(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 164 081 A1

(12) EUROPEAN PATENT APPLICATION
published in accordance with Art. 158(3) EPC

(43) Date of publication:
19.12.2001 Bulletin 2001/51

(21) Application number: **00951536.2**

(22) Date of filing: **31.07.2000**

(51) Int Cl.[7]: **B65B 43/12**, B65B 43/46, B65B 3/02, B65B 9/08

(86) International application number:
PCT/ES00/00295

(87) International publication number:
WO 01/10716 (15.02.2001 Gazette 2001/07)

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **10.08.1999 ES 9901833**

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(54) BAG TRANSFER DEVICE FOR AUTOMATIC PACKAGING MACHINES

(57) Bag transfer device for automatic packaging machines, applicable to packaging machine which are provided with a bag conforming train (3) to form bags with relatively reduced thickness and essentially quadrangular format which, once shaped, are arranged vertically and separately in longitudinal alignment thereby defining a supplyy line (2), and also provided with a bag packaging train (3), both trains being arranged perpendicularly to each other. The bag packaging train comprises bag opening means, bag filing means, bag closing means, bag collecting means and bag transportation means which, by maintaining the verticality of the bags, define two or more packaging lines(4) which are arranged parallel and arre perpendicullar and coplanar with respect to the supply line (2). The transfer device (1) intended to transfer the bags (3) links the supply line (2) with the packaging lines (4). The transfer devices comprises two or more transfer mechanisms, each of which having a transfer shaft (7) and mechanisms for holding the bags (3) said mechanisms being integral with the transfer shaft (7).

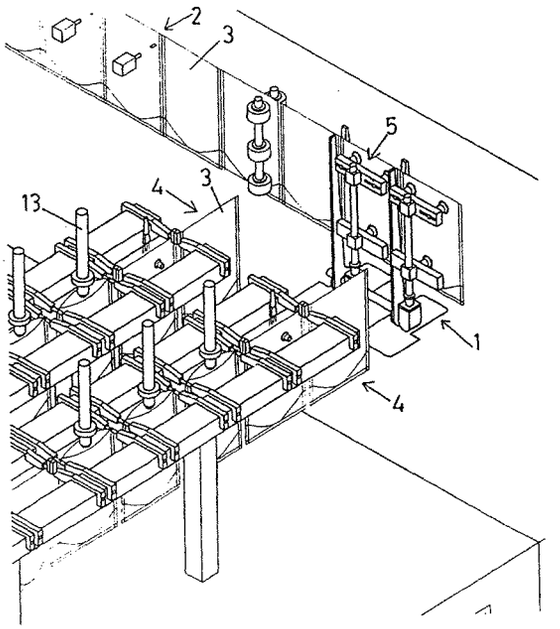


FIG. 1

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Description

Technical Sector of the Invention.

[0001] The object of the present invention is a bag transfer device for automatic packaging machines, which, in general, is applicable to automatic packaging machines of liquid, solid, granulated, ground or pulverulent products.

Background to the invention.

[0002] There are numerous known embodiments of automatic packaging machines of products which, in synthesis, comprise bag-shaped packaging conforming means, the bags having reduced thickness and essentially quadrangular format, obtained from a sheet of thermal welding material, bag filling means or product dosimeter and bag closing means containing the product dose. In general, the bag conforming means, bag filling means and bag closing means are arranged on a frame in longitudinal alignment and operate in a synchronized way through a process controller.

[0003] Patent document EP-A-0376174 describes a packaging machine of the previously mentioned type.

[0004] In the known linear packaging machines, the bags are conveyed during their journey through the successive stages with conveying means, for example, with a plurality of pincers which describe an a to-and-fro movement.

[0005] The inventor of the present invention is also the author of another invention concerning automatic packaging machines, in which the conformer train and the packaging train, the latter comprising opening means, filling means, closing means and conveying means, are arranged perpendicularly to each other. Such an arrangement of mutual perpendicularity between the conformer train and the packaging train allows the packaging capacity of packaging machines of liquid and solid products to increase, in that the filling times are important and/or the conveying speed of the bags prior to closing is limited by the content of the bag. The increase in packaging capacity of these packaging machines is achieved by transferring the bags from a supply line, defined by the conformer train, to two, or more, packaging lines, provided with bag filling and bag closing devices respectively, thereby succeeding in multiplying the production capacity in relation to the embodiments of completely longitudinal structured packaging machines.

[0006] Nevertheless, the first trials have revealed that in the transfer operation of the bags from the supply lines of same, to the opening means, it is very important that it is produced with great precision, otherwise breakdowns occur, or interruptions which adversely affect the general efficiency of the packaging machine.

[0007] With the present invention, the inventor discloses a bag transfer device with improved features to achieve an efficient synchronized coplanar bag transfer from a bag supply line, defined by a conformer train, to two or more packing lines arranged perpendicularly in relation to the supply line.

Explanation of the invention.

[0008] The bag transfer device according to the invention is applicable to packaging machines provided with a bag conformer train of relatively reduced thickness and essentially quadrangular format which, once shaped, are arranged vertically and separately in longitudinal alignment, thereby defining a supply line, and also provided with a bag packaging train, both trains being arranged perpendicularly to each other. The bag packaging train comprises bag opening means, bag filling means, bag closing means, bag collecting means and bag conveying means which, by maintaining the verticality of the bags, define two or more packaging lines, which are arranged parallel to each other and are perpendicular and coplanar with respect to the supply line. The transfer device intended to transfer the bags links the supply line with the packaging lines.

[0009] The bag transfer device according to the invention is characterized in that it comprises two or more transfer mechanisms, each of which are alike and independent and operate simultaneously and symmetrically with respect to an intermediate theoretical longitudinal axis between the respective packaging lines, each of the transfer mechanisms comprising:

- a transfer axis arranged vertically between said theoretical longitudinal axis and the packaging line which is adjacent to it, the axis being driven by a linear transfer mechanism which moves it parallel with respect to the packaging line in both directions and between two positions, those of holding position and transfer position respectively, as well as by turning mechanisms which produce the turning of the transfer axis around its longitudinal axis in both directions and between two positions, holding position and transfer position respectively; and
- bag holding mechanisms which are integral to the transfer axis and operate in such a way that, when the transfer axis is in holding position, said mechanisms proceed to the holding of the bag arranged on the supply line facing the transfer axis, and when the transfer axis is in transfer position, said holding mechanisms stop performing the holding function of said bag, which is arranged in the respective packaging line.

[0010] According to another feature of the bag transfer device of the invention, the transfer mechanisms and the transfer axis turning mechanisms for each of the packaging lines work simultaneously, i.e., they reach both the holding position and the transfer position at the same time.

[0011] Another feature of the bag transfer device of the invention consists of the fact that the holding of the bag by holding means is done by suction.

[0012] According to another feature of the bag transfer device of the invention, the holding means of each transfer axis comprises two transversal carriers, one located at the upper part of said transfer axis and the other at the lower part of the same transfer axis respectively, each of the transversal carriers being provided with suction nozzles.

[0013] Another feature of the bag transfer device, object of the invention, consists of the transversal carrier located at the upper part of the transfer shaft being provided with two suction nozzles.

[0014] According to another feature of the bag transfer device of the invention, the transversal carrier located at the lower part of the transfer axis is provided with a suction nozzle.

Brief description of the drawings.

[0015] In drawing sheets of the present specification, the bag transfer device for automatic packaging machines appears represented, according to the invention. In said drawings,

Fig. 1 is a perspective view of the bag transfer device according to the invention,

Fig. 2 is a perspective view of the bag transfer device of Fig. 1 in holding position,

Fig. 3 is a perspective view of the bag transfer device of Fig. 1 in an intermediate position between holding position and transfer position, and

Fig. 4 is a perspective view of the bag transfer device of Fig. 1 in transfer position.

Detailed description of the embodiment example.

[0016] In the description which follows of the bag transfer device for automatic packaging machines, object of the invention, reference is made to Figures 1 and 2 of the drawing sheets, since the remaining Figures 3 and 4 refer to the bag transfer device mode of operating, and more particularly, to its movements between holding position and transfer position.

[0017] The transfer device 1 of bags 3 is arranged between a supply line 2 of bags 3 obtained from a conformer train, which is not represented, and a packaging train formed by two packaging lines 4 parallel to each other of bags 3, thereby obtaining the opening of the bags by bag opening means 3, the filling of the bags 3 with the product to package by the filling means. The filling means have dosimeters 13 arranged perpendicularly to the conformer train and following the transfer device 1 of bags 3. Nor have the closing means of the bags 3 been shown once the product dose to package has been inserted into same, said closing means being arranged longitudinally, following said filling means. The supply line 2 of bags 3 is perpendicular and coplanar with respect to the packaging lines 4.

[0018] The bags 3 are obtained from a sheet of thermal thermoweldable material, have a relatively reduced thickness and an essentially quadrangular format and, on reaching the position occupied by the transfer device 1 of bags 3, are separated from each other and arranged vertically.

[0019] The transfer device 1 of bags 3 comprises two equal transfer mechanisms 5 which work simultaneously and symmetrically with respect to an intermediate theoretical longitudinal axis 6 between both packaging lines 4.

[0020] Each of the transfer mechanisms 5 comprises a transfer axis 7 arranged vertically between the theoretical longitudinal axis 6 and the corresponding packaging line 4. The transfer axis 7 is joined at its lower end part 8 by means of an adaptor 9 to some linear transfer mechanisms and some turning mechanisms that move it, developing in a way that shall be described later. Said transfer and turning mechanisms, with the object of achieving greater clarity of disclosure, have not been shown in the figures of the drawing sheets; it is understood that said mechanisms can be composed of any suitable type of device, such as, for example, mechanical, pneumatic, hydraulic, electrical devices, etc.

[0021] Each transfer axis 7 incorporates an upper transversal carrier 10 and a lower transversal carrier 11, the first being provided with two suction nozzles 12 and the second with an suction nozzle 12, with the capacity to hold by suction, a bag 3, during the transfer of same from the supply line 2 to the packaging line 4.

[0022] The transfer device 1 of bags 3 works in the way to be described next.

[0023] Figure 2 shows device 1 in transfer position. The conformer train arranges two bags 3, in vertical position and longitudinal alignment, on the supply line 2, and the three suction nozzles 12 of each transfer axis 7, hold a corresponding bag 3, by suction.

[0024] In Figure 3 the transfer mechanisms 5 appear represented in an intermediate bags 3 transfer position on their path from the supply line 2 to the packaging lines 4. Said transfer mechanisms have simultaneously moved both transfer mechanisms 5 in the direction shown as A proximate to the opening means, said paths being symmetrical with respect to the theoretical longitudinal axis 6.

[0025] In Figure 4 the transfer mechanisms 5 driven forward by said turning mechanisms in the direction shown as A', have simultaneously and symmetrically reached the transfer position, placing the bags 3 on the packaging lines 4, this being the moment in which the suction nozzles 12 stop performing their holding function over the bags 3.

[0026] Once the bags are arranged on the packaging

lines 4 the transfer and turning mechanisms move the transfer mechanisms 5 in the opposite direction to those of the previous ones, shown as B and B' , the transfer device 1 of bags 3 being in the initial position described earlier and ready to carry out a new bags 3 transfer operation.

Claims

1. Bag transfer device for automatic packaging machines, applicable to packaging machines provided with a bag conformer train (3) to form bags with relatively reduced thickness and essentially quadrangular format, which, once shaped, are arranged vertically and separately in longitudinal alignment thereby defining a supply line (2), and also provided with a bag packaging train (3), both trains being arranged perpendicularly to each other, said bag packaging train comprising bag opening means, bag filling means, bag closing means, bag collecting means and bag conveying means which, by maintaining the verticality of the bags, define two or more packaging lines (4), which are arranged parallel to each other and are perpendicular and coplanar with respect to the supply line (2), the transfer device (1) of bags (3) thereby linking the supply line (2) with said packaging lines (4), which are **characterized by** comprising two or more transfer mechanisms (5), each of which are alike and independent and operate simultaneously and symmetrically with respect to an intermediate theoretical longitudinal axis (6) between the two packaging lines (4), each of the transfer mechanisms (5) comprising:

   - a transfer axis (7) arranged vertically between said theoretical longitudinal axis (6) and the packaging line (4) which is adjacent to it, said axis (7) being driven by a linear transfer mechanism, which move it parallel with respect to the packaging line (4) in both directions (A, B) and between two positions, holding position and transfer position respectively, and by turning mechanisms which produce the turning of the transfer axis (7) around its longitudinal axis in both directions (A', B') and between two positions, holding position and transfer position respectively; and
   - bag holding mechanisms (3) which are integral to the transfer axis (7) and work in such a way that, when the transfer axis (7) is in holding position, proceed to the holding of the bag (3) arranged on the supply line (2) facing the transfer axis (7), and when the transfer axis (7) is in transfer position, stop performing the holding function of said bag (3), which is arranged in the packaging line (4).

2. Bag transfer device according to claim 1, which is **characterized in that** the transfer mechanisms and turning mechanisms of transfer axis (7) of each transfer mechanism (5) work simultaneously.

3. Bag transfer device according to claims 1 and 2, which are **characterized in that** the holding of the bags (3) by holding means is done by suction.

4. Bag transfer device according to claims 1 to 3, which are **characterized in that** the holding means of each transfer axis (7) comprises two transversal carriers, an upper one (10) and a lower one (11) respectively, each being provided with one or more suction nozzles (12).

5. Bag transfer device according to claim 4, which is **characterized in that** the upper transversal carrier (10) is provided with two suction nozzles (12).

6. Bag transfer device according to claims 4 and 5, which are **characterized in that** the lower transversal carrier (11) is provided with a suction nozzle (12).

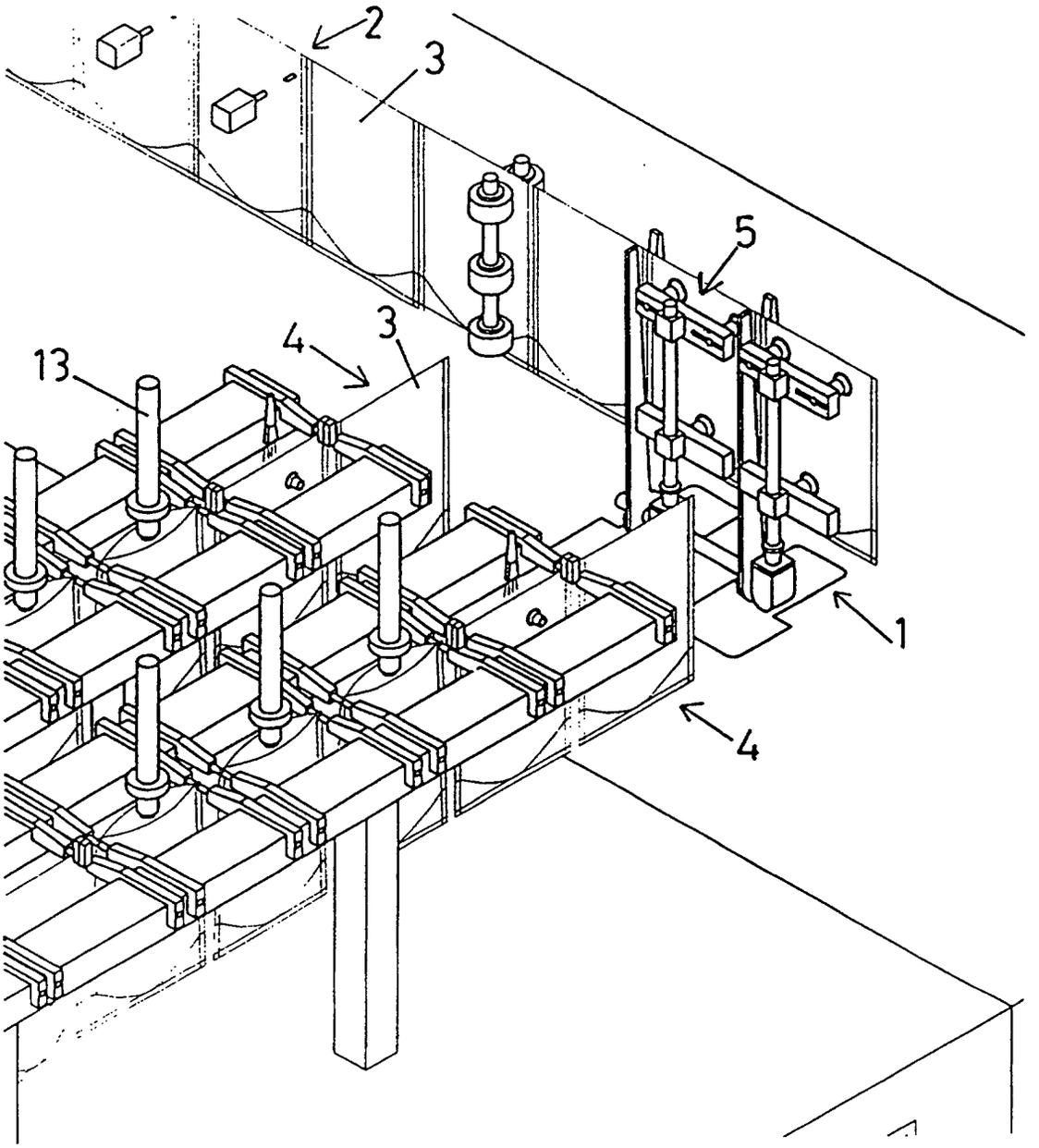


FIG. 1

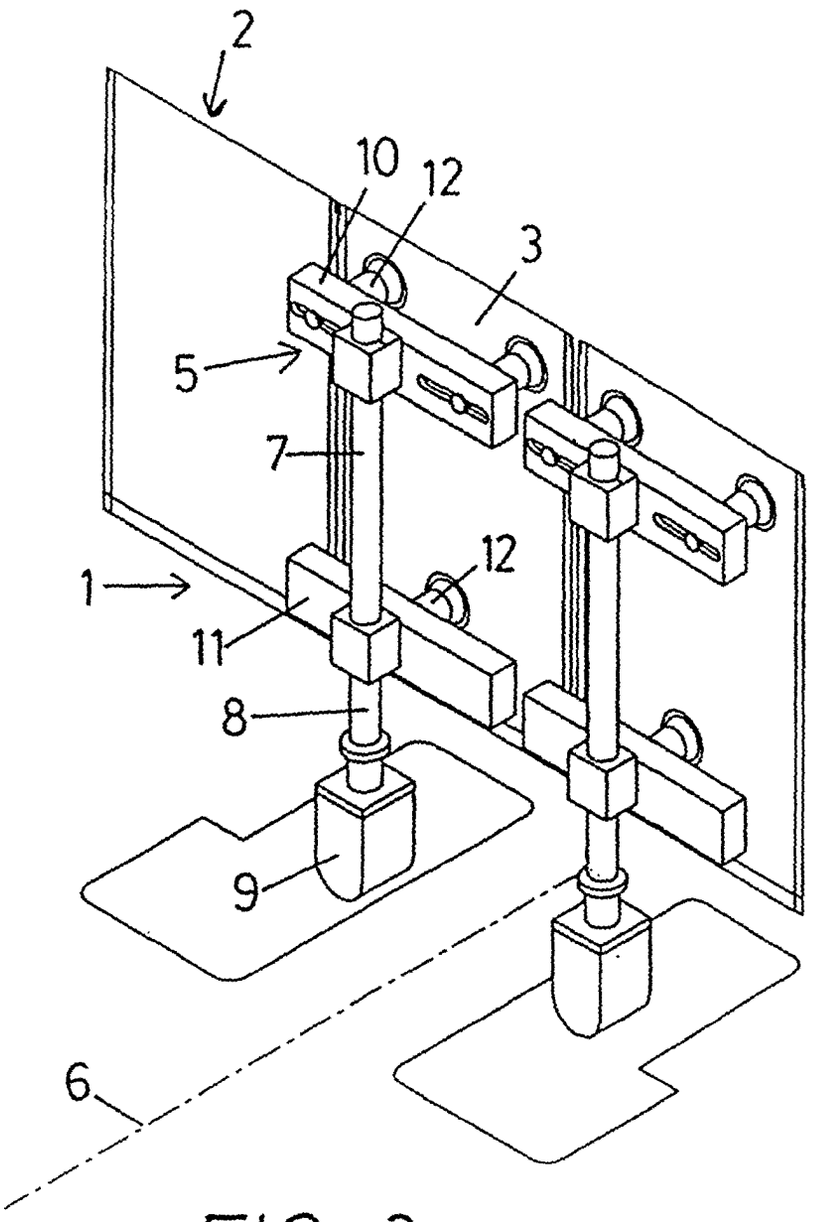


FIG. 2

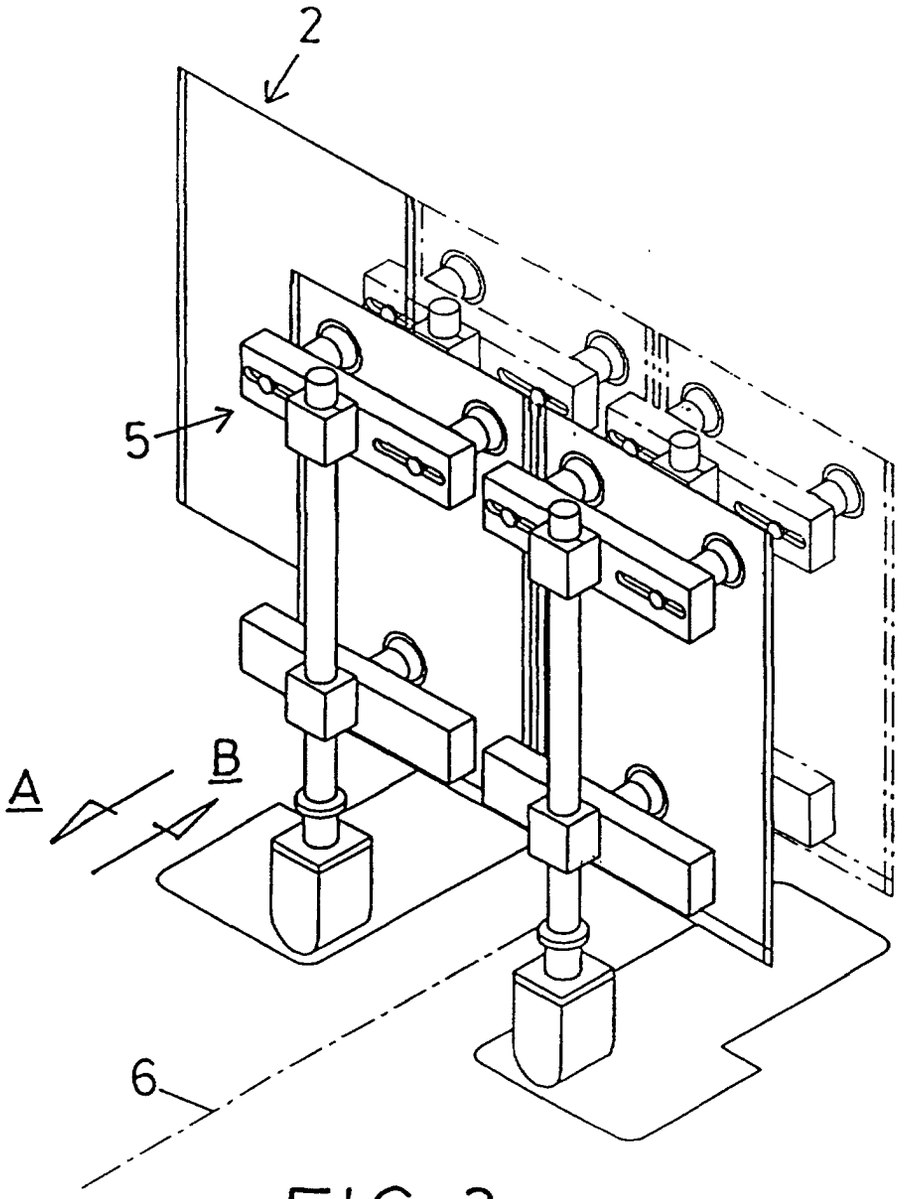


FIG. 3

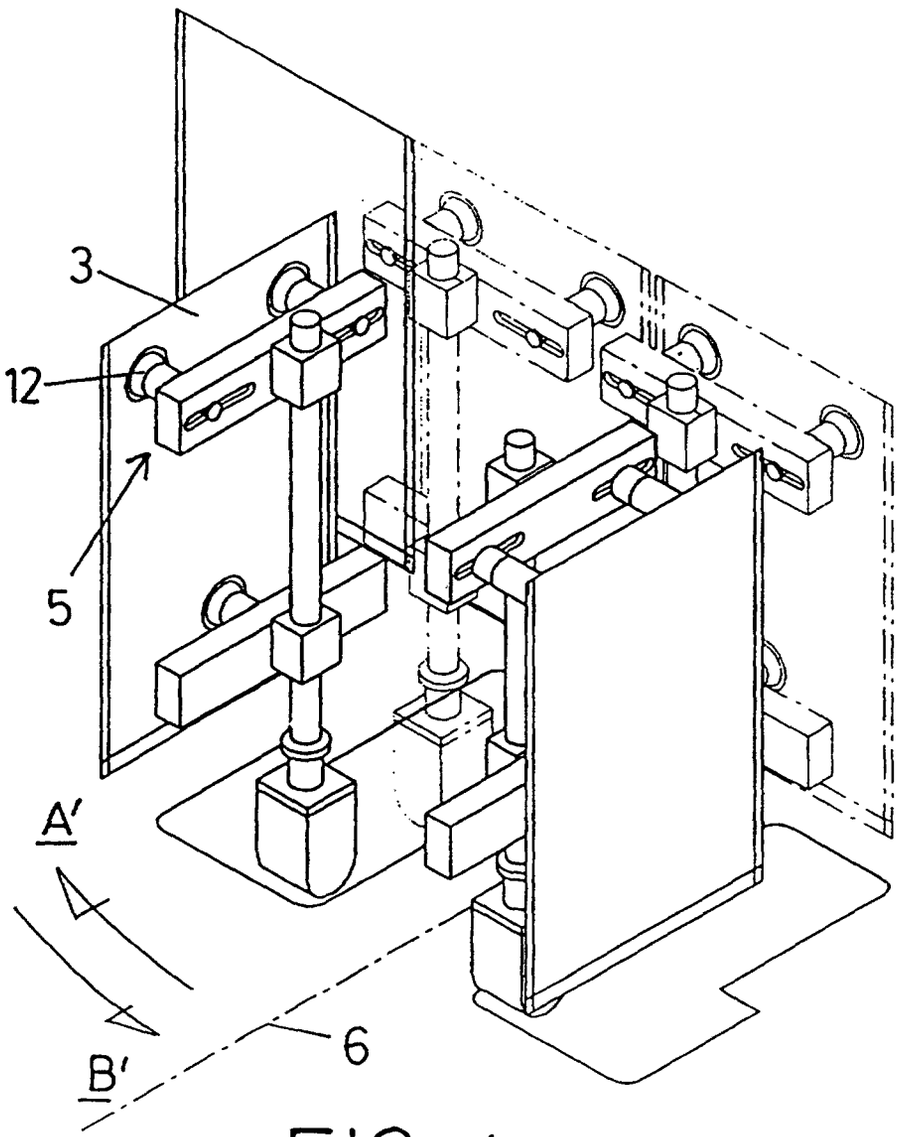


FIG. 4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES 00/00295

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 B65B 43/12, B65B 43/46, B65B 3/02, B65B 9/08

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)

IPC 7 B65B

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

ES

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

CIBEPAT, EPODOC, WPI, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	US 3580442 A (ROHDIN et.al) 25 May 1971 (25.05.71), column 2, line 42 - column 3, line 6; figures 1 and 3	1,3
A	ES 2007416 A6 (OLIVER Y BATLLE) 16 June 1989 (16.06.89), column 4, line 67 - column 5, line 63; figures 1, 2 and 7	1,3
A	ES 2017255 A6 (VOLPAK, S.A.) 16 January 1991 (16.01.91) column 1, line 25 - column 2, line 5; figures	1,3
A	ES 2098169 A1 (BATALLA) 16 April 1997 (16.04.97), column 1, line 3 - column 6, line 37; column 7, lines 9-21; figures 1-5	1
A	EP 0872421 A1 (HARRO HOfliger) 21 October 1998 (21.10.98), 1st claim; Abstract; figures 1 and 2	1

☐ 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	Date of mailing of the international search report
10 October 2000 (10.10.2000)	17 October 2000 (17.10.2000)
Name and mailing address of the ISA/ SPTO	Authorized officer
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Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
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Form PCT/ISA/210 (patent family annex) (July 1992)