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(71) Applicant *(for all designated States except US)*: **PROCES-DATA A/S** [DK/DK]; Navervej 8, DK-8600 Silkeborg (DK).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **THYRRING, Rasmus** [DK/DK]; Sølystvej 102, DK-8600 Silkeborg (DK). **CRAMER NIELSEN, Christian** [DK/DK]; Buskelundtoften 40, DK-8600 Silkeborg (DK).

(74) Agents: **GREY, Ian** et al.; 200 Aldersgate, London EC1A 4HD (GB).

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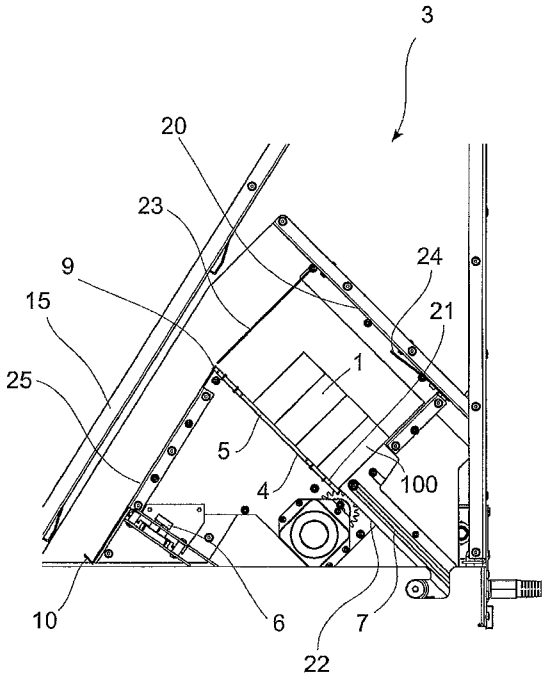

Fig. 1

(57) Abstract: The invention relates to an apparatus for storing and dispensing goods such as tobacco related products, which products are contained in packages, said apparatus comprising a storage unit (16) for storing packages in a number of storage shelves or tubes (15), a unit (14) for conveying one or more packages (1, 100) from the storage unit (16) to an outlet, said unit (14) being in the form of a fetcher mechanism which comprises means for determining position, whereby the fetcher mechanism (14) can be caused to be situated next to a given storage shelf or tube (15), where said fetcher mechanism (14) is arranged to convey one or more packages (1, 100) from a feeding device (3) to a storage shelf or tube(15). The invention further relates to a method for storing and dispensing goods such as tobacco related products.

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APPARATUS AND METHOD FOR STORING AND DISPENSING GOODS SUCH AS PACKAGED TOBACCO PRODUCTS

The invention relates to an apparatus for storing and dispensing goods such as tobacco related products, which products are contained in packages, said apparatus comprising a storage unit for storing packages in a plurality of storage shelves or tubes, a conveying unit for conveying a package within the storage unit, and a registration unit operable to register a package inputted into the apparatus and to assign a position in one of the plurality of storage shelves or tubes to the package, the conveying unit being operable to convey the package to the assigned position in one of the plurality of storage shelves or tubes.

The invention also relates to an apparatus for storing and dispensing goods such as tobacco related products, which products are contained in packages, said apparatus comprising a storage unit for storing packages in a number of storage shelves or tubes, a conveying unit for conveying one or more packages within the storage unit.

The invention further relates to a method for storing and dispensing goods such as tobacco related products, which products are contained in packages in an apparatus comprising a storage unit for storing packages in a number of storage shelves or tubes.

From EP1977401 A1 is known an apparatus for storing and dispensing goods such as tobacco related products, which products are contained in packages. The apparatus comprises a storing unit, which unit is connected to a pneumatic distribution device for delivering packages from the storage unit to a row of check-out counters.

Such an apparatus requires installation of pneumatic delivery piping and is not suitable to be installed in small stares such as gas stations or kiosks.

The present invention also tries to ensure that the packages cannot be handed out without payment being made or without detecting that a package is handed out without payment.

When packages are positioned in an inlet of the storage apparatus, the individual packages are scanned and registered. When registering the packages, the individual package is assigned to a given position, corresponding to an inclining shelf in the storage unit. Thereby it is possible to keep a register of the individual packages contained in the storage unit and the actual position of the packages.

When a person, typically being a retail worker, puts a number of packages into an insert opening of the storage apparatus and the packages are registered the storage apparatus takes over the “responsibility” for the packages, since the apparatus is designed in such a way that the retail worker or other persons being in the store, cannot get access to the storage compartment of the storage apparatus.

When a customer wants to purchase a package, which for example can be a pack of cigarettes, the retail worker presses an icon on a display, which icon represents the desired product. Then a fetcher mechanism will be positioned relative to the storing shelf containing the specific package, the fetcher mechanism releases the package from the inclining storage shelf or tube and the package slides into a chamber in the fetcher mechanism. Hereafter, the fetcher mechanism moves to an outlet opening (not shown), where the package is delivered and from where the retail worker or the customer can pick up the purchased package.

Hereby it is achieved that it is only possible to distribute the exact number of packages corresponding to the packages in the apparatus, and no one may obtain a package that has not been bought.

This is achieved by an apparatus for storing and dispensing goods such as tobacco related products, which products are contained in packages, said apparatus comprising a storage unit for storing packages in a plurality of storage shelves or tubes, a conveying unit for conveying a package within the storage unit, and a registration unit operable to register a package inputted into the apparatus and to assign a position in one of the plurality of storage shelves or tubes to the pack, the conveying unit being operable to convey the package to the assigned position in one of the plurality of storage shelves or tubes.

This is also achieved by the invention by having a conveying unit which is arranged to convey one or more packages from a feeding device to a storage shelf or tube.

Having a conveying unit being in the form of a fetcher mechanism comprising means for determining position, whereby the fetcher mechanism can be caused to be situated next to a given storage shelf or tube, it is possible for the apparatus to determine the destination of a package based on data of the content of a storage shelf or tube.

Having a feeding device comprising a detecting device for detecting a code placed on a package makes it possible to register and keep track on packages entered into the system.

Having a window and a detecting device which are arranged relative to each other in such a way that the window is positioned sloping in relation to a longitudinal axis through the detecting device minimizes or avoids presence of disturbing reflections.

A mirror can be arranged at an opposite side of the window in relation to the detecting device to be able to detect a pattern or the like on the upper side of a base surface for support of the packages.

The mirror can be arranged sloping in relation to the window to be able to increase the detection angle.

The feeding device comprises a first pushing device to move the packages from the inlet and further to a fetcher mechanism.

The inlet can be provided with an image of a line pattern placed on top of the base surface, which pattern is visible or detectable for the detecting device if no packages are placed in the inlet or feeding device in front of the first pushing device.

The fetcher mechanism can also convey a package from an assigned storage shelf or tube to a discharge opening.

The invention is also achieved by a method where the method comprises the steps of:

- Placing one or more packages in an inlet device from where the individual packages are detected and registered;
- Transferring one or more packages from the inlet device to a fetcher mechanism;
- Positioning the fetcher mechanism under a storage shelf or tube;
- Transferring the one or more packages to the storage shelf or tube.

Further the method can comprise following steps:

- Positioning the fetcher mechanism under a storage shelf or tube;

- Releasing one or more packages from the storage shelf or tube into the fetcher mechanism;
- Positioning the fetcher mechanism over a discharge opening, which discharge opening is in connection to an outlet opening;
- Releasing the one or more packages into the discharge opening.

In an embodiment the number of packages and the identity of the one or more packages are registered before handing out the one or more packages.

In an embodiment of the invention each package is assigned a unique code, which code follows the package within the apparatus.

In an embodiment of the invention registered data of a package is compared with information in a data processing unit (not shown) and position based on product information and stock levels in storage unit is assigned to the package.

Further the exact place of each package can be registered and processed in a processing unit.

Hereby is achieved that the system is able to provide a reliable overview over the flow of packages into and out of the storage apparatus.

As used herein, the terms tobacco-related products and cigarettes are taken to include all tobacco industry products and for example include smokeable products such as cigarettes, cigars and cigarillos whether based on tobacco, tobacco derivatives, expanded tobacco, reconstituted tobacco or tobacco substitutes and also heat-not-burn products.

Further embodiments and advantages are disclosed below in the description and in the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described more fully below with reference to the drawings, in which:

Figure 1 shows a section of a feeding device with packages positioned in an inlet opening and a pushing device ready to push one or more packages;

Figure 2 shows a section of the feeding device with one or more packages pushed towards a bend;

Figure 3 shows a section of the feeding device with a package pushed beyond a bend;

Figure 4 shows an alternative feeding device with packages positioned in an inlet opening;

Figure 5 shows the alternative feeding device with a first pushing device ready to push a package;

Figure 6 shows the alternative feeding device with a package pushed towards a bend;

Figure 7 shows the feeding device with a package pushed over the bend and resting against stop means;

Figure 8 shows a storing unit;

Figure 9 shows an alternative embodiment of a storing unit;

Figure 10 shows a position of the inlet opening in the storing unit shown in figure 9;

Figure 11 shows the fetcher mechanism positioned just below an inlet shelf;

Figure 12 shows the fetcher mechanism ready to pick up a stored package from the inlet shelf;

Figure 13 show the fetcher mechanism releasing a package from the inlet shelf;

Figure 14 shows the fetcher mechanism with a package in a chamber for delivery to a storage shelf or tube or to an outlet opening;

Figure 15 show the fetcher mechanism with a package in the chamber for delivery to a storage shelf or tube;

Figure 16 shows the fetcher mechanism ready to place a package on a storage shelf or tube;

Figure 17 shows the fetcher mechanism ready to pick up a stored package with a lifting device lifting the package over the stop means of the storage shelf or tube;

Figure 18 shows the fetcher mechanism with the lifting device and the second restraining device positioning the package in a storage shelf or tube;

Figure 19 shows the fetcher mechanism retracting the lifting device and the second restraining device holding the package; and

Figure 20 shows the fetcher mechanism with the second restraining device after positioning the package in place on a storage shelf or tube.

DETAILED DESCRIPTION

The invention comprises a storage unit 16 for storing packages in a number of storage shelves 15,, a unit 14 for conveying one or more packages 1, 100 from the storage unit 16 to an outlet, said unit 14 being in the form of a fetcher mechanism 14 which comprises means for determining position, whereby the fetcher mechanism 14 can be caused to be situated next to a given storage shelf 15.

The shelves 15 can be tubes, which tubes are positioned in an angle to the horizontal which is larger than or smaller than 90°. The tubes 15 are provided with an edge or protrusion at their bottom end to prevent the packages from falling out. The packages must be moved or pushed over the edge or protrusion to be released from the storage shelf or tube.

When inserting one or more packages 1, 100 in an insert opening 2 of the apparatus for storing and dispensing goods such as tobacco related products, the one or more packages 1, 100 are placed in a feeding device 3 on a base surface 4. In a feeding device 3 a number of packages 1 can be positioned on top of each other in such a way that they rest against each other with respect to their largest surfaces, with a bottom package 100 resting against a first pushing device 7 on the largest surface of the package 100 and the packaging or packages resting with their edges on the base surface in such a way that it is possible for a detecting device 6 to detect read or in another way scan a code for the specific kind of package.

When a package is detected and identified through the code in the inlet, the package is provided with a unique code, which code can comprise an

electronic “time stamp”. This “time stamp” makes it possible at any time to determine when a given package 1, 100 is inserted into the apparatus for storing and dispensing goods.

This “time stamp” or unique code makes it possible to withdraw certain packages from the storage unit i.e. in case of a batch of faulty produced goods.

The unique code makes it also possible to sell special offers or special designed packages 1, 100 for shorter periods without reconfiguration of the storage unit 16.

In an embodiment of the invention the detecting device 6 is placed below the base surface and at least a part of the base surface 4 is provided with a transparent part 5, which transparent part 5 in the rest of the description for convenience will be called a window 5.

When the one or more packages 1, 100 are pushed across the base surface 4 and thereby across the window 5 the detecting device 6 is able to scan the unique codes of the packages one at the time.

The inlet chamber 3 can be provided with a line pattern at the top 20 of the inlet 3 opposite the base surface 4 and the window 5. Further a mirror 24 can be placed at the top 20 of the inlet 3 to reflect an image of a line pattern placed on top 21 of the base surface 4, which pattern is visible for the detecting device 6 if no packages 1, 100 are placed in the inlet 3 in front of the first pushing device 7, when the first pushing device 7 is retracted to its initial position. The underside 22 of the first pushing device 7 can also be provided with a line pattern.

The purpose of the line pattern is to make it possible to distinguish between packages with authorized codes, objects with unauthorized codes and if objects with no codes are present in the inlet opening 3.

If the pattern is visible for the detecting device 6 the system will know that there is no objects present in the inlet ahead of the first pushing device 7. If the detecting device 6 detects that the line pattern is interfered the first pushing device 7 will be advanced and the system checks through the detecting device if an authorized bar code is present. If this is the case, the first pushing device 7 is advanced to push the one or more packages 1, 100 over a bend or edge 9 from where the one or more packages 1, 100 slides in a substantially downwards direction until the package or first package 1, 100 rests against a stopping member 10 at the end of a sloping surface of an inlet shelf 25. If the system does not detect an authorized bar code, the first pushing device will return to its initial position and a display or other form for signal will give the instruction “remove object”. Thereby no fingers or hands should be caught in the inlet, when the first pushing device 7 moves forwards. Further a person operating the system will know the instruction can be caused by a package 1, 100 placed the wrong way, why the bar code cannot be detected. Then the package can be placed correct and the operation can continue.

If only one or a few packages 1, 100 are placed in the inlet the first pushing device 7 will start advancing after a defined time interval. Hereby it is possible to for the system to await insertion of any further packages 1, 100 before the first pushing device is advanced (again when determined whether the object is a package 1, 100 with an acceptable code or if the object could be a finger or a hand).

The lines in the pattern will have a certain thickness, which is larger than the average thickness of a bar code. The line pattern is provided by lines

preferably in black and white, but other colours or greyscale contrasts can be used. The black and white lines can be of the same thickness or they can be of different thickness. The most important is that the detecting device is capable of recognising the pattern or can recognise if the pattern is interfered by an unauthorized object, which object could be a finger or a hand.

When the line patterns are placed out of optimal focus of the scanner, it is advantageous to have a line pattern of relatively wide lines to ensure that the scanner is able to detect the difference between “pattern” and “not pattern”

At the top of the inlet 3 a hatch 23 can be provided. The hatch 23 is connected to the first pushing device 7 and prevents that a package 1, 100 or another object by mistake or deliberately can be inserted into the storage unit 16 without first being detected and registered by the detecting device 6

In alternative embodiment the detecting device 6 can be placed behind a window (not shown) placed behind the packages 1, 100 shown in figure 1. In such an embodiment the packages 1, 100 should be placed on the base surface 4 with their shortest edges facing towards the base surface 4 and the surfaces of the packages 1, 100 whereon the unique codes i.e. bar codes are placed facing towards the detecting device 6.

In an alternative embodiment of a feeding device 3, the packages 1, 100 can rest on the base surface 4 on one of their narrow sides of the packages 1, 100.

In an embodiment the window 5 and the detecting device 6 are preferably arranged relative to each other in such a way that the window is not positioned perpendicular to a longitudinal axis through the detecting device. Hereby reflections are avoided.

On the other hand an angle between the window and the detecting device must not be too wide since total reflection then can occur and the detecting device will not be able to detect the code on the packages, which code can be a bar code.

In yet an alternative embodiment packages is placed in the inlet 3 with a bottom package 100 resting on the base surface 4 on the largest surface of the package 1, 100.

The way of positioning the packages on the base surface 4 in the inlet 3 is determined by a position of the window 5 and the detecting device 6 for detecting, reading or in another way scanning a unique code for the specific kind of package. Such a unique code could be a bar code or another code presenting information i.e. about size of the package, price, content, date of production or the like.

When a number of packages 1, 100 are positioned on the base surface 4 of the inlet or feeding device 3 a first pushing device 7 moves into an engaging position, bringing a protrusion 8 into position to push the bottom package 100 from the its position and over a bend or edge 9 from where the package 100 slides in a substantially downwards direction until the package 100 rests against a stopping member 10.

To ensure that only the bottom package 100 is pushed out from a stack of packages 1, 100 in this embodiment, a first restraining device 11 holds back the package 1 lying on top of the bottom package 100.

To position the first restraining device 11 in a proper distance from the base surface 4 to hold back the package 1 lying on top of the bottom package 100, the restraining device 11 is provided with a distance sensing device 12.

In an embodiment, the distance sensing device 12 is provided by an arm 12, which is hinged at a hinging point 13 to the restraining device 11 in such a way that the length of the arm 12 ensures that the restraining device is positioned to hold back the package 1 lying on top of the bottom package 100.

When the bottom package 100 is pushed against and beyond the bend 9, the arm 12 will pivot around the hinging point 13 allowing the bottom package 100 to pass under the first restraining device 11 while the first restraining device 11 is holding back the package 1 (if any) lying on top of the bottom package 100.

When the package 100 is pushed towards the bend 9, the restraining device 11 can follow the package 100 guiding the package 100 downwards in an inclining direction towards the stopping member 10.

When the package is resting against the stopping member 10, the package 100 is ready to be collected by a fetcher mechanism 14.

The fetcher mechanism 14 is arranged to be moved under a number of storage shelves 15, which storage shelves 15 are arranged inclining relative to a storage unit 16 in such a way that the packages 1, 100 will be positioned in a lower end of a shelf 15 due to gravity. Hereby it is possible to release a package, stored on a shelf, by means of the fetcher mechanism 14. The fetcher mechanism 14 can then transport the package 1, 100 to the outlet opening or the second pushing device 17 can simply let the package 1, 100 drop through an opening in the bottom of the fetcher mechanism 14 by moving the second pushing device to the side so it will no longer support the package 1, 100. Then the package 1, 100 will drop onto a kind of funnel leading the package 1, 100 to the outlet opening.

On the second pushing device 17 a substantially vertically positioned plate 18 is provided. The plate 18 can lift a package 1, 100 over the stopping member 10 when the plate 18 extends through a slit in a storage shelf or tube 15 or in an inlet shelf 25 in order to release the package 1, 100.

A third pushing device 19 is positioned on another side of a chamber in the fetcher mechanism 14 in relation to the position of the storage shelves or tubes 15 or the inlet shelf 25 to be able to push a package 1, 100 through the chamber of the fetcher mechanism 14. The third pushing device is able to follow a pack 1, 100 through the chamber and to place the package 1, 100 over the stopping member in such a way that the package 1, 100 rests on the stopping member 10 of a storage shelf or tube 15. Further the third pushing device 19 could be capable of lifting a package over the stopping member 10 to release a package 1, 100 for transport by the fetcher mechanism.

The third pushing device also secures that a released package 1, 100 does not fall through the chamber of the fetcher mechanism.

In an embodiment the second and third pushing device 17, 19 can be provided with a control arm (not shown). The third pushing device 19 can also in this embodiment be provided with a platform (not shown), which platform is held parallel with the bottom of the package 1 and perpendicular to the travelling direction of the package when moved in relation to the fetcher mechanism 14.

The control arm and the third pushing device are at one end both pivot-ably hinged to the platform and at the other end both pivot-ably hinged such that their mutual movement enables the platform to be held at the same angle relative to the fetcher mechanism 14 and to the package when the third pushing device 19 supports and moves the package 1 on its way into the chamber in the fetcher mechanism 14 or out of the same.

The fetcher mechanism 14 can be moved in a substantially horizontal direction to bring packages 1, 100 from the feeding device 3 to the storage shelves 15 and from the storage shelves 15 to an outlet (not shown).

In another embodiment of the invention the apparatus for managing and dispensing goods such as tobacco related products, which products are contained in packages can comprise:

- a display unit for displaying available products; and
- a storage unit 16 for storing packages in a plurality of storage shelves 15, a conveying unit 14 for conveying a package 1, 100 within the storage unit 16, and a registration unit operable to identify a package inputted into the apparatus and to assign a position in one of the plurality of storage shelves 15 to the pack, the conveying unit 14 being operable to convey the package 1, 100 to the assigned position in one of the plurality of storage shelves 15, and
- the conveying unit being operable to deliver a package to an outlet, the package corresponding to the product selected on the display unit.

Hereby accurate information on stock levels is achieved. A further advantage is that manual stock taking can be avoided. This is achievable, because the system knows exactly what is on stock and the system is configured to compare against stock delivered to retailer.

Data regarding volumes and sales can be communicated to a remote location and it is further possible to connect the apparatus and system to an outer system for replenishing stock into the storage unit.

The display unit makes it possible for a customer or the retail worker to see an image or like recognisable representation of the content of a package.
The apparatus and the method can also be connected to and cooperate with a unit of managing larger packages, i.e. cartons of cigarettes.

Throughout the description we have used expressions as packages and cigarette pack. It is obvious that the apparatus can be used for vending other types of packages.

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CLAIMS

1. An apparatus for storing and dispensing goods such as tobacco related products, which products are contained in packages, said apparatus comprising a storage unit (16) for storing packages in a plurality of storage shelves or tubes (15), a conveying unit (14) for conveying a package (1, 100) within the storage unit (16), and a registration unit operable to register a package inputted into the apparatus and to assign a position in one of the plurality of storage shelves or tubes (15) to the pack, the conveying unit (14) being operable to convey the package (1, 100) to the assigned position in one of the plurality of storage shelves or tubes (15).

2. An apparatus for storing and dispensing goods such as tobacco related products, which products are contained in packages, said apparatus comprising a storage unit (16) for storing packages in a plurality of storage shelves or tubes (15), a conveying unit (14) for conveying one or more packages (1, 100) within the storage unit (16) **characterised in** that said conveying unit (14) is arranged to convey one or more packages (1, 100) from a feeding device (3) to a storage shelf or tube (15).

3. Apparatus according to claim 2, **characterised in** that the conveying unit (14) being in the form of a fetcher mechanism (14) comprising means for determining position, whereby the fetcher mechanism (14) can be caused to be situated next to a given storage shelf or tube (15).

4. An apparatus according to claim 2 or 3, **characterised in** that the feeding device (3) comprises a detecting device (6) for detecting a code placed on a package (1, 100).

5. An apparatus according to claim 4, **characterised in** that a window (5) and the detecting device (6) are arranged relative to each other in such a

way that the window (5) is positioned sloping in relation to a longitudinal axis through the detecting device (6).

6. An apparatus according to claim 4 or 5, **characterised in** that a mirror (24) is arranged at an opposite side of the window (5) in relation to the detecting device (6).

7. An apparatus according to claim 6, **characterised in** that the mirror (24) is arranged sloping in relation to the window (5).

8. An apparatus according to one or more of the claims 1 - 5, **characterised in** that the feeding device (3) comprises a first pushing device (7).

9. An apparatus according to claim 2 or 3, **characterised in** that an image of a line pattern is placed on top (21) of the base surface (4), which pattern is visible for the detecting device (6) if no packages (1, 100) are placed in the inlet or feeding device (3) in front of the first pushing device (7).

10 An apparatus according to one or more of the preceding claims; **characterised in** that the fetcher mechanism (14) conveys a package (1, 100) from an assigned storage shelf or tube (15) to a discharge opening.

11. A method for storing and dispensing goods such as tobacco related products, which products are contained in packages in an apparatus comprising a storage unit (16) for storing packages in a number of storage shelves or tubes (15), comprising the steps of:

- Placing one or more packages (1, 100) in an inlet device (3) from where the individual packages (1, 100) are detected and registered;
- Transferring one or more packages (1, 100) from the inlet device to a fetcher mechanism (14);

- Positioning the fetcher mechanism (14) under a storage shelf or tube (15);
- Transferring the one or more packages (1, 100) to the storage shelf or tube (15).

12. A method according to claim 11, further comprising the steps:

- Positioning the fetcher mechanism (14) under a storage shelf or tube (15);
- Releasing one or more packages (1, 100) from the storage shelf or tube (15) into the fetcher mechanism;
- Positioning the fetcher mechanism (14) over a discharge opening, which discharge opening is in connection to an outlet opening;
- Releasing the one or more packages (1, 100) into the discharge opening.

13. A method according to claim 12, **characterised in** that the number of packages and the identity of the one or more packages are registered before handing out the one or more packages (1, 100).

14. A method according to one or more of the claims 11 – 13, **characterised in** that each package is assigned a unique code, which code follows an exact package within the apparatus.

15. A method according to one or more of the claims 11 – 14, **characterised in** that registered data of a package is compared with information in a data processing unit and position based on product information and stock levels in storage unit is assigned to the package.

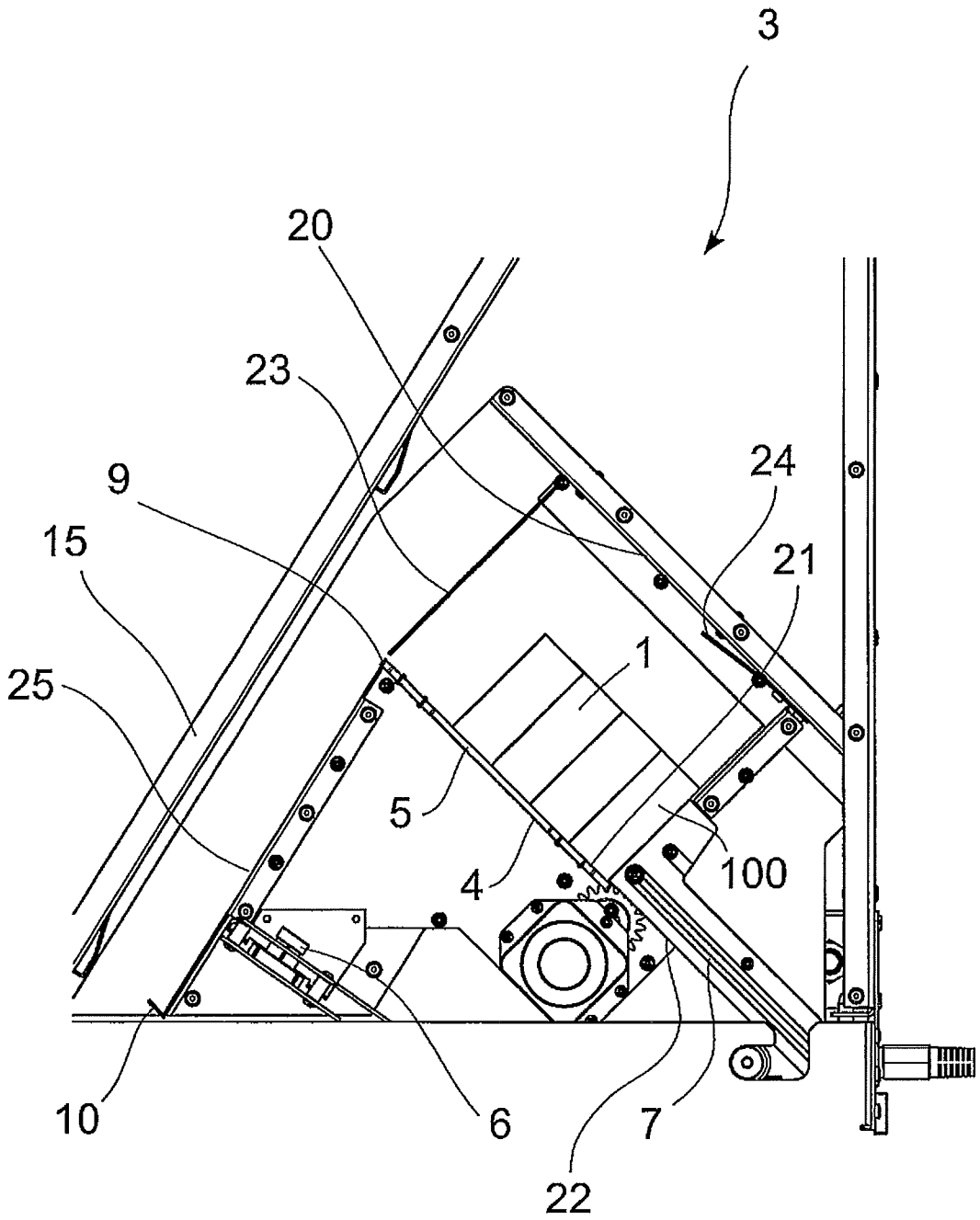

Fig. 1

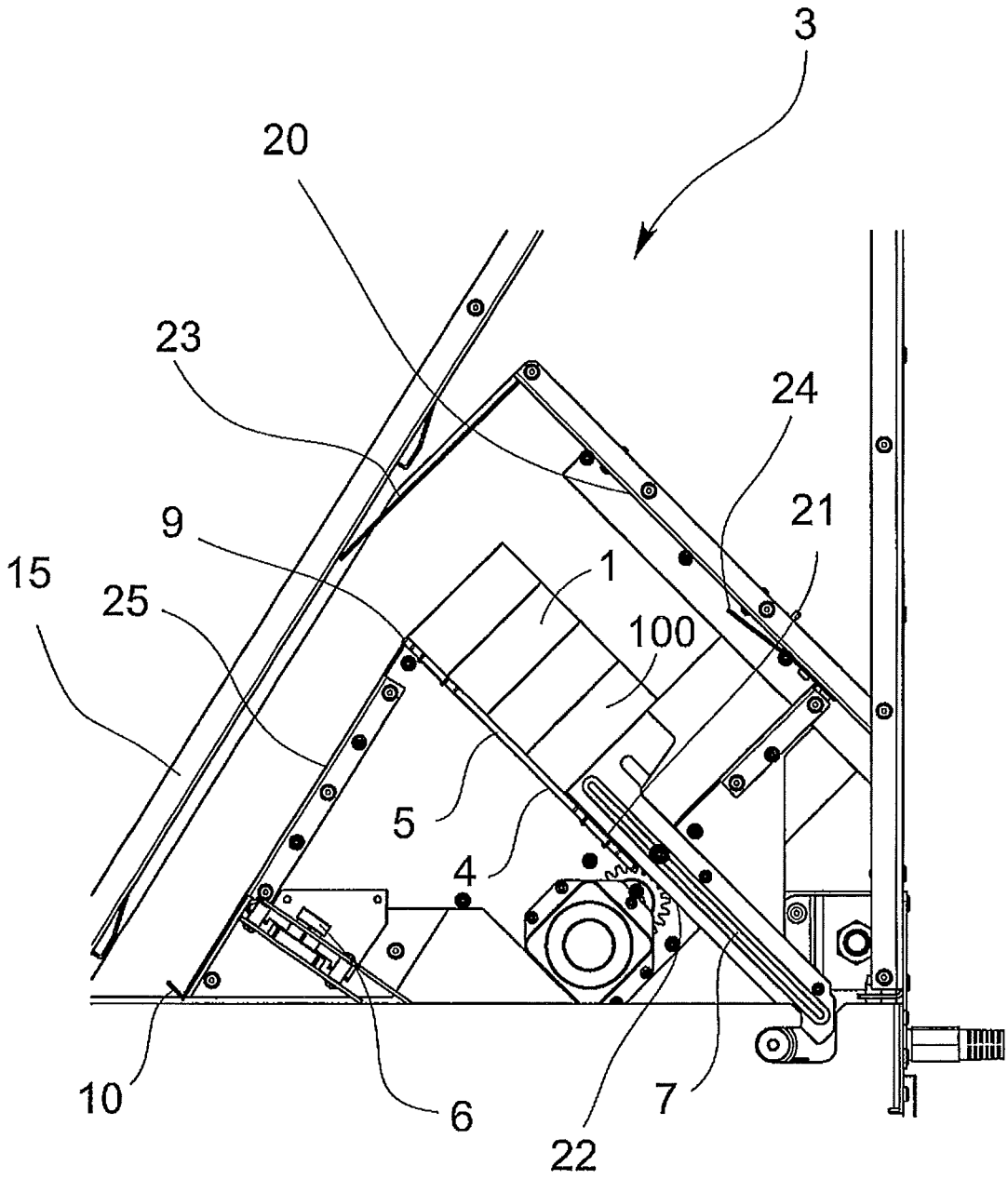

Fig. 2

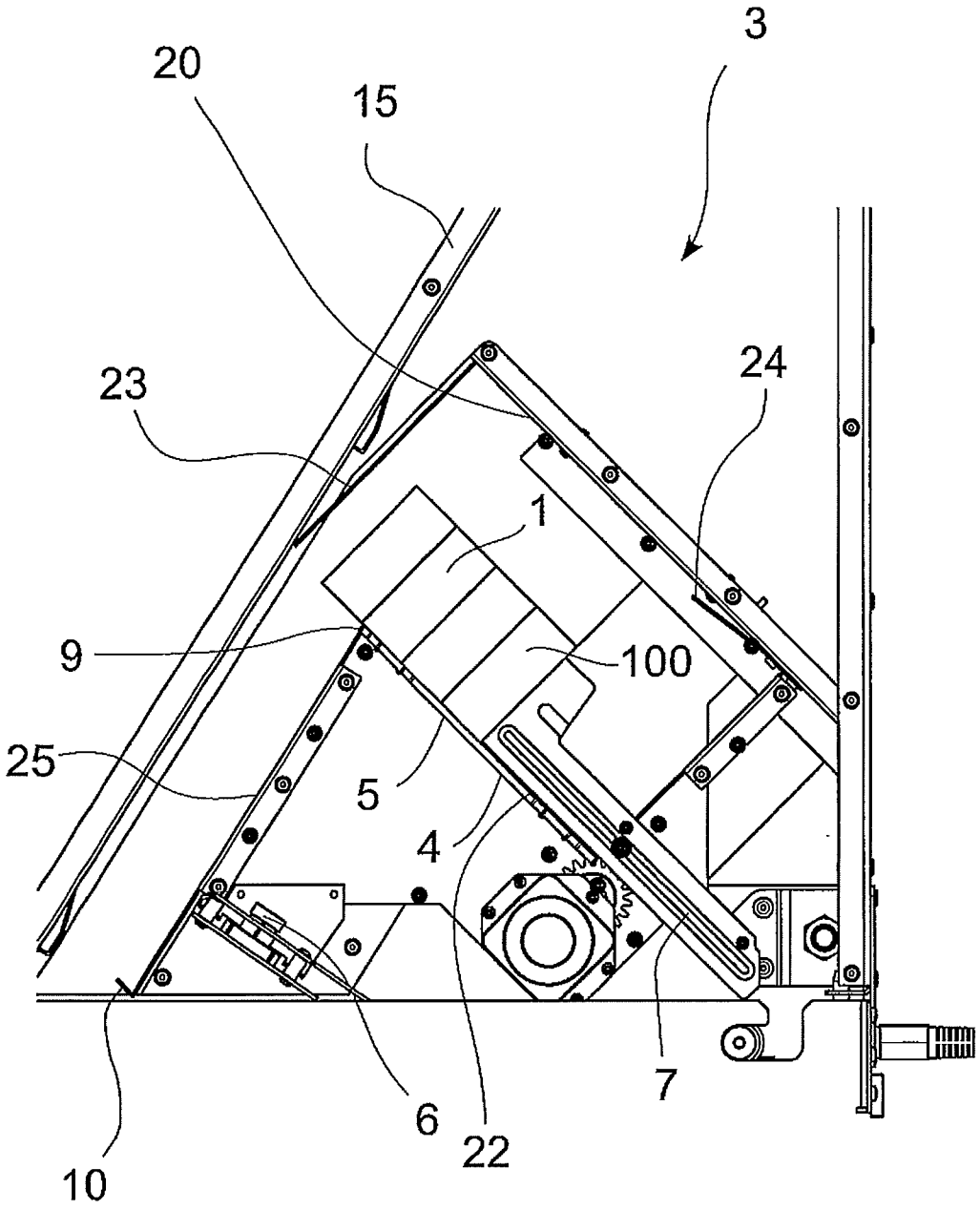

Fig. 3

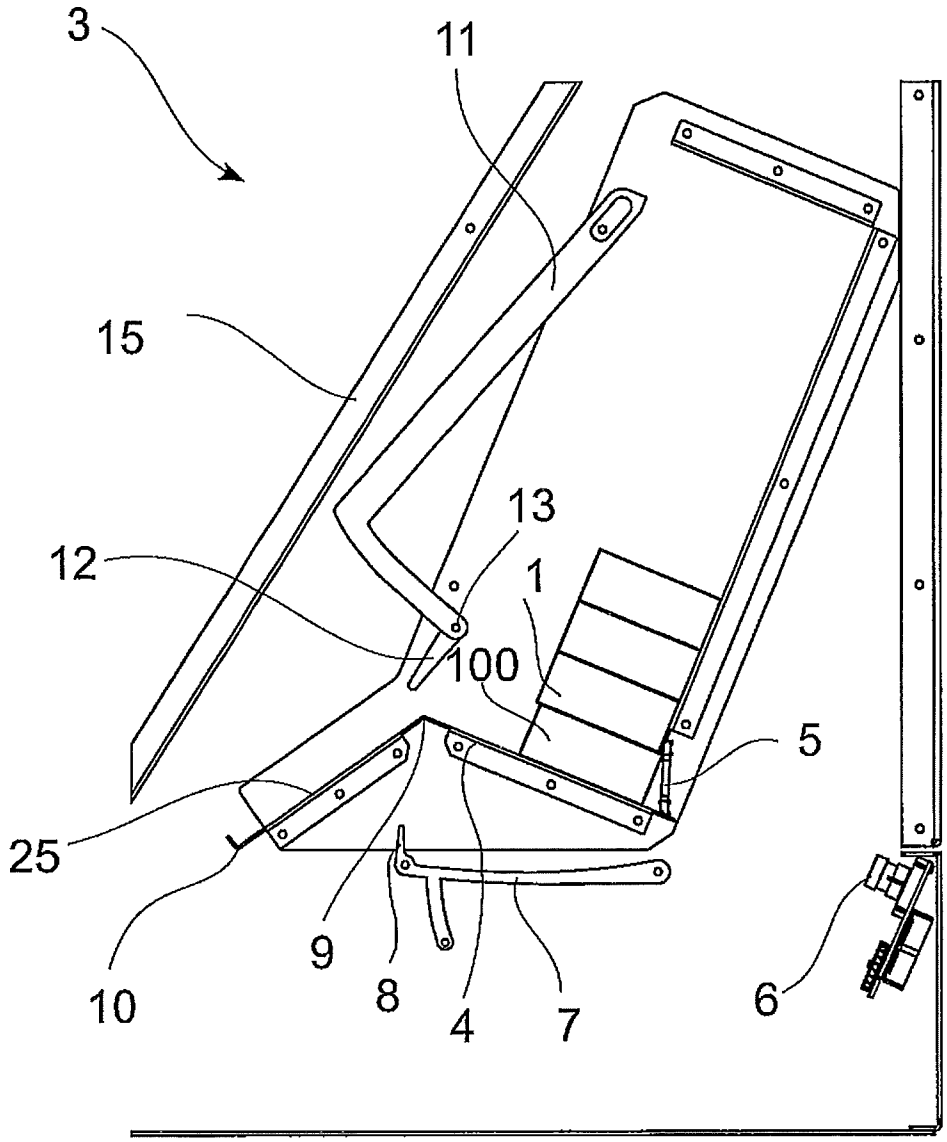

Fig. 4

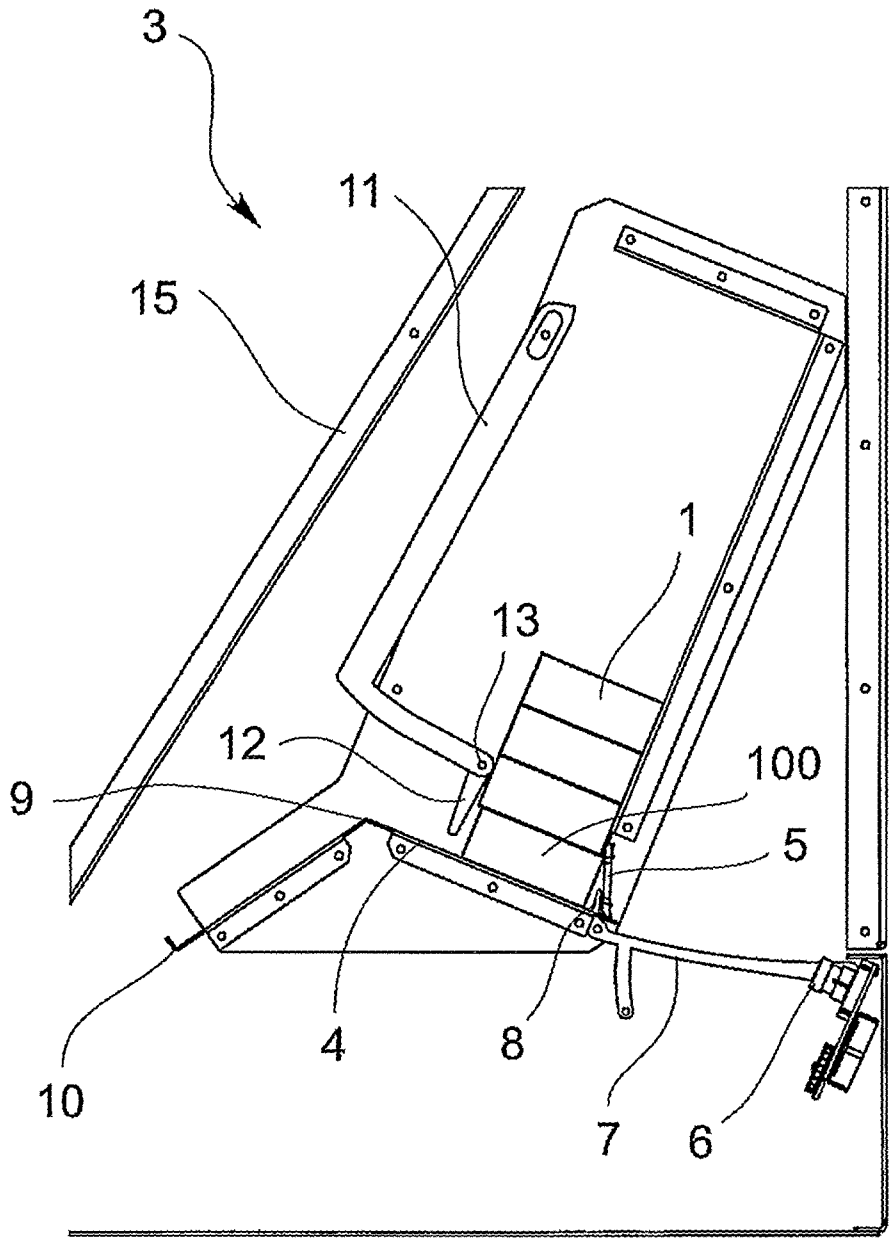

Fig. 5

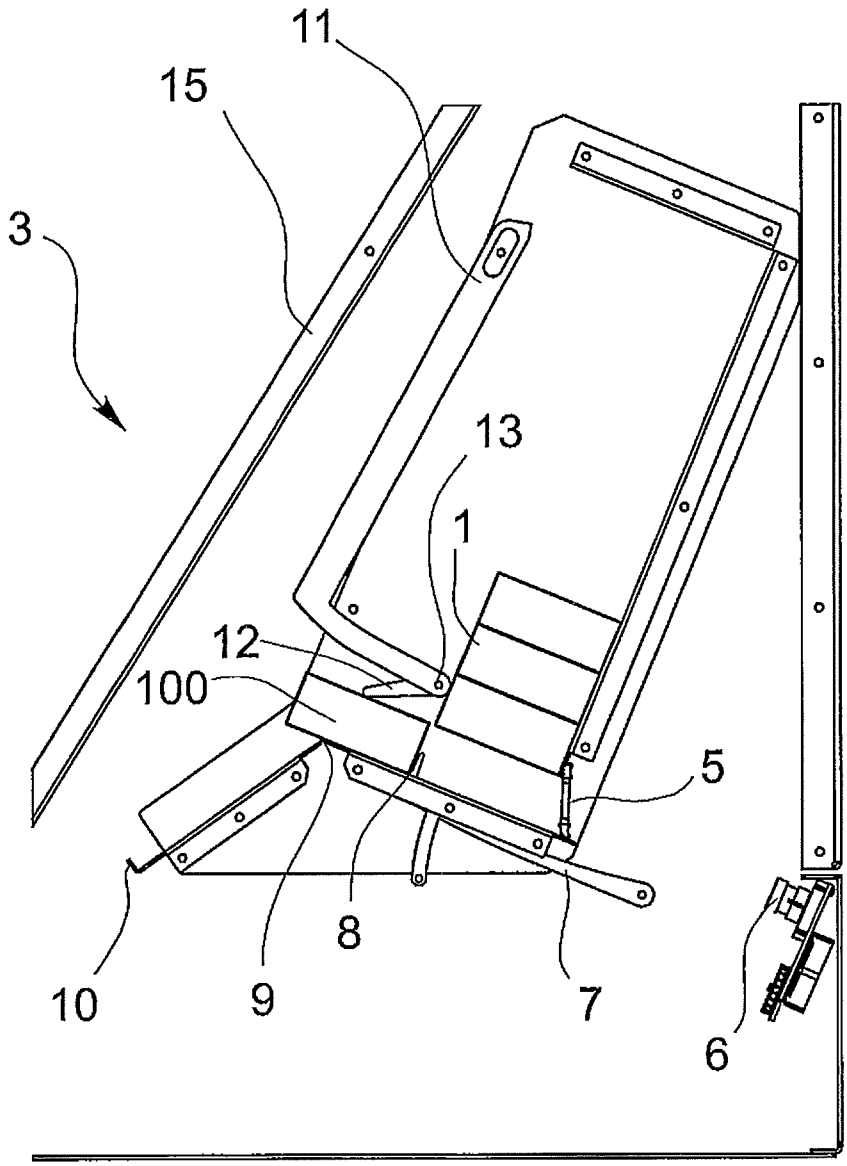

Fig. 6

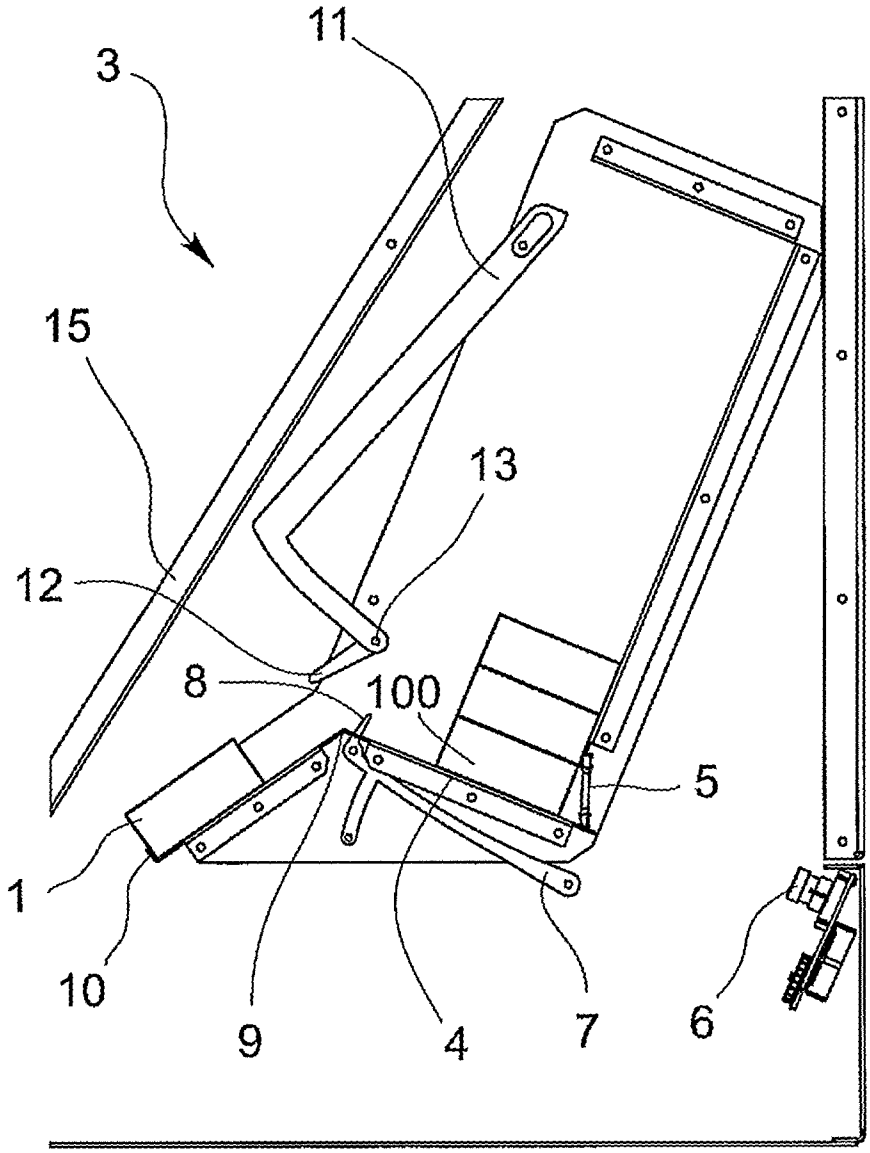

Fig. 7

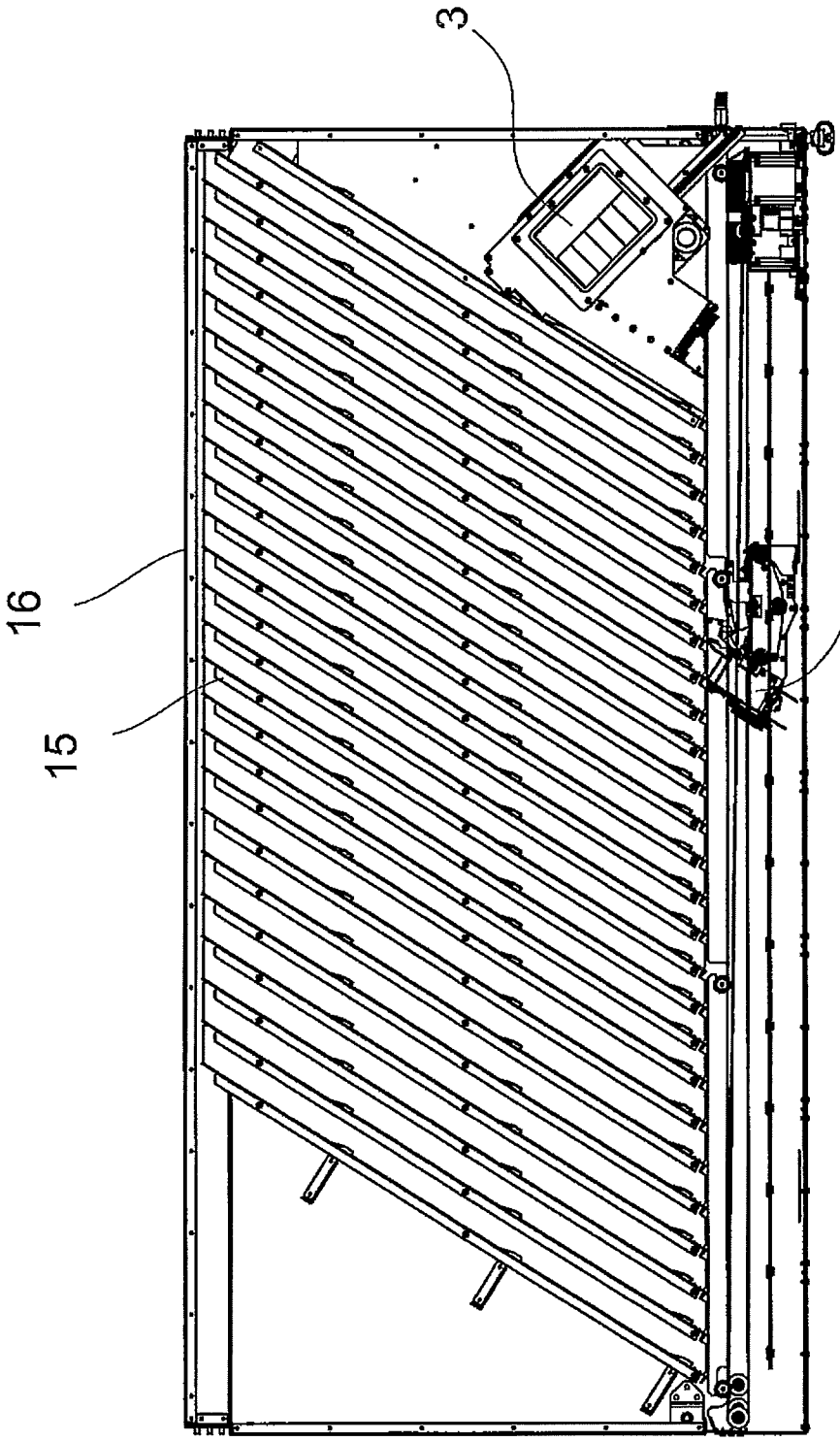

Fig. 8

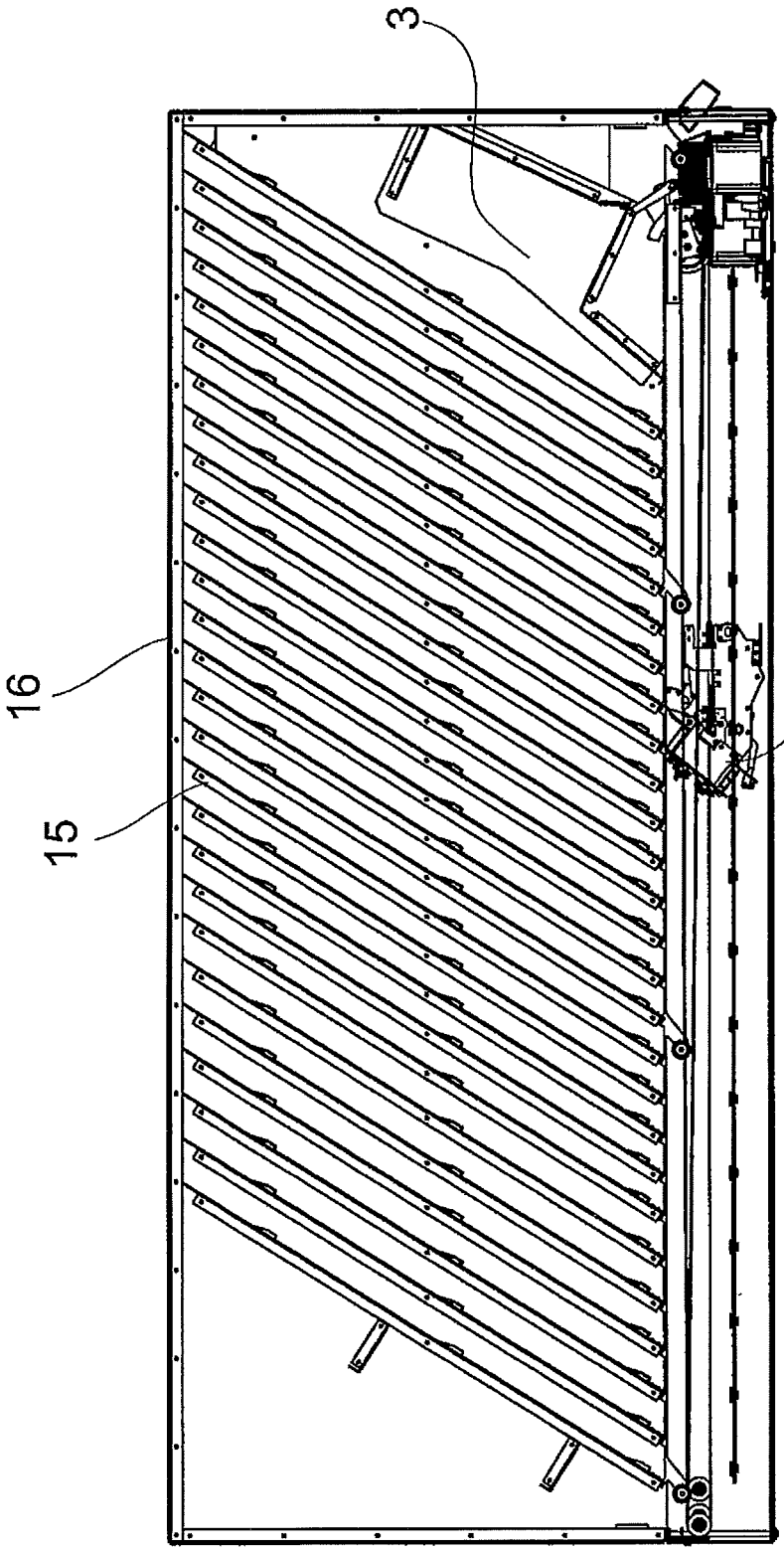

Fig. 9

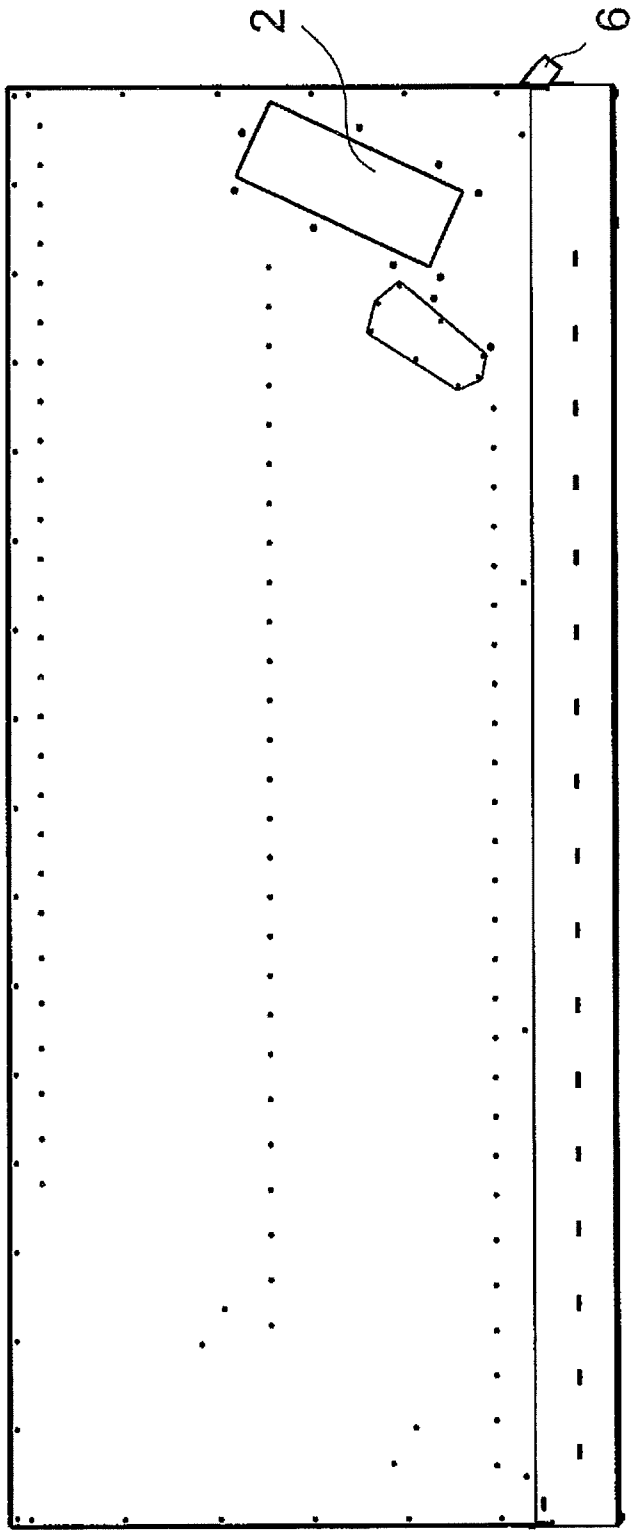

Fig. 10

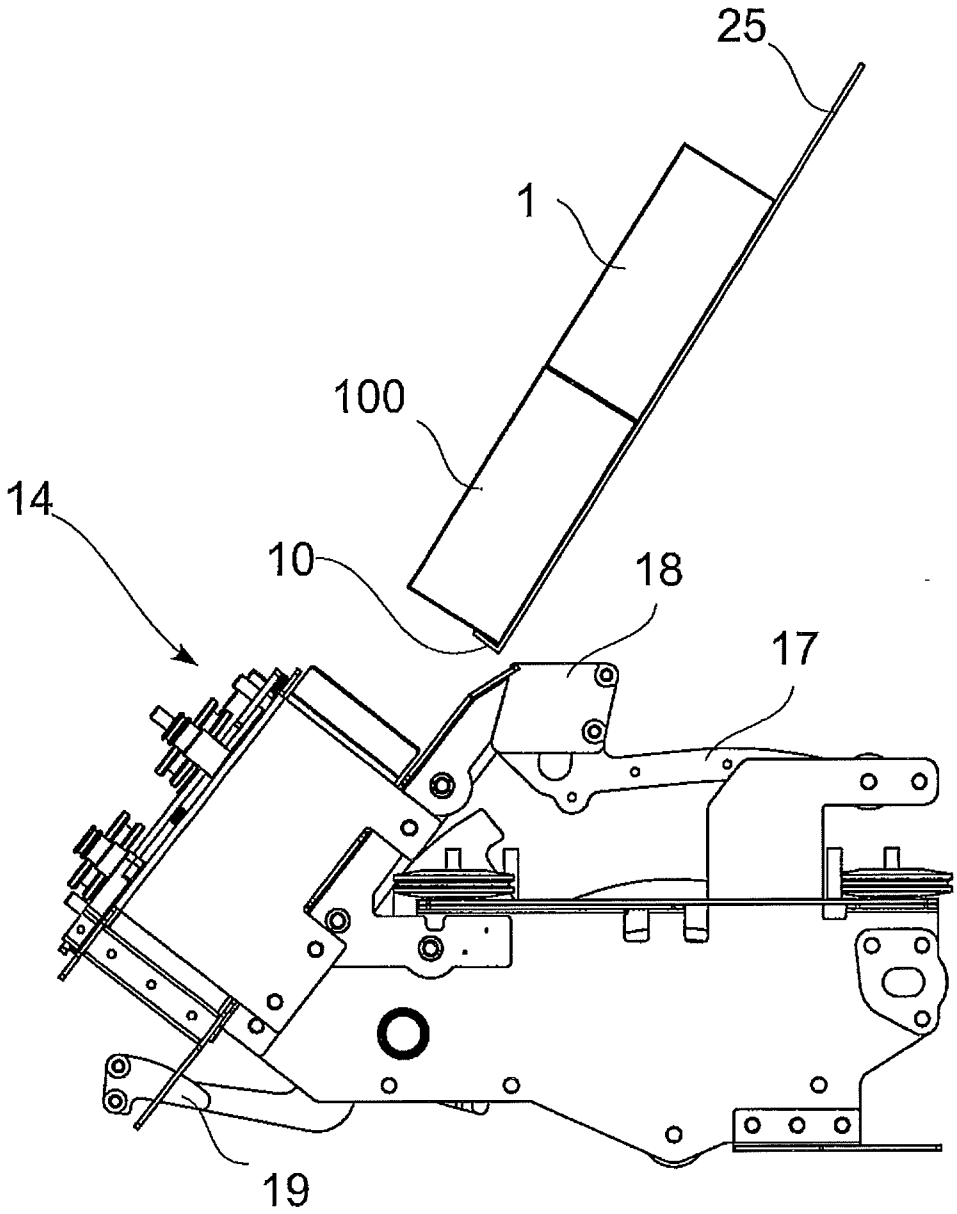

Fig. 11

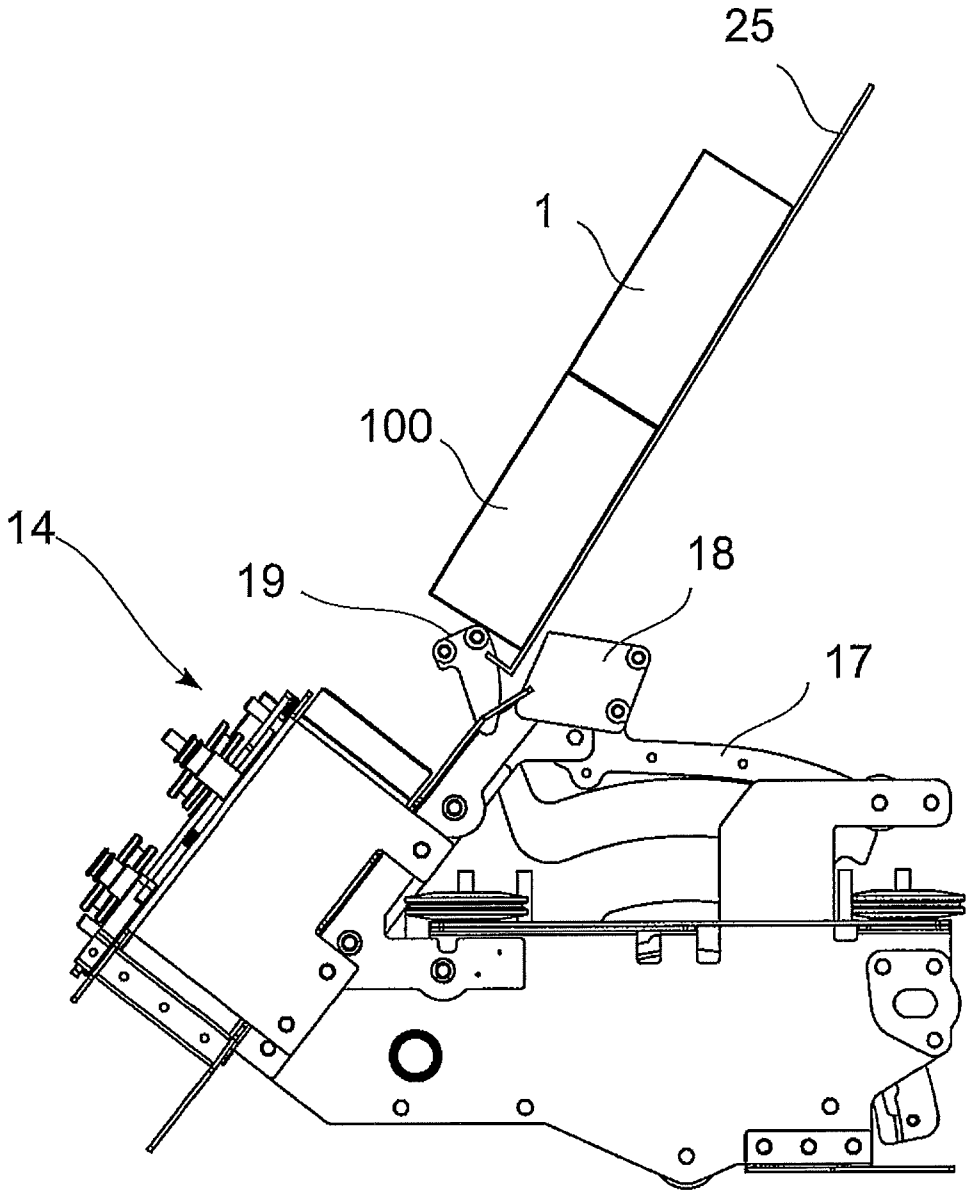

Fig. 12

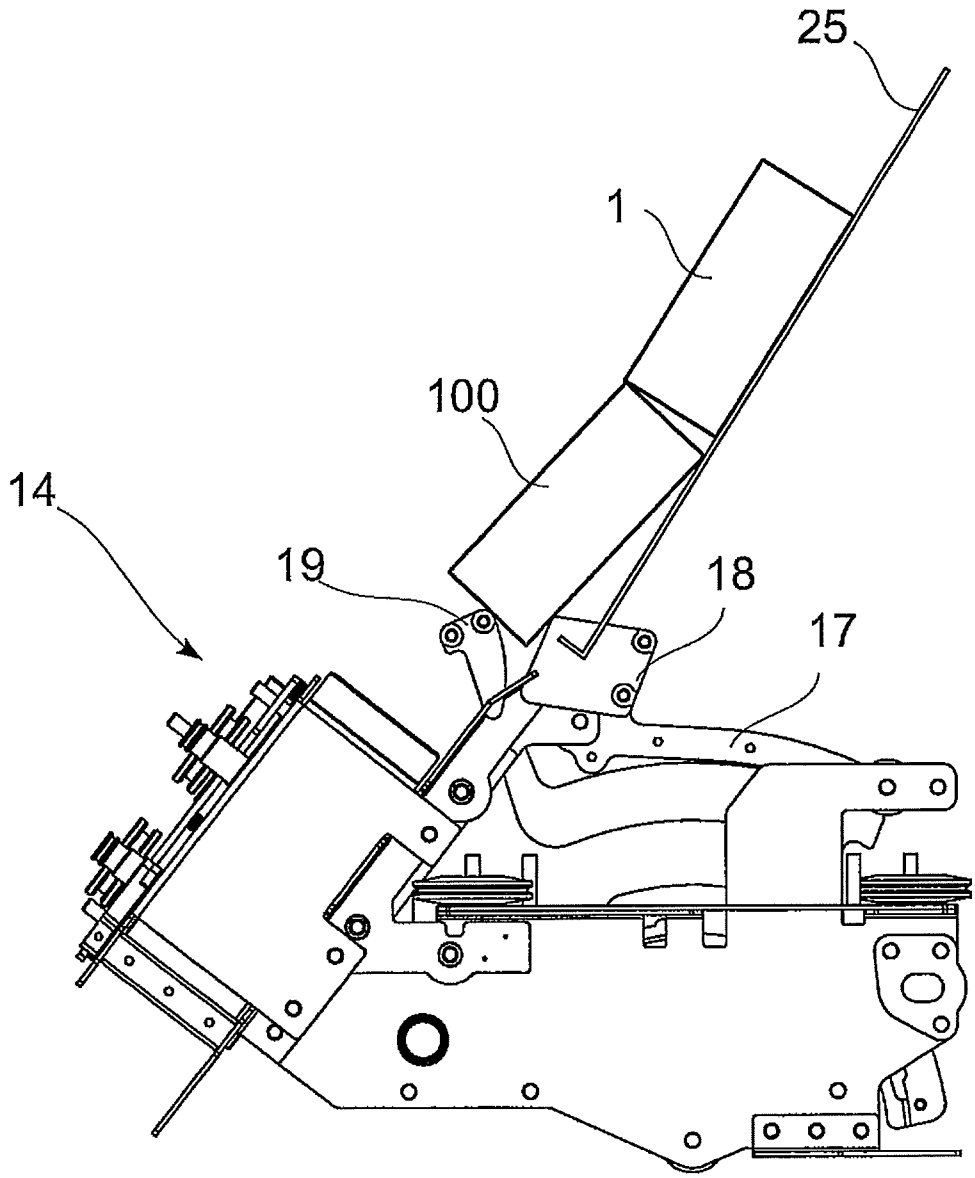

Fig. 13

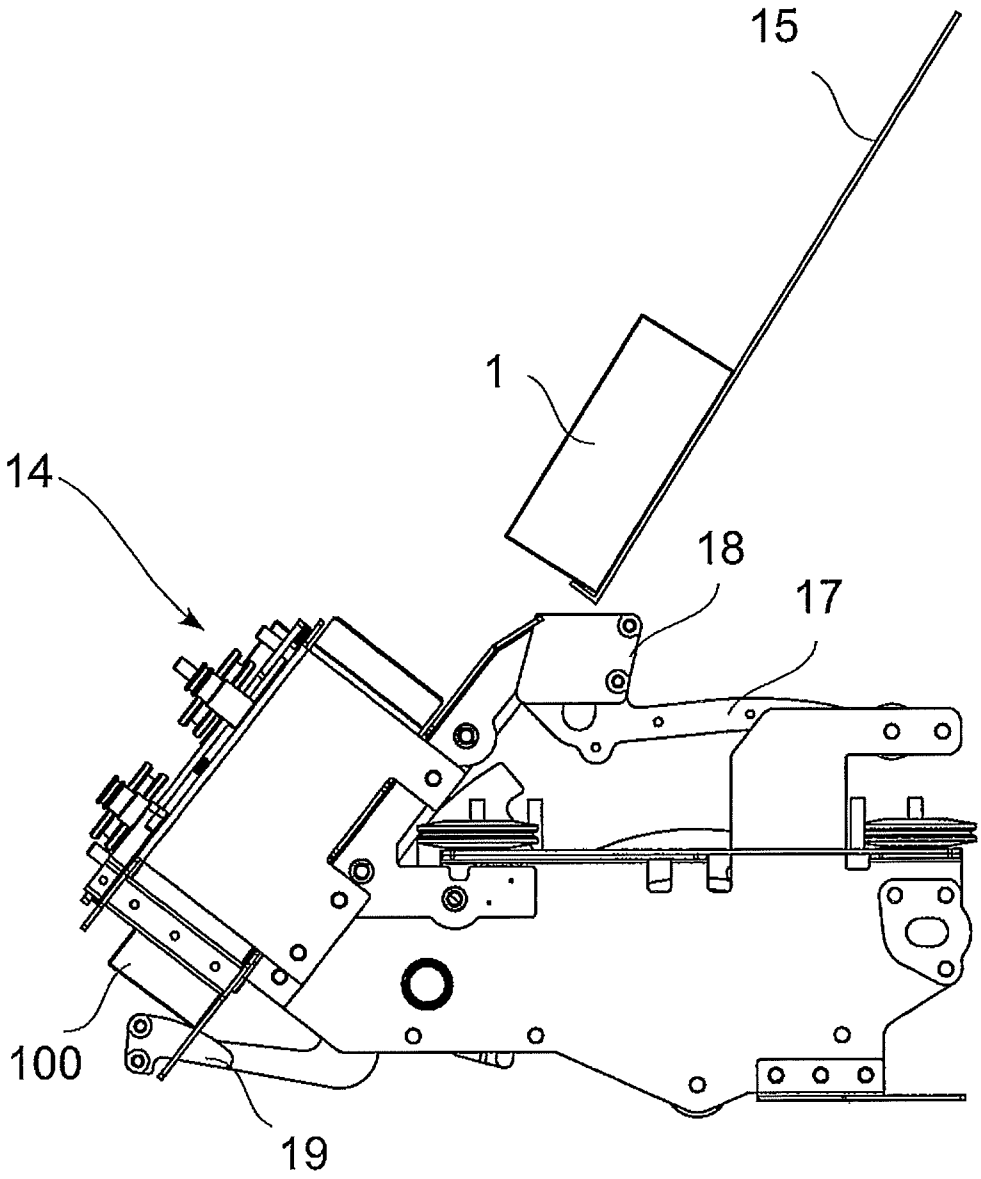

Fig. 14

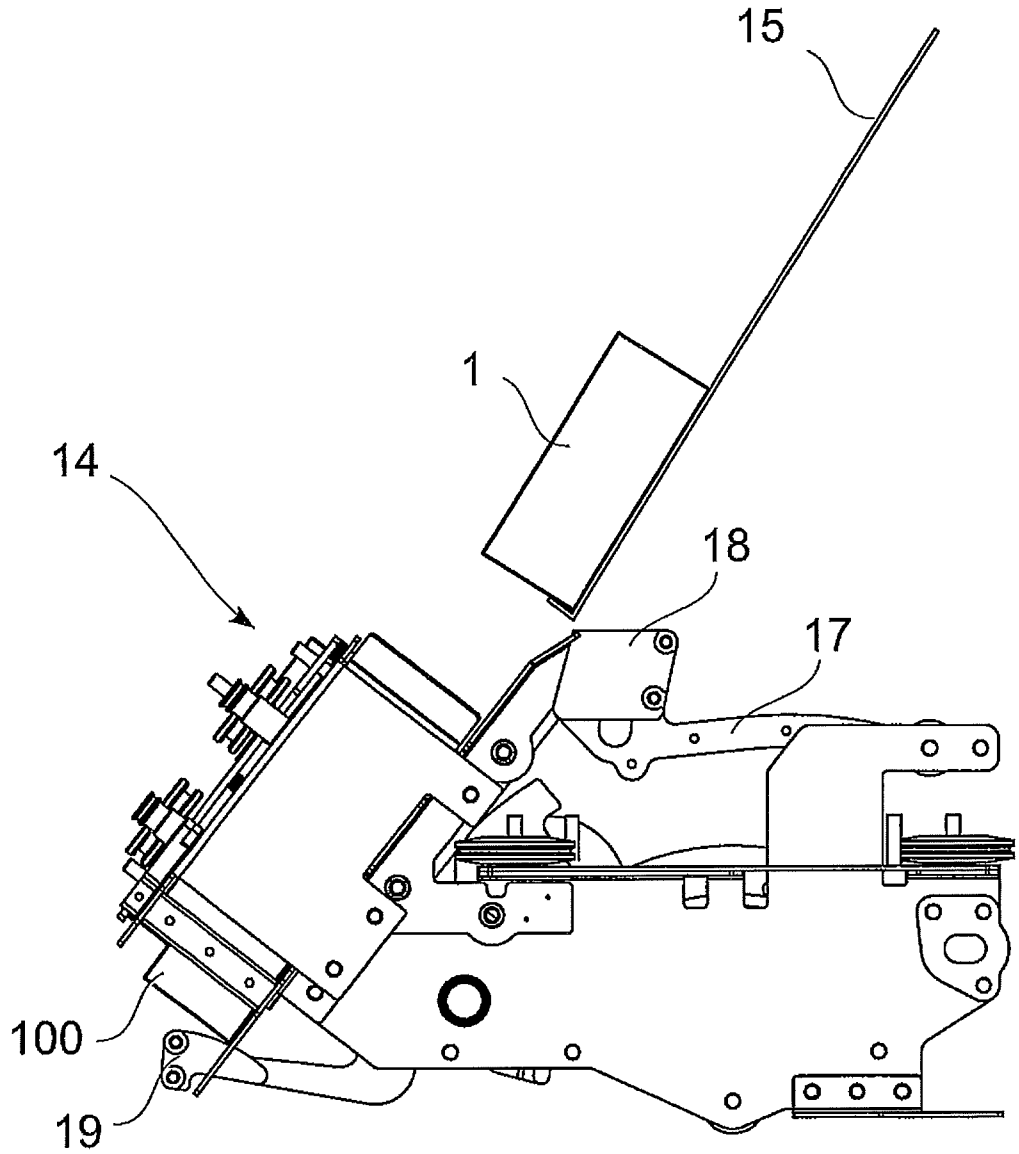

Fig. 15

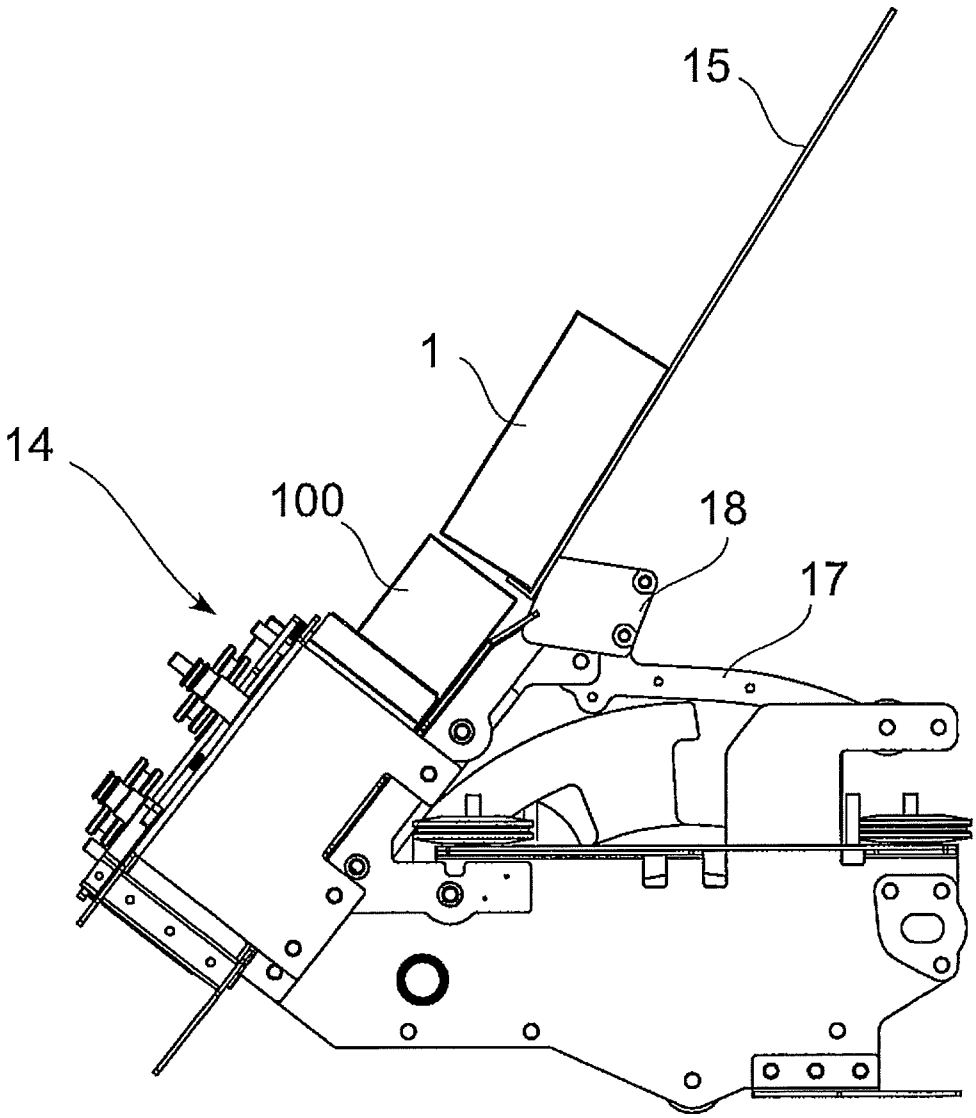

Fig. 16

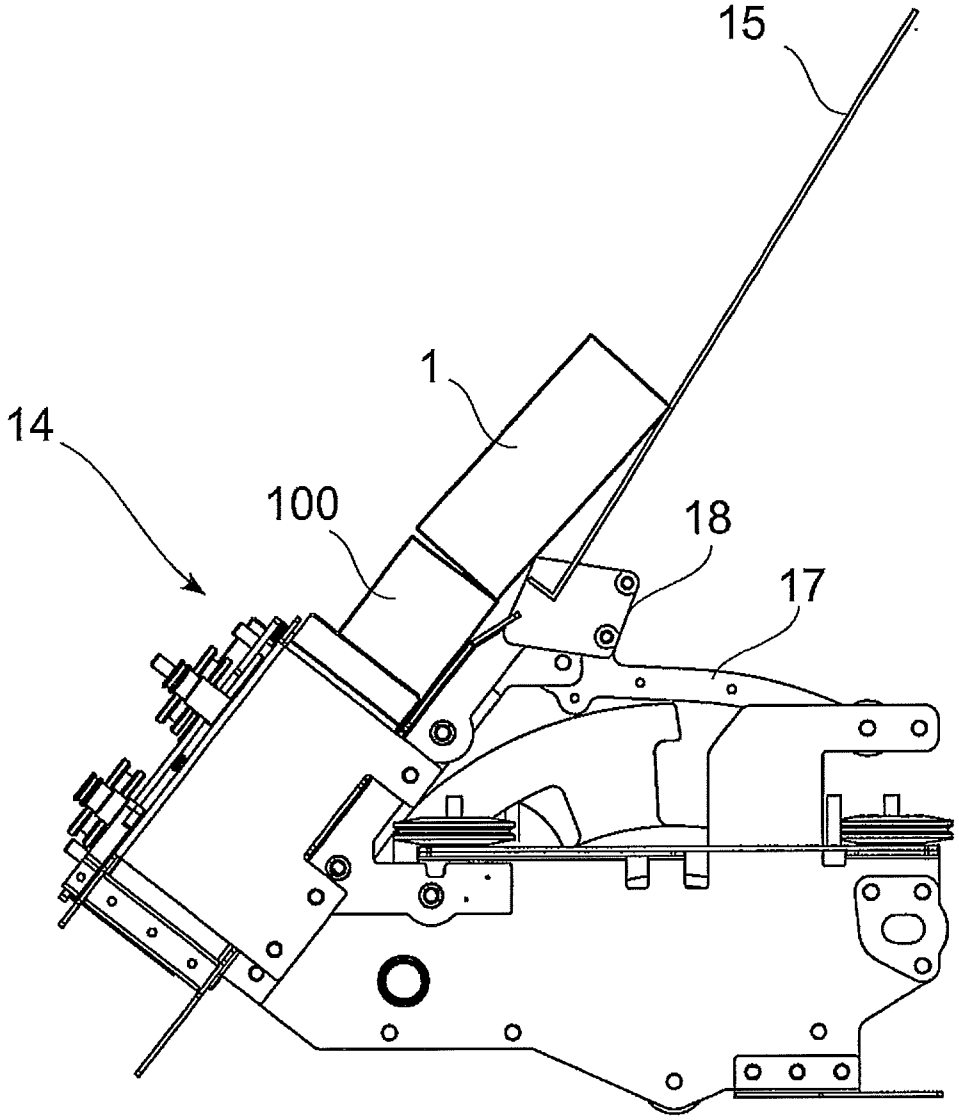

Fig. 17

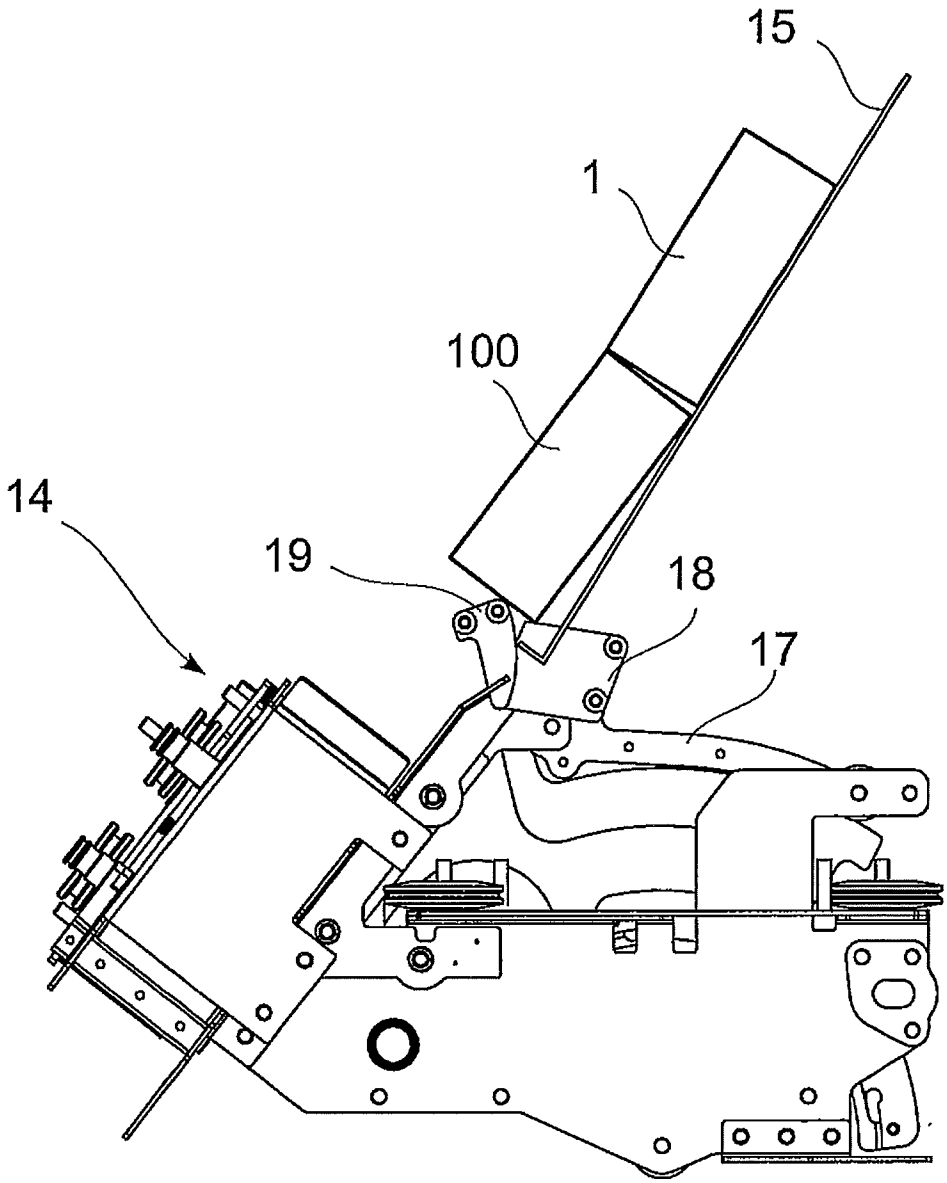

Fig. 18

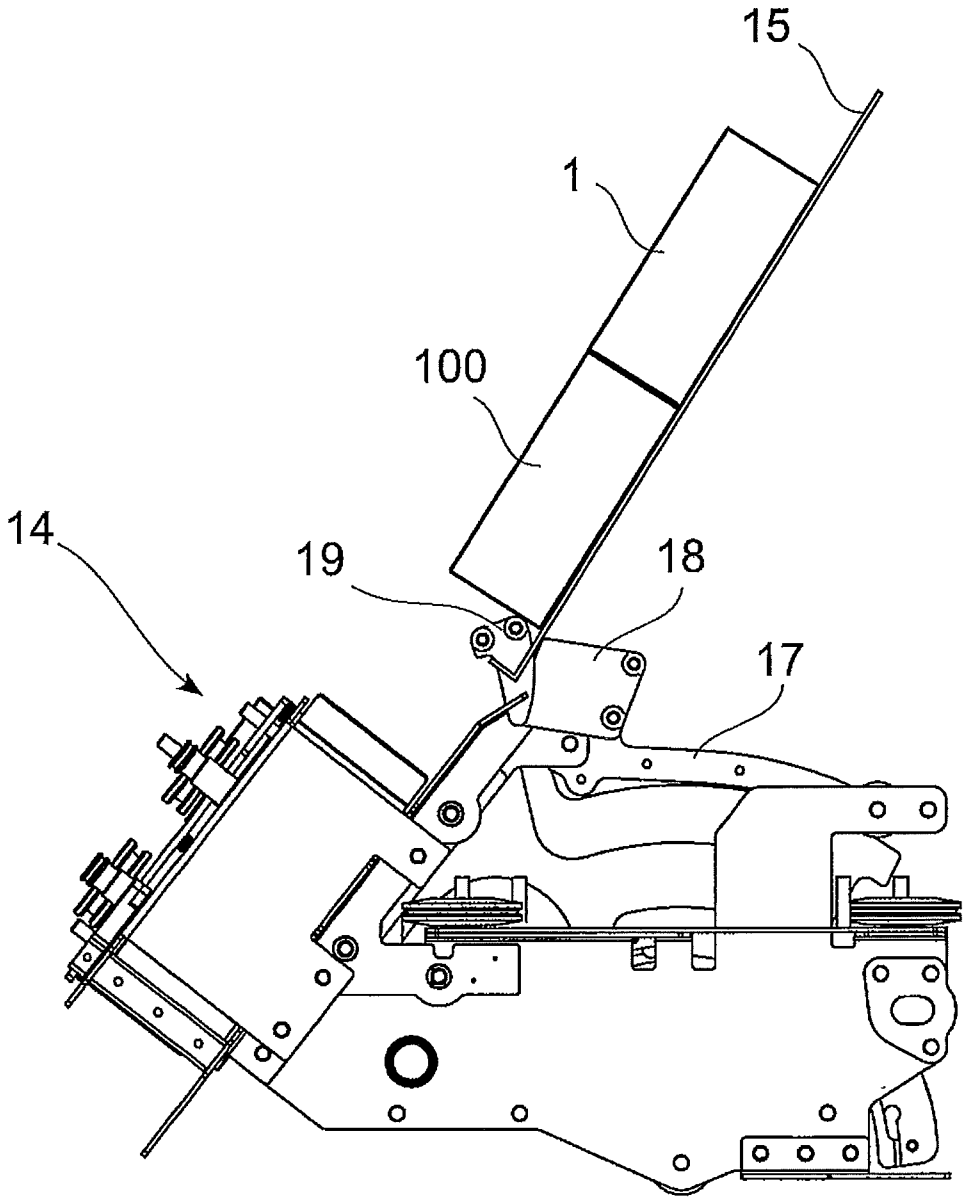

Fig. 19

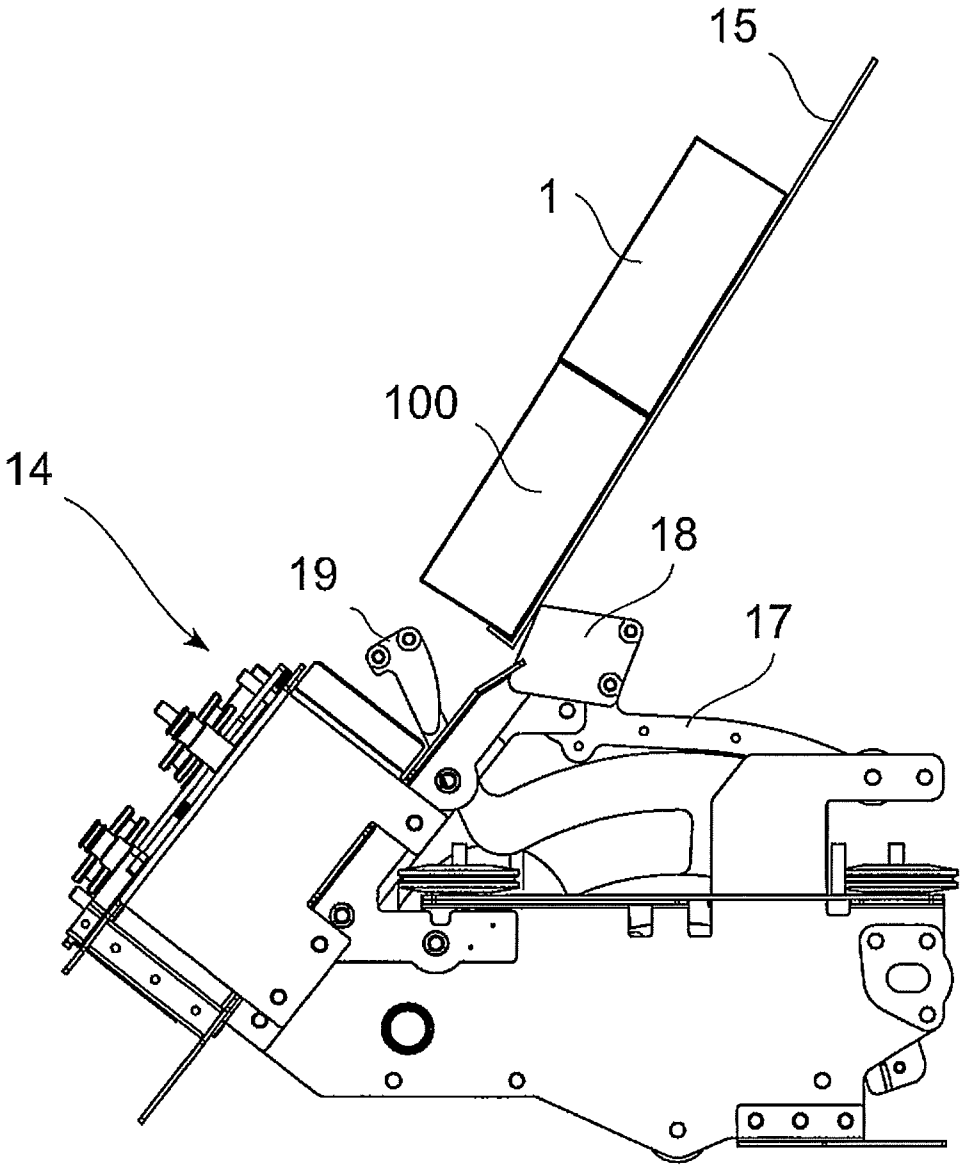

Fig. 20

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2012/057182

A. CLASSIFICATION OF SUBJECT MATTER
INV. B65G1/08 B65G1/137 G07F11/16
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 G07F

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 practicable, 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 Y	EP 2 040 230 A2 (GEBR. WILLACH) 25 March 2009 (2009-03-25) column 4, line 34 - column 5, line 32; claims; figures	1,2,4, 11,14,15 3,10
Y A	EP 0 991 037 A2 (GEBR. WILLACH) 5 April 2000 (2000-04-05) column 4, line 40 - column 6, line 18; figures	3,10 1,2,11
A	US 2002/087231 A1 (J. LEWIS) 4 July 2002 (2002-07-04) page 2, column 2, line 40 - page 3, column 1, line 63; figures	1,11
A	WO 2007/014956 A2 (F. OGNIBENE) 8 February 2007 (2007-02-08) claims; figures	1,3,11

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

☒ See patent family annex.

* Special categories of cited documents :

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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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
10 July 2012	31/07/2012

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Jagusiak, Antony

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2012/057182

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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US 2002087231 A1	04-07-2002	NONE	
WO 2007014956 A2	08-02-2007	EP 1910192 A2	16-04-2008
		WO 2007014956 A2	08-02-2007