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(54) Title: AUTOMATED CONTAINER HANDLING MACHINE

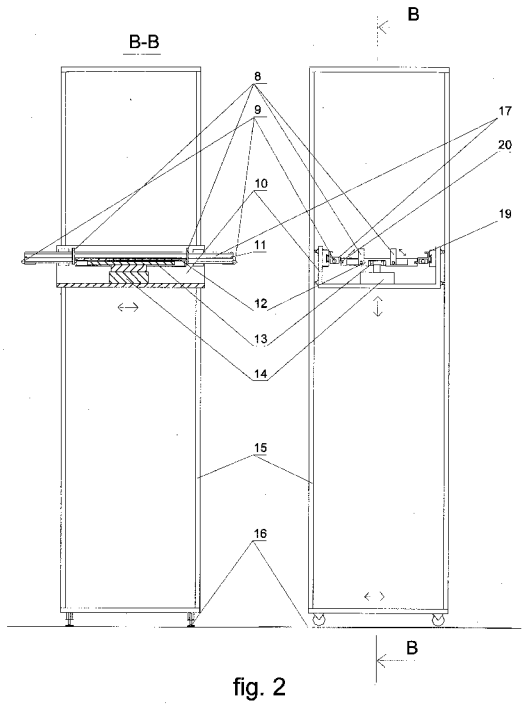


fig. 2

(57) Abstract: The object of the invention is an automated container handling machine to be used for automatic container handling (loading and unloading) from the shelving. The automated container handling machine is composed of a shelving and a moveable transport shelving. Slidable containers (2) are placed - one after another - on rails (3), which are fixed to the shelving casing (1). An additional guide (18) is located on the rails (3). From the front, the rails (3) are equipped with docking spots (5), whereas an element blocking containers (6) against falling out is located on every rail (3). The moveable transport shelving is provided with a rigid frame (15) able to slide on guides (16) arranged in parallel against the front wall of the shelving and with a slidable platform (10), to which are fixed: a pair of rails (17) that can move along their axis and - on two sides - docking spots (9) fitting to docking spots (5) of the shelving. It is also a container-moving carrier (12), which can slide on guides (20) of the moveable transport shelving and on guides (18) of the shelving.

Automated container handling machine.

The object of the invention is an automated container handling machine to be used for automatic container handling (loading and unloading) from the shelving.

There exist automated shelvings manufactured by Kardex Polska Sp. z o.o. The offer includes vertical carousel shelvings composed of moveable shelves moving up and down carrying goods to a functional access window when activated by the staff,. There are horizontal system too.

There also exists a lift shelving manufactured by Modul Polska Sp. z o.o. and composed of a moveable carrier, which is to take moveable shelves from or place them at target storage locations. A group of photoelectric cells is located where the goods are put into the shelving onto a shelf given.

Their function is to define maximum height of goods on a shelf and reserve precisely the amount of place the goods require. This distinguishes the lift shelving from a traditional shelving. In case of goods of various heights, this function ensures a high level of optimisation and of space usage, which entails decrease in required storage space. The shelves may be pulled out of the shelving, so that their whole contents may be taken out.

The same manufacturer places on the market a rotation (carousel) system shelving. Working principle of carousel system shelvings consists in vertical flat elliptical movement of shelves. At all times maintained a vertical arrangement of shelves is maintained on the model of gondolas. There is no defined rotation direction – it depends on whether a shelf given is closer to an operator going up or

down. This helps reduce the time to access goods. Every single shelf is designed following the type of goods to be stored.

As per the invention, the automated container handling machine is composed of a shelving and a moveable transport shelving. Slidable containers are placed – one after another – on rails, which are fixed to the shelving casing. An additional guide is placed on the rails. An elastic distance holder is placed at every pair of rails, at the back of the shelving. In the front, the rails are equipped with docking spots; moreover, an element blocking the containers is to be found on every rail.

The moveable transport shelving is provided with a rigid frame, which can slide on guides arranged in parallel against the front wall of the shelving; it is also provided with a slidable platform with a pair of rails fixed to it and able to perform small movements along their axis. On both sides of the rails are docking spots fitting the docking spots at the shelving. The rails are also provided with safeguard preventing the containers from falling out accidentally, as well as with a container-moving carrier, which can slide on guides of the moveable transport shelving and on guides of the shelving.

A telescopic mechanism with drive constitutes the carrier drive. Hinged tappets are to be found on both sides of the carrier.

The moveable shelving may be equipped with a strip lifting the containers, which increases the machine capacity. In this version, it is provided with a platform, which a pair of lifting grabs is mounted on and vertically slidable, whereas hinged catches are fixed to those grabs.

Due to the moveable transport shelving, during all operations related to their removing, inserting, and transporting, the containers are always positioned

between two rails. This allows operating the containers easily, with no sophisticated and high-precision devices required. The simplicity of the machine reduces its costs and significantly increases its reliability. Moving the moveable transport shelving and connecting it to rails at the shelving – using the tongue and groove method – does not require high precision. Setting the container-moving carrier in a correct position, so as to turn and slide the tappets in between the containers, is a simple operation as well.

The object of the invention has been shown as an example implementation by the drawing, where Fig. 1 presents the shelving in view and projection, Fig. 2 – moveable transport shelving in view and projection, Fig. 3. – moveable transport shelving with lifting strip in view and projection, and Fig. 4 presents the moveable transport shelving and the shelving combined.

Rails 3 are fixed to the casing 1, adapted containers 2 are placed on those rails 3 one after another. On the rails 3 an additional guide 18 is placed, which the container-moving carrier 12 can slide on. An elastic distance holder 4 is placed at every pair of rails, at the back of the shelving. From the front, the rails 3 are equipped with docking spots 5 for the moveable transport shelving. An element blocking the containers 6 is to be found on every rail. They are unblocked at the moment of connecting the tongue 5 of the rail 3 to the groove 9 of the moveable transport shelving. The shelving gives the possibility of storage and transportation of several types of containers. The containers are protected against falling out accidentally.

A rigid frame 15 can slide on guides 16 arranged in parallel against the front wall of the shelvings (the automated machine can serve one or more shelvings). The platform 10 slides vertically on the frame 15. A pair of rails 17 is attached to

the platform 10 – they are able to perform small movements along their axis. The scope of the motion of the frame 15, of the platform 10 and of the rails 17 allows setting a required position and connection of the rails 17 with any pair of rails 3 of the shelving. On its two sides, the moveable transport shelving is provided with docking spots 9 fitting docking spots 5 of the shelving. It is also provided with safeguard preventing the containers 11 from falling out accidentally, which is unblocked at the moment of connecting the tongue 5 to the groove 9. The automated machine is equipped with a carrier to move the containers 12. This carrier slides on guides 20 of the moveable transport shelving, and once connected to a rail of the shelving, it continues sliding on a rail of the shelving among container courses. The carrier is slid by a telescopic mechanism 13 with a drive 14. The mechanism enables the carrier to move out to the right and to the left side. Hinged tappets 8 are located on both sides of the carrier. When the carrier 12 is in a right position, the tappets 8 turn to a vertical position and come in between two containers, into an opening between them 7. Then the telescopic mechanism 13 pulls or pushes the carrier 12 moving the containers on the rails.

As regards the strip option, the moveable transport shelving is equipped with a strip lifting the containers, which increases the machine capacity. A pair of lifting grabs 22 moves on the platform 21 up and down. Hinged catches 23 are fixed to the grabs 22. While turning, the catches seize a separate container and, together with the grabs 22, they lift it. A few catches are located on every strip – they twist independently and can seize a single container, leaving the other containers.

Patent Claims

1. Automated container handling machine composed of a shelving and a moveable transport shelving, characterised in that to the shelving casing (1) are fixed rails (3), on which containers (2) are placed one after another, on the rails (3) an additional guide (18) is located, while at the back of the shelving, at every pair of rails (3), an elastic distance holder (4) is located, and at the front, the rails (3) are equipped with docking spots (5), whereas on every rail (3) an element blocking the containers (6) is located.

2. The automated machine as of Claim 1 characterised in that the moveable transport shelving is provided with a rigid frame (15) able to slide on guides (16) arranged in parallel against the front wall of the shelving and with a slidable platform (10), to which are fixed: a pair of rails (17) that can move along their axis and – on two sides – docking spots (9) fitting to docking spots (5) of the shelving, as well as safeguard against the containers (11) falling out accidentally, and a carrier to move the containers (12) able to slide on the guides (20) of the moveable transport shelving and the guides (18) of the shelving, where the carrier drive (12) consists of a telescopic mechanism (13) with a drive (14), and hinged tappets (8) are located on both sides of the carrier.

3. The automated machine as of Claim 2 characterised in that the moveable transport shelving is provided with a platform (21), which a pair of lifting grabs (22) are mounted on and vertically slidable, whereas hinged catches (23) are fixed to those grabs.

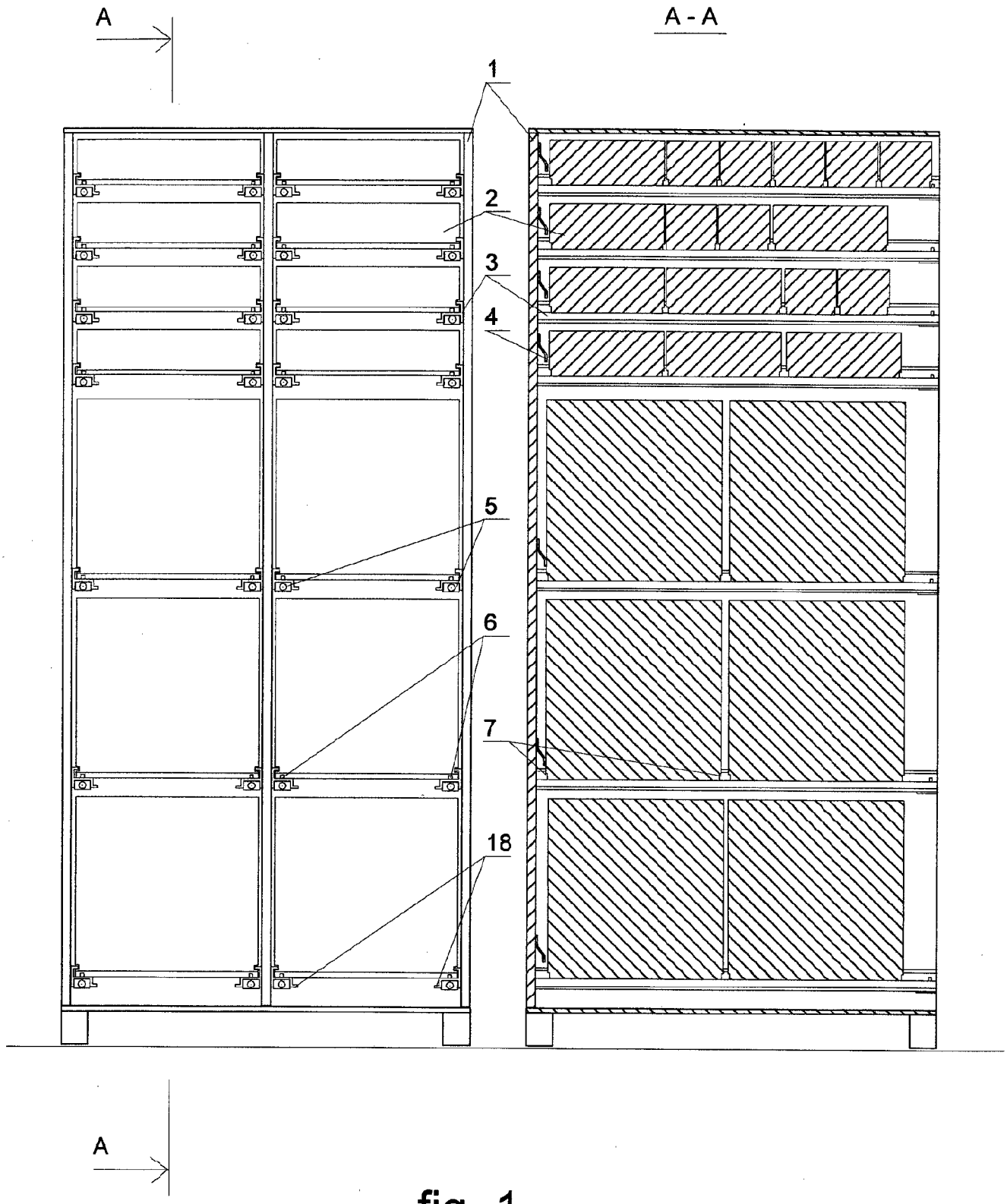


fig. 1

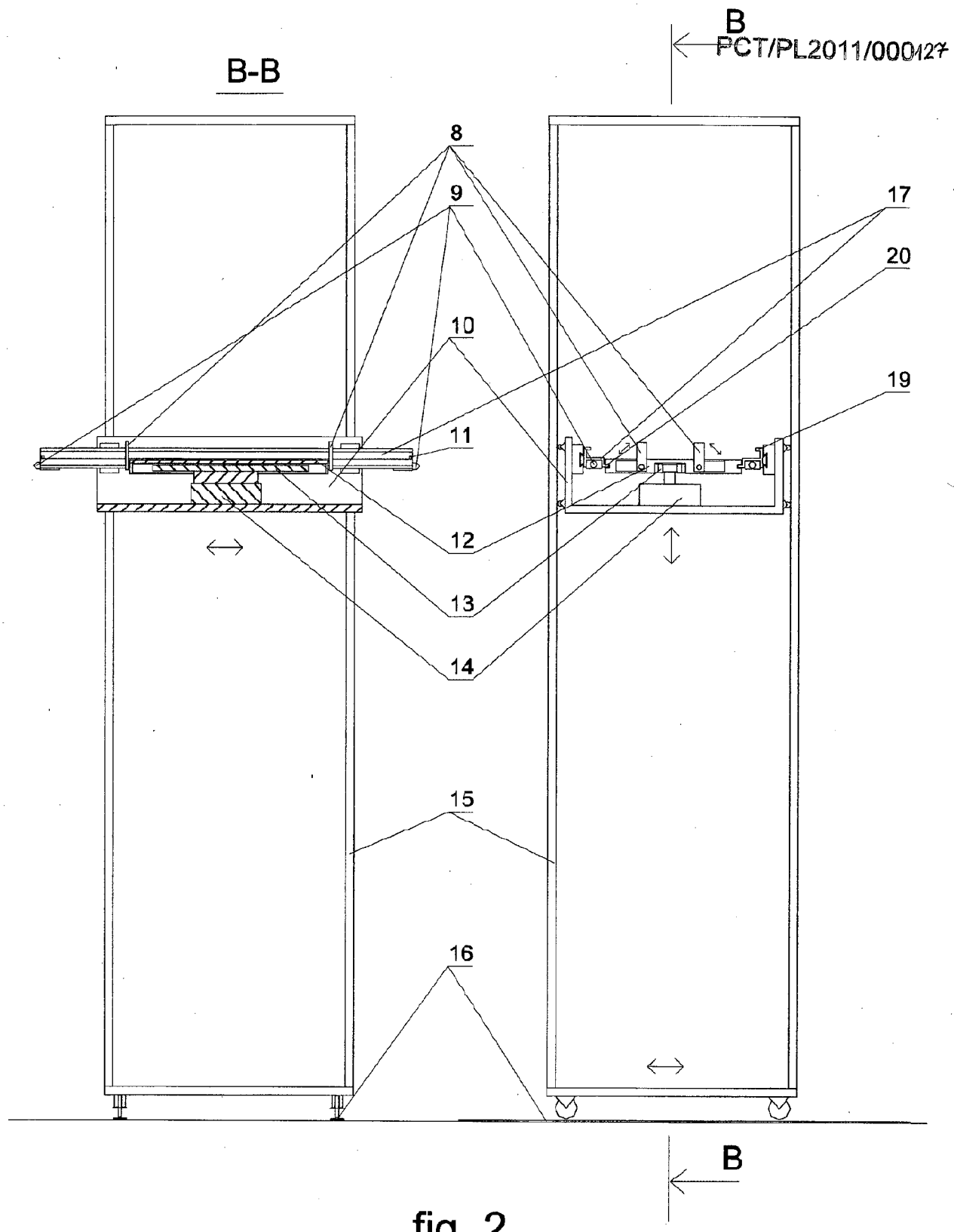


fig. 2

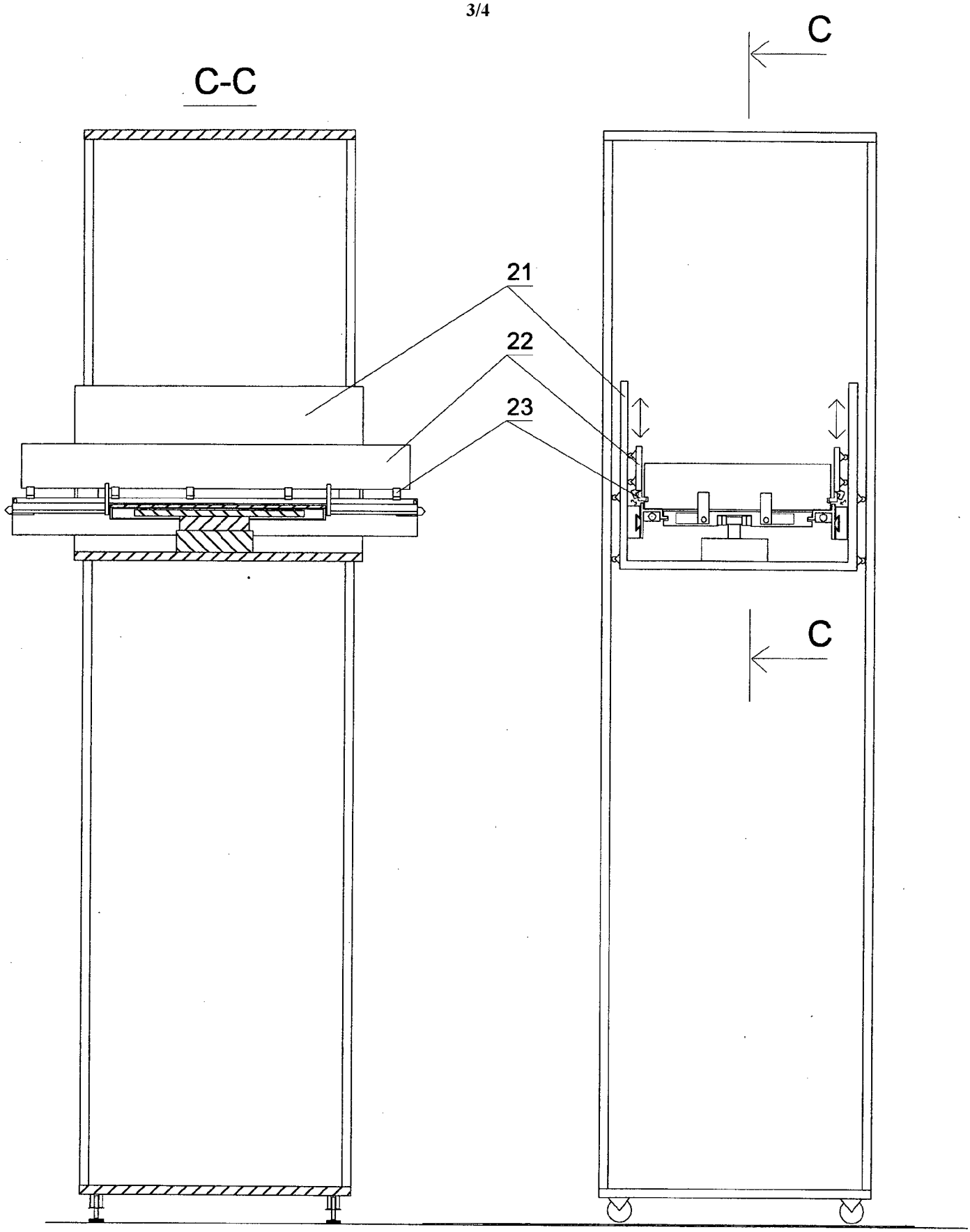


fig. 3

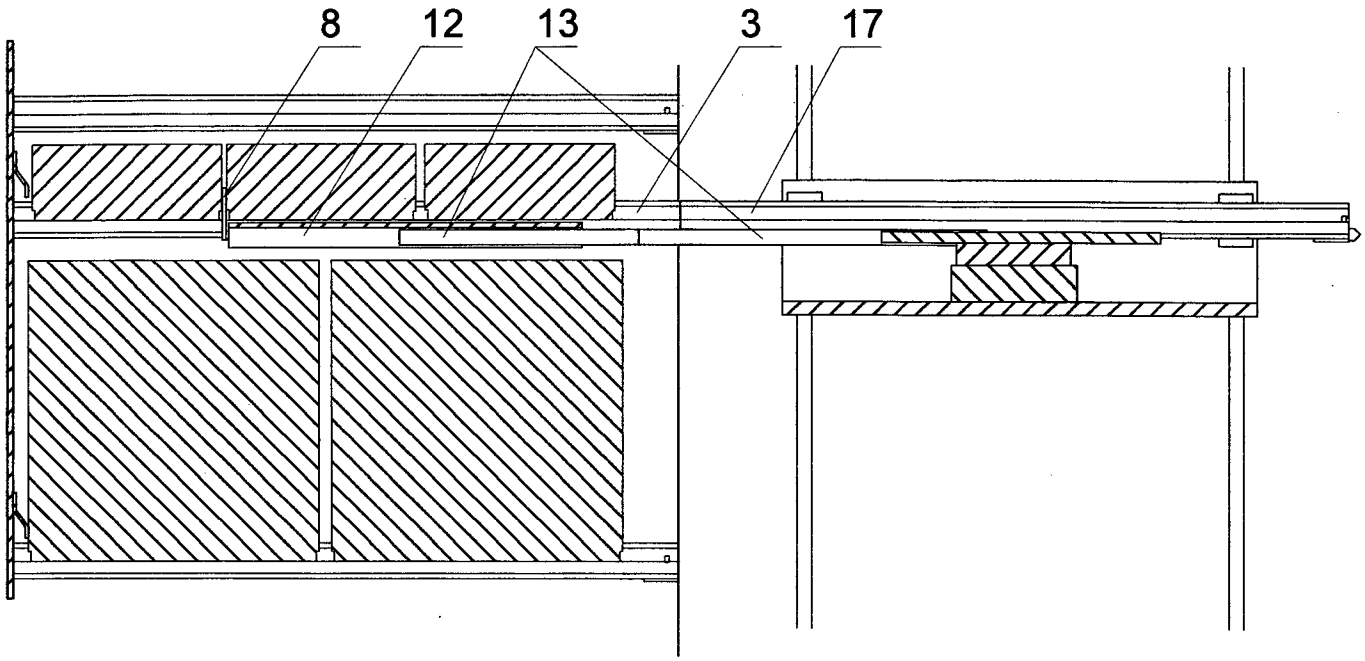


fig. 4

INTERNATIONAL SEARCH REPORT

International application No
PCT/PL2011/000127

A. CLASSIFICATION OF SUBJECT MATTER
INV. B65G1/04
ADD.

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, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 60 090202 U (-) 20 June 1985 (1985-06-20) figures 1-20	1
Y	US 3 624 792 A (LIPFERT DONALD ERNEST) 30 November 1971 (1971-11-30) columns 1-8; figures 1-8	1
A	US 3 664 534 A (HUNTER CALVIN W) 23 May 1972 (1972-05-23) columns 1-4; figures 1-8	1
A	DE 20 21 611 A1 (EATON YALE & TOWNE) 19 November 1970 (1970-11-19) pages 1-32; figures 1-11	1
A	DE 93 21 117 U1 (NOELL GMBH [DE]) 29 February 1996 (1996-02-29) pages 1-10; figures 1-4	1

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

☒ See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
16 March 2012	26/03/2012

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
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