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(54) Title: SEALING DEVICE FOR AN ARTICLE HANDLING MACHINE

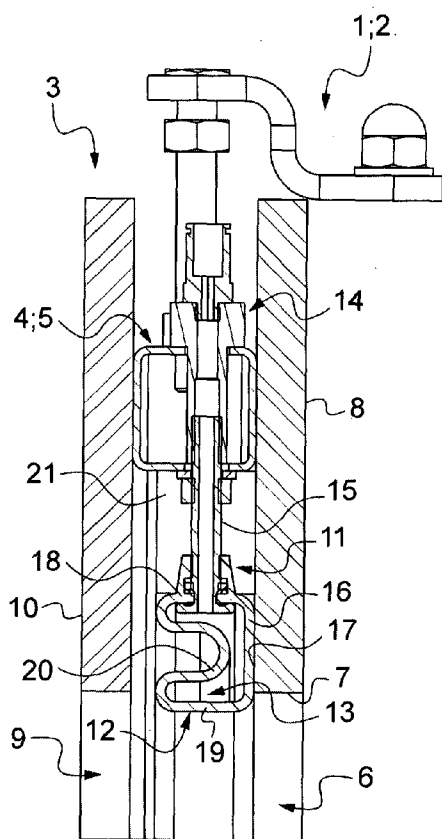


Fig.2

(57) Abstract: Sealing device (11) for sealingly interfacing two adjacent blocks (2, 3) of an article handling machine, each provided with an aperture (6, 9), said sealing device (11) comprising a resilient static sealing joint (12) mounted along the edge (7) of one aperture (6), wherein the sealing joint (12) is hollow, and wherein the sealing device (11) further includes an injection valve (14) for injecting air in the sealing joint (12) to inflate it.

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Sealing device for an article handling machine

## FIELD OF THE INVENTION

5 The invention relates to a sealing device for sealingly interfacing two adjacent blocks of an article handling machine.

## BACKGROUND OF THE INVENTION

10 Article handling machines are often manufactured in several parts (called blocks) assembled to form a one-piece manufacturing line.

Such a design (called modular design) is satisfactory because it facilitates transportation of the different blocks (which may come from different manufacturing places) to the final destination where the machine  
15 is assembled.

However, assembly of the different blocks may be problematic, especially for handling machines which define a closed inner volume. For example, in the container industry, aseptic filling machines require that the inner volume be isolated from the outer environment to preserve containers  
20 from bacteria.

In such a case, sealing joints are generally provided at the interface between two adjacent blocks, around an aperture in the blocks for allowing passage of the articles.

Such a solution seems satisfactory, but leaks are often witnessed in  
25 large-sized machines, due to the distortion of the blocks under the stress they undergo during assembly (the ground may not be perfectly planar) and operation (e.g. vibrations may occur) of the machine.

There is therefore a need for improvements in sealing devices provided at the interface between adjacent blocks of an article handling  
30 machine.

## SUMMARY OF THE INVENTION

It is an object of the invention to provide a sealing device having  
35 increased sealing properties.

It is another object of the invention to provide a sealing device having enhanced reliability.

Accordingly, there is proposed a sealing device for sealingly interfacing two adjacent blocks of an article handling machine, each 5 provided with an aperture, said sealing device comprising a resilient static sealing joint mounted along the edge of one aperture, wherein the sealing joint is hollow, and wherein the sealing device further includes an injection valve for injecting air in the sealing joint to inflate it.

The above and other objects and advantages of the invention will 10 become apparent from the detailed description of preferred embodiments, considered in conjunction with the accompanying drawings.

#### BRIEF DESCRIPTION OF THE DRAWINGS

15 **FIG. 1** is a partial perspective view showing a block of an article handling machine provided with a sealing device.

**FIG. 2** is a sectional view showing assembly of two blocks interfaced with a sealing device, shown in a non inflated state.

**FIG. 3** is a sectional view showing assembly of the blocks of **FIG.2**, 20 interfaced with the sealing device shown in an inflated state.

#### DESCRIPTION OF PREFERRED EMBODIMENTS

Turning now to the drawings, there is shown a frame element **1** of an 25 article handling machine **2**, e.g. a container handling machine. The machine is modular, and therefore built by assembly of several functional blocks **2**, **3** (e.g. for supporting a container feeding unit, a container rinsing unit, a container filling unit and a container capping unit) juxtaposed and coupled by means of removable fixation means such as bolts.

30 The frame element **1** shown on **FIG.1** is a lateral wall of a machine block **2**, ready to be interfaced with one adjacent block **3**. The wall **1** comprises an overall chassis **4** formed of welded metallic beams **5** of rectangular or square section.

There is defined in the chassis **4** an aperture **6** through which the 35 articles are to be transferred from one block **2** to the adjacent one **3**. In

one embodiment, illustrated on **FIG.1**, the aperture **6** has a rectangular shape (with rounded corners) and is limited by a rectangular edge **7** defined by a cut-out in a plate **8** fixed to the chassis **4**.

Correspondingly, the adjacent block **3** defines an aperture **9** of similar shape and dimensions, formed by a rectangular cut-out in a plate **10** fixed to a chassis of the adjacent block **3**. Once the blocks **2, 3** are assembled, both apertures **6, 9** are coincident, as illustrated on **FIG.2**.

As depicted on the drawings, there is provided a sealing device **11** for sealingly interfacing the adjacent blocks **2, 3**, mounted on the chassis **4** of the block **2** around the aperture **6**.

More precisely, the sealing device **11** comprises a resilient static sealing joint **12**, made e.g. of rubber, mounted along the edge **7** of the aperture **6**.

The sealing joint **12** is hollow and defines an inner air chamber **13**. The sealing device **11** further includes an injection valve **14** for injecting pressurized air (or any equivalent inert gas) in the air chamber **13** to inflate the sealing joint **12**.

As depicted on **FIG.2**, the injection valve **14** comprises a nozzle **15** attached to the sealing joint **12**, for putting the air chamber **13** in communication with a pressure source.

It can be seen on **FIG.2** that, before it is inflated, the sealing joint **12** presents a U-shaped section. It comprises a flat back wall **16**, fixed to a planar outer face **17** of the plate **8** (e.g. by means of glue), an outer wall **18** to which the nozzle **15** is attached, an inner wall **19** limiting the aperture **6**, and a U-shaped front wall **20** linking the outer wall **18** and the inner wall **19** and protruding inwards into the volume limited by the back wall **16**, outer wall **18** and inner wall **19**.

The sealing device **11** further comprises a frame **21** fixed to the outer face **17** of the plate **8** and surrounding the sealing joint **12**, in contact with the outer wall **17** thereof, to confine the sealing joint **12** when inflated.

As depicted on **FIG.2**, the surrounding frame **21** is adjacent the beams **5** of the overall chassis **4**, thereby increasing rigidity of the wall **1**.

The machine blocks **2, 3** are sealingly assembled as follows.

First, the blocks **2, 3** are placed adjacent to one another, so that the

apertures **6**, **9** are coincident. The plate **10** of the adjacent block **3** may be in contact with the chassis **4** of the block **2**, as depicted on **FIG.2**. The blocks **2**, **3** are then fixed to one another, e.g. by means of fixation bolts inserted in holes provided in coupling plates **22**. Once the blocks **2**, **3** are fixed together, pressurized air is injected via the nozzle **15** in the air chamber **13**, so that the sealing joint **12** is inflated, until the front wall is bent outwards to a point where it exerts on the plate **10** of the adjacent block **3** a pressure all around the aperture **9** (**FIG.3**), thereby sealing the interface between the blocks **2**, **3**. Under the pressure of the sealing joint **12**, the adjacent block **3** may be slightly spaced from the chassis **4**, as depicted on **FIG.3**.

The back wall **16** and outer wall **18** remain still, since they are confined by the plate **8** and the surrounding frame **21**, respectively, so that only the inner wall **19** and front wall **20** are bent, thereby conferring the sealing joint **12** the general shape of a bean (**FIG.3**).

Value or the air pressure in the air chamber **13** is left to the appreciation of the skilled person. Pressures comprised between 2 and 4 bars seem convenient in most applications.

The sealing joint **12** is preferably made of silicon, and has a wall thickness e.g. in the range of 2-5 mm.

Accordingly, there is provided a sealing device allowing good and reliable performance for interfacing two blocks in article conveying machines.

Of course, the invention is not limited to the disclosed embodiments. In particular, the skilled person may adapt the shape of the sealing joint **12** to the edge of the aperture **6**, and/or the section of the sealing joint **12** to the surfaces on which it is provided to exert a pressure.

**CLAIMS**

1. Sealing device (11) for sealingly interfacing two adjacent blocks  
5 (2, 3) of an article handling machine, each provided with an aperture (6, 9),  
said sealing device (11) comprising a resilient static sealing joint (12)  
mounted along the edge (7) of one aperture (6), wherein the sealing joint  
(12) is hollow, and wherein the sealing device (11) further includes an  
injection valve (14) for injecting air in the sealing joint (12) to inflate it.
- 10 2. Sealing device (11) according to claim 1, wherein, before  
inflated, the sealing joint (12) has a U-shaped section.
3. Sealing device (11) according to claim 1 or 2, wherein the sealing  
joint (12) is fixed to a planar surface (17) of one block (2), adjacent said  
aperture (6).
- 15 4. Sealing device (11) according to claim 3, wherein the sealing  
joint (12) is glued to said planar surface (17).
5. Sealing device (11) according to any of claims 1-4, further  
comprising a frame (21) surrounding the sealing joint (12).
6. Sealing device (11) according to claim 5, wherein the frame (21)  
20 is fixed to one block (2).
7. Sealing device (11) according to any of claims 1-6, wherein the  
injection valve (14) comprises a nozzle (15) for putting an inner volume  
(13) of the sealing joint (12) in communication with a pressure source.
8. Sealing device (11) according to claim 7, wherein said nozzle  
25 (15) is fixed to an outer wall (18) of the sealing joint (12).

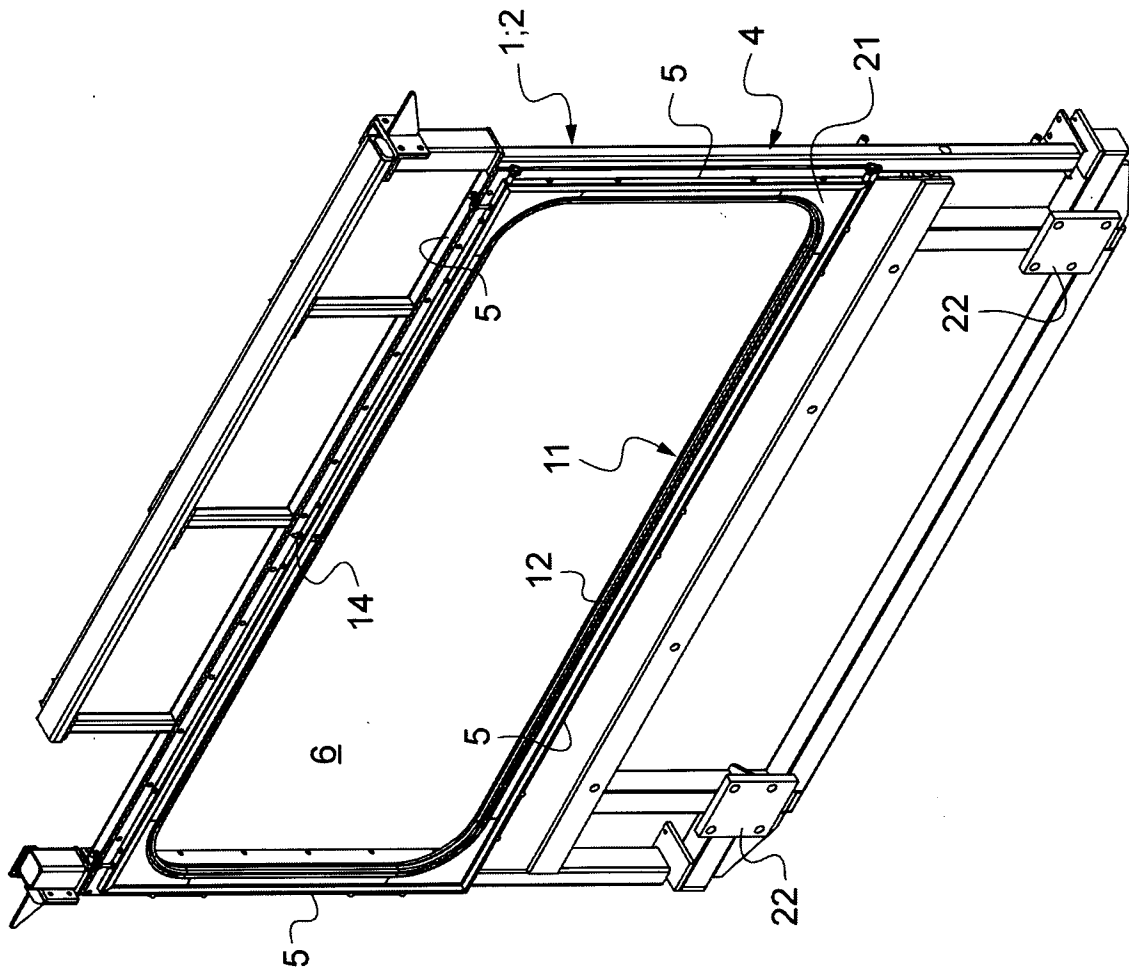


Fig.1



# INTERNATIONAL SEARCH REPORT

International application No  
PCT/IB2007/004268

**A. CLASSIFICATION OF SUBJECT MATTER**  
INV. F16J15/46 B65B65/00

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)  
F16J B65B

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**

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Further documents are listed in the continuation of Box C.

See patent family annex.

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## INTERNATIONAL SEARCH REPORT

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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