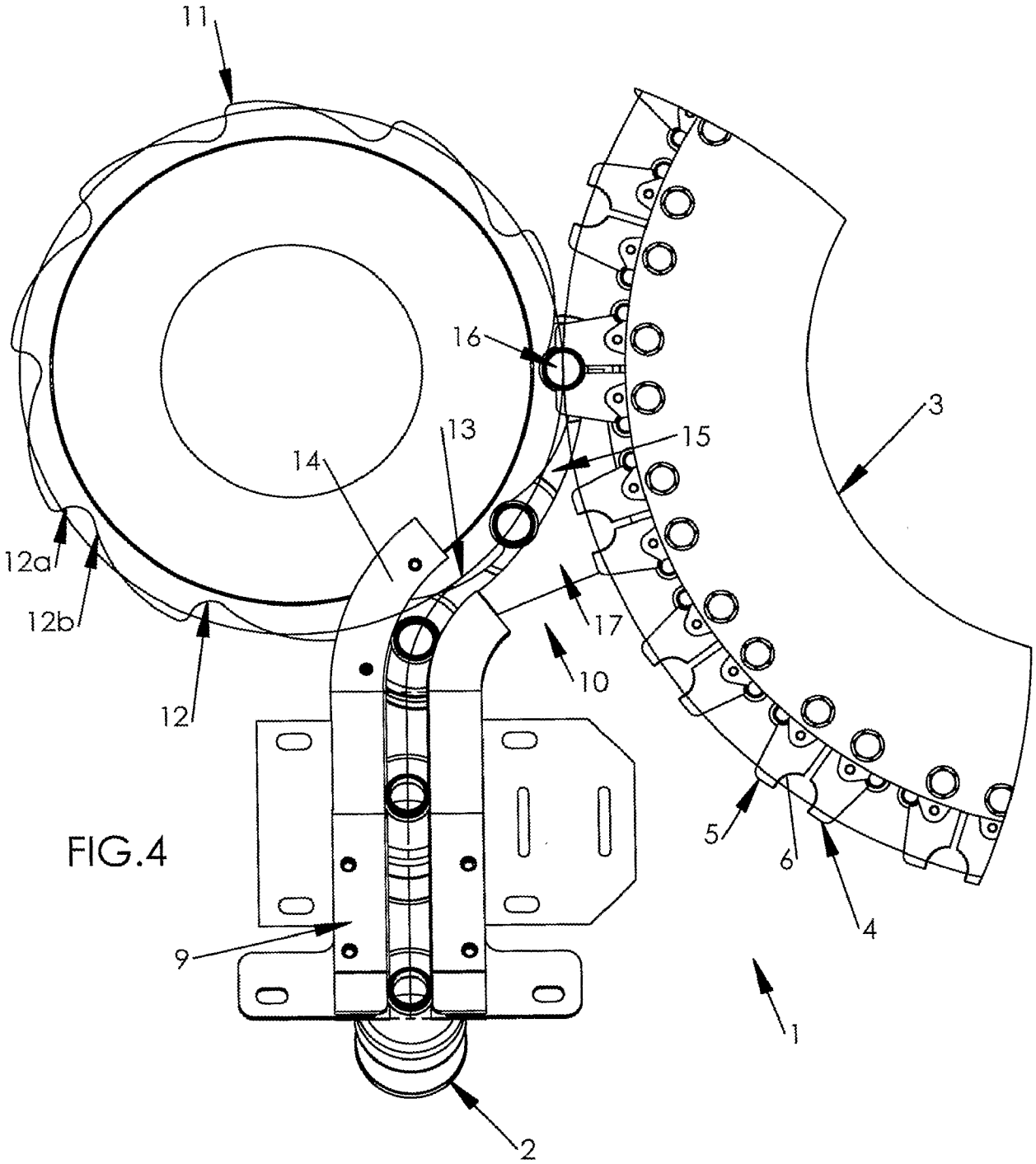


FIG.4

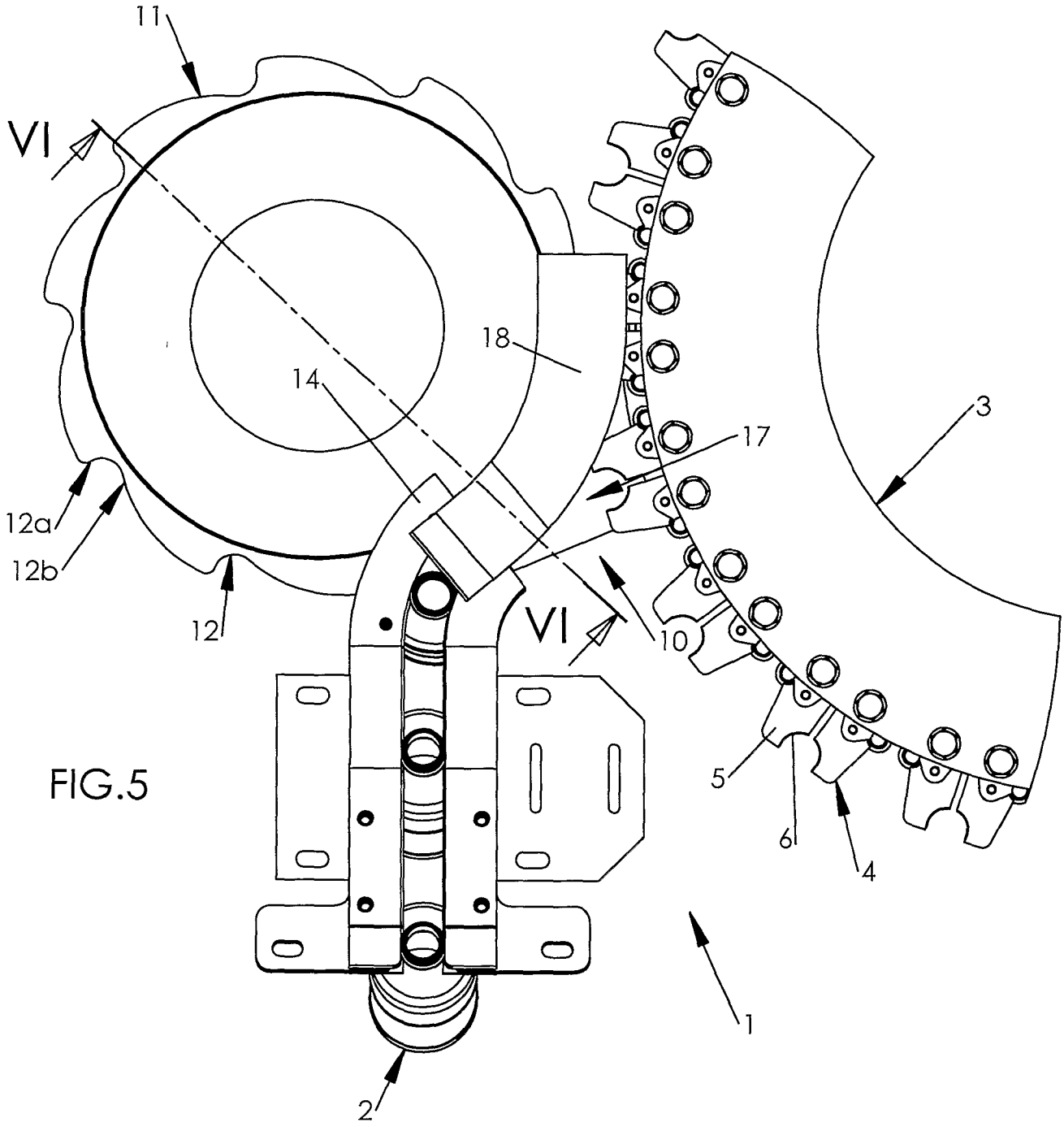


FIG.5

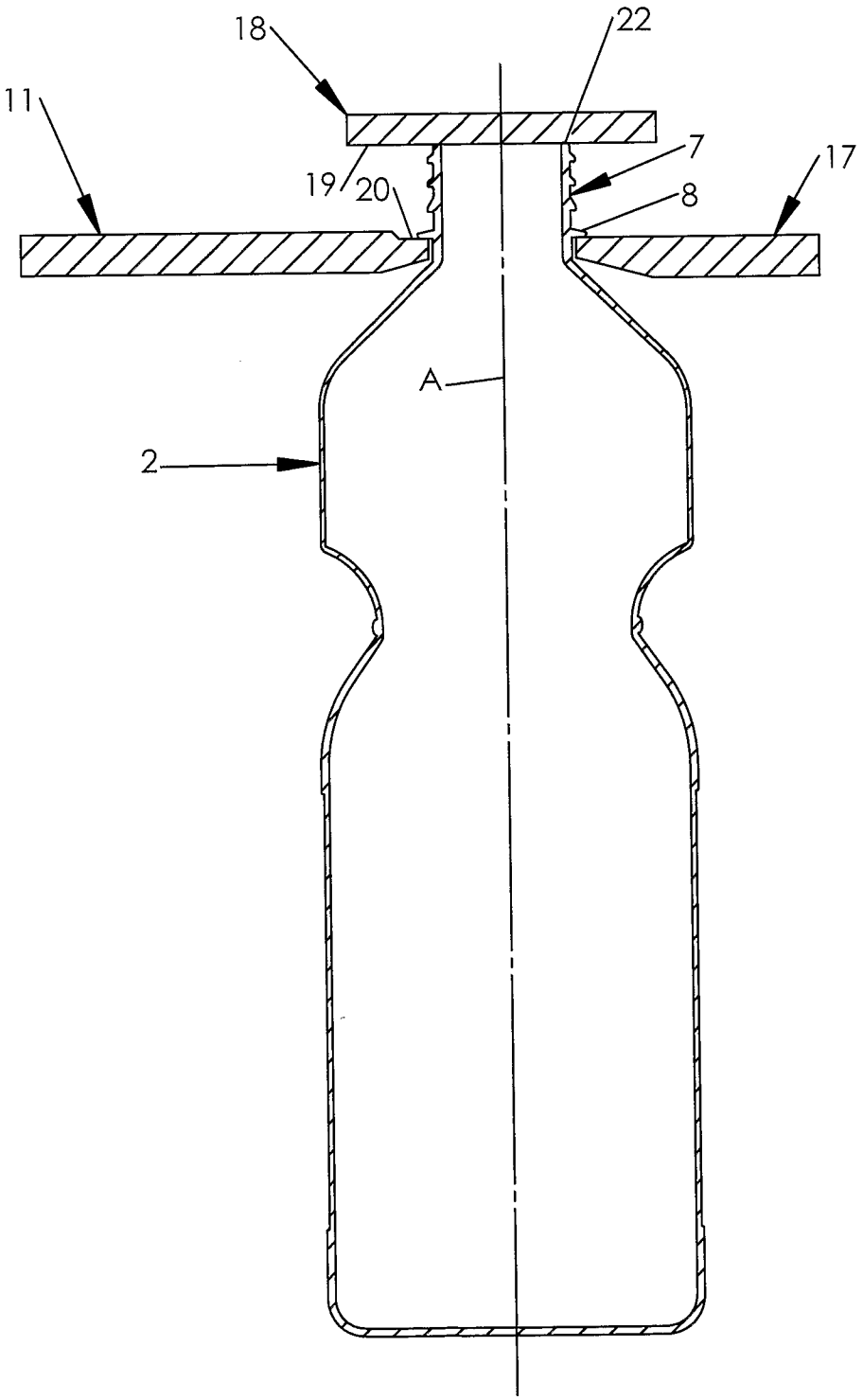


FIG.6

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2007/002291

A. CLASSIFICATION OF SUBJECT MATTER
INV. B65G47/84 B65G21/20

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)
B65G

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

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 01/42113 A (CENTRAL BOTTLING INTERNAT LTD [GB]; GUNTON ROGER WILLIAM [GB]; THISTLE) 14 June 2001 (2001-06-14) pages 8-10 figures 1-3b	1-7

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

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Date of the actual completion of the international search	Date of mailing of the international search report
20 December 2007	10/01/2008

Name and mailing address of the ISA/	Authorized officer
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IB2007/002291

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 0142113 A	14-06-2001	AU 2190901 A	18-06-2001