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(54) **Title**: A storage system with carrier shelves moveable along a track and each having a driveable conveyor belt organ as supporting surface.

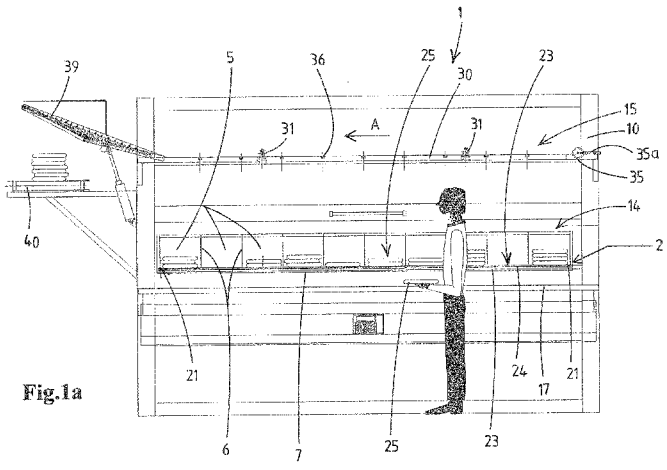

Fig.1a

(57) **Abstract**: A storage system 1, in particular of the Paternoster type, comprising a frame 10, a plurality of longitudinal carrier shelves 2 each having a supporting surface and being positioned moveable one behind the other at fixed intervals along a conveying track 4, in particular a loop shaped track, at least one loading and/or unloading station 14, 15 arranged along the track 4, and conveying means for moving the plurality of carrier shelves 2 along the track 4 and passing the shelves 2 along the loading and/or unloading station 14, 15 such that in between movements of the carrier shelves 2 along the track 4 a respective one of the carrier shelves 2 connects to the loading and/or unloading station 14, 15 during a stop. Each of the carrier shelves 2 comprises a driveable conveyor belt organ 20 as its supporting surface.

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Title: A storage system with carrier shelves moveable along a track and each having a driveable conveyor belt organ as supporting surface.

The invention relates to a storage system comprising a plurality of carrier shelves moveable along a conveying track.

Such storage systems are known in a wide variety of embodiments. For example vertical Paternoster storage systems are known which comprise a large number of horizontal carrier shelves which are circulating along an oval track. Such a Paternoster storage system presently is sold by applicant for amongst others to be used for the sorting of washed textile articles during folding and just before bringing them back to where they came from in batches of washed, sorted and folded articles wrapped in suitable hygienic wrappings. For this a stationary shelf is arranged as loading and unloading station along the track. An employee is then able to each time scan a bar code of a washed article in front of a bar code scanner and then start to fold it up. During the folding, the storage system in correspondence to the scanned bar code, starts rotating until a compartment on a particular carrier shelf which corresponds to the scanned bar code is lined up with the stationary shelf. Subsequently a lamp above the respective compartment lights up and the employee is able to place the folded article in the correct compartment. At some point in time, for example when the storage system is fully loaded or when there are no more washed and folded articles to be placed therein, the employee can start unloading the entire system. For this, each batch of folded articles in a particular compartment is taken out, bundled with a rubber band and placed on a conveyor belt organ which transports this batch to a wrapping installation. There the batch gets wrapped up in a plastic cover. This repeats itself until each of the compartments has been unloaded. Then all the batches are ready for transportation in a hygienic manner back to where they came from, for example a hospital, a nursing or rest home or the like.

A disadvantage with this known vertical Paternoster storage system is that its loading and unloading processes leave to be improved. Both the loading and unloading takes up a lot of time for an employee, particularly because it is performed manually by one and the same person. This is both costly and time-consuming. Furthermore, there is the risk that the carefully folded and assembled batches of articles in the various compartments in some way get distorted during the unloading process.

The present invention aims to overcome one or more of the abovementioned disadvantages or to provide a usable alternative. In particular the invention aims to provide a user-friendly and efficiently operating storage system.

This aim is achieved by a storage system according to claim 1. The storage system comprises a frame and a plurality of longitudinal carrier shelves. Each carrier shelf has a supporting surface, in particular a substantially horizontal supporting surface, on top of which a number of articles can be placed such that they can be stored (temporarily) in the system. The carrier shelves are positioned moveable one behind the other at fixed intervals along a conveying track, in particular a substantially vertically oriented conveying track. At least one loading and/or unloading station is arranged along the track. Furthermore, conveying means are provided for moving the plurality of carrier shelves along the track and with those movements passing the shelves along the loading and/or unloading station. This makes it possible to each time have a respective one of the carrier shelves stop in front of the loading and/or unloading station in between movements of the carrier shelves along the track. According to the invention each of the carrier shelves comprises a driveable conveyor belt organ as its supporting surface. The conveyor belt organ as supporting surface advantageously makes it possible to automate the loading and/or unloading process. Each time that it is for example desired to unload one of the carrier shelves it suffices to position it in front of the unloading station and then start driving the conveyor belt organ of that carrier shelf. Any articles stored on top of that conveyor belt organ can then automatically be transferred from out of that carrier shelf onto the unloading station by driving the conveyor belt organ in rotation. In a similar manner it is also possible to even automate the loading process if desired. The provision of the plurality of driveable conveyor belt organs moveable at fixed intervals as an assembly along the conveyor track makes it possible to save both costs and time for a user.

The conveying track preferably is a closed loop shaped track with vertically directed longitudinal track parts along which the preferably substantially horizontally orientated conveyor belt organs can be moved. The conveying means can then be designed to move the plurality of carrier shelves in one direction only or both clockwise and counter clockwise if desired. Thus a storage system of the Paternoster type can be obtained. It is also possible to use the invention in combination with other kinds and shapes of tracks. For example the conveying track may only comprise a substantially vertically directed track along which the plurality of carrier shelves including their conveyor belt organs can be moved up and down along a loading and/or unloading station.

In a preferred embodiment the loading and/or unloading station comprises a displacement mechanism for moving the entire conveyor belt organ stopped in front of it to a loading and/or unloading position sideways of the conveying track, in particular in front

thereof. This has the advantage that the conveyor belt organ in this outwardly pulled/pushed loading and/or unloading position becomes more accessible for other equipment to connect thereto and/or for an operator to pick and place articles. For example the conveyor belt organ in this position can be more easily connected to further conveying means of the loading and/or unloading station, and/or can be more easily engaged by parts of a drive unit which then can be positioned sideways of the conveying track also.

In a further embodiment friction reduction means, like for example roller bearings, can be provided sideways of the conveying track below the loading and/or unloading position of the conveyor belt organ. Those friction reduction means serve the purpose of having a lower side of the conveyor belt organ to rest upon when moved to its loading and/or unloading position. This makes the transition of the belt organ from its position inside the conveying track towards its pulled out loading and/or unloading position outside of the track easier, particularly when the conveyor belt organ is heavily loaded with articles. Not only are those friction reduction means advantageous during the pulling out of the conveyor belt organ, they also help it to run more smoothly when it gets driven in rotation during a loading or unloading action.

It is possible to provide each of the conveyor belt organs of the carrier shelves with its own drive unit. Those drive units then need to move along with the carrier shelves during their movements along the track. In a preferred embodiment, the loading and/or unloading station is equipped with a common drive unit, while furthermore an operating mechanism is provided for engaging this common drive unit with a desired conveyor belt organ when this has been stopped in front of the station. For example the common drive unit may comprise a driveable pressure roller which by means of the operating mechanism can be pushed against the outside of the conveyor belt organ for driving it in rotation.

The carrier shelves preferably are of a longitudinal shape, and each comprise a set of partition walls positioned above their conveyor belt organ. The partition walls subdivide each carrier shelf in a plurality of compartments along its longitudinal direction. The compartments make it possible to use the storage system not only for storing articles but also to sort them out by type, seize, colour, end user, or the like.

It is possible to provide a common conveyor belt organ for each of the compartments of a carrier shelf. It is also possible to provide conveyor belt organs for each of the compartments separately. The conveyor belt organ(s) can be outlined with its (their) transportation direction parallel or perpendicular to the longitudinal direction of the carrier shelves. In a preferred embodiment the conveyor belt organs each have their longitudinal transportation direction extending parallel to the longitudinal direction of the carrier shelves.

In a further embodiment, the loading and/or unloading station is equipped with a displacement mechanism for moving a conveyor belt organ and set of partition walls which

have been stopped in front of the station, relative to one another. This relative movement is then directed in the sideways direction substantially perpendicular to the transportation direction, and clears the way for the articles placed in the various compartments of the respective carrier shelf to be (un)loaded in one single action of driving its conveyor belt organ in rotation.

In a first variant the displacement mechanism is designed for moving the conveyor belt organ stopped in front of the station sideways from underneath its corresponding set of partition walls and out of its carrier shelf. In this pulled out position the conveyor belt organ can then be driven in rotation without having its load running against the partition walls.

In a second variant the displacement mechanism is designed for moving the set of partition walls stopped in front of the station sideways from above its corresponding conveyor belt organ and out of its carrier shelf. In this pulled out position the conveyor belt organ can then also be driven in rotation without having its load running against the partition walls.

In order to save space each conveyor belt organ preferably is made of slender design. In particular this slender design is such that a maximum height between an upper and a lower track of the belt occurs which is less than 50 mm, in particular less than 10 mm. The belt can then be guided over end rollers with a low-friction guidance plate extending between the upper and lower track for proper support and guidance of the belt both during storage and during (un)loading.

If desired, for example in the case of heavy articles to be stored in the system, the conveyor belt organs may be supported on top of bottom plates which form part of the carrier shelves.

The loading and/or unloading station may comprise a stationary working platform with which the conveyor belt organ of a respective one of the carrier shelves connects during a stop. For the loading station this stationary working platform makes it possible for the user to perform some kind of action to the articles before placing them onto a conveyor belt organ of an aimed carrier shelf or carrier shelf compartment. For the unloading station this stationary working platform makes it possible to pull out a respective conveyor belt organ stopped in front of it and place it on top of the platform in order to drive it in rotation in this supported position.

If desired the (bottom plates of the) carrier shelves and/or the mentioned platform can be provided with the abovementioned friction reduction means, like for example roller bearings, on top of which the lower side of the conveyor belt organ can rest upon when driven in rotation.

The loading and/or unloading station can be equipped with a stationary conveyor belt organ, or other suitable type of transportation device, with which a conveyor belt organ of a

carrier shelf stopped in front of this station is able to connect. If, for example this station is the unloading station, then this stationary conveyor belt organ can lead to another type of handling apparatus, for example a wrapping installation for wrapping the various batches of articles transported thereto.

Although the loading station and the unloading station can be located at one and the same position along the track, they are preferably arranged at different positions. This makes it possible to at the same time perform a loading and an unloading operation. Also it makes it possible to provide the loading station at a height which is well reachable for a user to place articles manually onto the aimed carrier shelf or carrier shelf compartment, while the unloading station can then be provided along any other part of the track, for example an upper part, where it does not stand in the way to the user or other personnel.

Further embodiments are stated in the subclaims.

The storage system can be used for all kinds of purposes. In particular it is used for sorting of textile articles, in particular washed textile articles to be folded and packaged.

The invention also relates to a method according to claim 23 or 24.

The invention shall be explained in more detail with reference to the drawings, in which:

Fig. 1 a, b show a front and a side view of an embodiment of a Paternoster type storage system according to the invention during loading;

Fig. 2 a, b, c show a front, a side and a top view of the system of fig. 1 ready for unloading;

Fig. 3 a, b, c show a front, a cross sectional side and a top view of the system of fig. 1 during unloading;

Fig. 4 is a cross-sectional view of a conveyor belt organ pulled out at an unloading station showing an alternative intermediate positioning of a drive unit below the belt organ;

Fig. 5 shows a partial enlarged cross sectional view of fig. 4 over the line A-A; and

Fig. 6 is a side view of fig. 4 showing operable limitation means for the pulled-out belt organ.

In fig. 1-3 the entire storage system has been given the reference numeral 1. The system 1 comprises a plurality of storage/carrier shelves 2 mounted at fixed intervals to a chain 3 of a vertically orientated loop-shaped conveying track 4 (see fig. 3b in which two of the shelves are shown). Each shelf 2 has a longitudinal direction along which a number of compartments 5 are positioned, ten in the shown example. The compartments 5 are separated from each other by means of partition walls 6. At the bottom side of each shelf 2 a bottom plate 7 is provided. Between this bottom plate 7 and the lower sides of the partition

walls 6 a gap is present of for example 15 mm. The partition walls 6 as it where are positioned floating above the bottom plate 7. A motor is provided for driving the chain 3 in rotation taking the shelves 2 along and guiding them one behind the other along the track 4. As is typical for storage systems of the Paternoster type, each of the shelves 2 is mounted to the chain 3 in such a way that all along their movement along the track 4, they are all able to maintain a position in which their bottom plate 7 is able to maintain such an orientation that articles stored in the shelves 2 do not fall of, preferably this is a substantially horizontal orientation.

The rotatable assembly of conveying track 4 and shelves 2 mounted thereto is placed inside a housing 10 supported by a suitable frame 11. The housing 10 is substantially closed and is provided with a longitudinal inlet opening at a position of a loading station 14, and with a longitudinal outlet opening at a position of an unloading station 15. The opening of the loading station 14 is provided at a height which makes it well possible for a user to place articles in the compartment 5 of shelves 2 via the inlet opening. In the embodiment shown this is substantially along a middle part of the vertically orientated loop shaped track 4. The outlet opening of the unloading station 15 is provided near the upper side of the track 4, preferably at a height of at least 2 m so that it does not stand in the way of the user.

The loading station 14 is provided with a fixed stationary working platform 17 at the outside of the housing 10. This working platform 17 can be used by the user for performing actions to articles which are to be placed in the storage system 1.

According to the invention each carrier shelf 2 comprises a horizontally directed slender driveable conveyor belt organ 20 having a total thickness of approximately 8 mm. This conveyor belt organ 20 rests on top of the bottom plate 7 and extends in the longitudinal direction underneath all of the compartments 5 including the partition walls 6 separating them from each other. The transportation direction A of the conveyor belt organ 20 is parallel to the longitudinal direction of the shelf 2. Each conveyor belt organ 20 comprises a pair of end rollers 21 mounted in a subframe 22. A belt 23 runs over the end rollers 21. In between the end rollers 21 a low-friction plastic guidance plate 24 is provided which separates the lower and upper part of the belt 23 from each other. The conveyor belt organ 20 thus has a length substantially equal to the carrier shelf 2 and extends over the larger part of the width of the installation 1.

During loading a user each time has a particular compartment 5 of a particular shelf 2 stopping in front of the working platform 17. He is then able to place a certain article which is linked to that particular compartment 5. This action is repeated until there are no more articles to be stored in the various compartments 5 and/or if all the compartments 5 have become fully loaded with articles. In the embodiment shown the user places washed

garments 25 in the compartments 5, with which each specific compartment 5 has been linked to a specific end user of some of those garments 25. Each time the user has the storage system 1 rotate the assembly of shelves 2 in order to have a particular compartment 5 of a particular shelf 2 stop in front of the loading station 14. During this rotating of the system, the user has time to neatly fold up the garment 25 which is linked to that specific compartment 5. Thus the user is able to efficiently and quickly fold up and sort out a batch of washed garments 25 and store them temporarily in the system 1. With this the user places the garments 25 stacked on their aimed compartments 5 on top of the conveyor belt organ 20 of that shelf 2. During this loading the belt 23 does not rotate but is at a stand still, and the part of the belt 23 which at moment lies on the upper side forms a suitable supporting surface.

The unloading station 15 is provided with a stationary guidance platform 30 at the outside of the housing 10. The unloading station 15 comprises a displacement mechanism formed by two controllable piston-cylinder organs 31. Those piston-cylinder organs 31 are provided with hooks 32 at their outer ends with which they are able to grip into complementary openings of the subframe 22 of a particular conveyor belt organ 20 stopped in front of the unloading station 15 (fig. 2). By operating the piston-cylinder organs 31 that conveyor belt organ 20 can then be moved from underneath its set of partition walls 6 in a direction X substantially horizontal and perpendicular to the transportation direction A. The conveyor belt organ 20 together with the various garments 25 stacked on top of it can thus be moved to a position in which they rest on top of the guidance platform 30 (fig. 3).

The unloading station 15 furthermore comprises a driveable pressure roller 35 at one of the ends of its platform 30. As soon as one of the conveyor belt organs 20 is moved to rest on top of the platform 30, a pressure roller 35 can be pushed against one of its end rollers 21 by means of a suitable operating mechanism, for example another piston-cylinder organ 35a. By then driving the pressure roller 35 in rotation, the conveyor belt organ 20 is automatically also driven in rotation. In order to reduce the friction of the belt 23 during its rotating action, the platform 30 is provided with roller bearings 36. Those roller bearings 36 also help to reduce any friction during the moving of the organ 20 in and out of its shelf 2 to and from a position on top of the platform 30. This friction can further be reduced by the provision of guidance roller bearings on the subframe 22.

The platform 30 connects with an up and downwardly hingeable curved rollway 39 to a stationary transportation organ, in this case a stationary conveyor belt 40 which in turn connects to a wrapping installation. By driving the pressure roller 35, the conveyor belt organ 20 automatically unloads the garments 25 stored thereupon towards the conveyor belt 40. With this the stacks of garments 25 corresponding to the respective compartments 5 remain

properly separated from each other. Thus each sorted out stack can be individually wrapped in the wrapping installation, before being transported back again to their end-users.

In fig. 4-6 an alternative is shown in which a common drivable pressure roller 50 is positioned sideways of the conveying track 4 at a position below the platform 30 of the unloading station 15. The pressure roller 50 can be pushed upwards against the belt 23 by means of a suitable operating mechanism, for example two piston-cylinder organs 51. By then driving the pressure roller 50 in rotation, the conveyor belt organ 20 is automatically also driven in rotation. As can be seen in fig. 4 and 5 the pressure roller 50 in its upwards driving position pushes the lower part of the belt 23 somewhat upwardly against two support rollers 52 which are positioned adjacent each other inside a slit shaped opening 53 which has been provided in the guidance plate 24. Thus the lower part of the belt 23 advantageously is not pushed against the guidance plate 24 during driving, which would otherwise result in undesired higher friction forces between the belt 23 and the plate 24.

In order to prevent that the entire belt organ 23 including the plate 24 is pushed upwards by the pressure roller 50 during driving, limitation means are provided which are positioned sideways of the conveying track 4 at the position of the unloading station 15. The limitation means here are formed by two hooked organs 55 and 56 of which the one closest to the track 4 is operable by means of a piston-cylinder organ 57 towards a gripping position. When the conveyor belt organ 20 is pulled out onto the platform 30 it automatically comes to lie with an outer longitudinal edge 24' of the plate 24 into the hooked organ 55. By then also closing the hooked organ 56 into its gripping position it grips the opposite inner longitudinal edge 24'' of the plate 24. Together the organs 55 and 56 are well able to delimit the conveyor belt organ 23 by firmly gripping its plate 24.

Besides the embodiment shown many variants are possible. For example the numbers of shelves, the dimensions and shapes of the various parts can be varied. Also it is possible to use other types of operating and displacement mechanisms and drive units. A control unit may be provided to control the operation of the various operating and displacement mechanisms and drive units in dependence of instructions of the user. For example the garments to be sorted out may be provided with suitable tags, barcodes or the like which the user can scan at the position of the working platform so that the control unit can then automatically steer the conveying means such that the corresponding shelf is stopped in front of the loading station. Likewise the control unit can suitably automate the unloading process of the shelves one after the other as soon as the user has given instructions for this. Partition walls are not necessary. The various articles stored on top of the various conveyor belt organs can also be separated in another manner from each other, for example by means of the belts being provided with suitable partition ribs or by the articles being placed in suitable trays on top of the belts.

Thus according to the invention a storage system is provided which makes it able to fully automate the loading/unloading process without a user having to perform all the actions. Besides the sorting of washed garments, the invention can also be used for the sorting or temporarily storing of any other kinds of articles.

Claims

1. Storage system, in particular of the Paternoster type, comprising:
- a frame;
- a plurality of longitudinal carrier shelves each having a supporting surface and being positioned moveable one behind the other at fixed intervals along a conveying track, in particular a loop shaped track;
- at least one loading and/or unloading station arranged along the track; and
- conveying means for moving the plurality of carrier shelves along the track and passing the shelves along the loading and/or unloading station such that in between movements of the carrier shelves along the track a respective one of the carrier shelves connects to the loading and/or unloading station during a stop,
characterized in that,
each of the carrier shelves comprises a driveable conveyor belt organ as its supporting surface.

2. Storage system according to claim 1, wherein the station comprises a displacement mechanism for moving the conveyor belt organ of the respective one of the carrier shelves connecting to the station during a stop, to a loading and/or unloading position sideways of the conveying track, in particular in front thereof.

3. Storage system according to claim 2, wherein friction reduction means, in particular roller bearings, are provided sideways of the conveying track below the loading and/or unloading position of the conveyor belt organ for a lower side of the conveyor belt organ to rest upon when moved to its loading and/or unloading position, in particular when driven in rotation in this loading and/or unloading position.

4. Storage system according to one of the preceding claims, wherein the station comprises a common drive unit, and wherein an operating mechanism is provided for engaging the common drive unit with the conveyor belt organ of the respective one of the carrier shelves connecting to the station during a stop.

5. Storage system according to claim 2 or 3 and 4, wherein the operating mechanism and common drive unit are positioned sideways of the conveying track such that the operating mechanism is able to engage the common drive unit with the conveyor belt organ when it has been moved to its loading and/or unloading position.

6. Storage system according to claim 4 or 5, wherein the common drive unit comprises a driveable pressure roller which by means of the operating mechanism can be pushed against the outside of the conveyor belt organ for driving the belt in rotation.

7. Storage system according to one of claims 4-6, wherein the operating mechanism and common drive unit are positioned sideways of the conveying track at a position below the loading and/or unloading position of the conveyor belt organ.

8. Storage system according to claim 7, wherein limitation means are provided which are positioned sideways of the conveying track at the position of the loading and/or unloading position of the conveyor belt organ such that they can delimiting the conveyor belt organ when the driveable pressure roller is pushed from below against it.

9. Storage system according to one of the preceding claims, wherein each conveyor belt organ has its transportation direction extending parallel to a longitudinal direction of the respective carrier shelf.

10. Storage system according to one of the preceding claims, wherein each carrier shelf comprises a set of partition walls positioned above its conveyor belt organ for subdividing its carrier shelf in a plurality of compartments along a longitudinal direction thereof.

11. Storage system according to claims 9 and 10, wherein the station comprises a displacement mechanism for moving the conveyor belt organ and set of partition walls, of the respective one of the carrier shelves connecting to the station, relative to one another sideways in a direction substantially perpendicular to the transportation direction.

12. Storage system according to claims 2 and 11, wherein the displacement mechanism is designed for moving the conveyor belt organ sideways from underneath the set of partition walls.

13. Storage system according to claims 2 and 11, wherein the displacement mechanism is designed for moving the set of partition walls sideways from above the conveyor belt organ.

14. Storage system according to one of the preceding claims, wherein each conveyor belt organ is of slender design with a height between an upper and a lower track of each conveyor belt organ is less than 50 mm, in particular less than 10 mm.

15. Storage system according to claim 14, wherein a belt of the conveyor belt organ is guided over end rollers with a guidance plate extending between the upper and lower track.

16. Storage system according to one of the preceding claims, wherein each carrier shelf comprises a bottom plate on top of which the conveyor belt organ is supported.

17. Storage system according to one of the preceding claims, wherein the station comprises a stationary working platform with which the conveyor belt organ of a respective one of the carrier shelves connects during a stop.

18. Storage system according to claims 2 and 17, wherein the stationary working platform is provided sideways of the conveying track below the loading and/or unloading position of the conveyor belt organ for a lower side of the conveyor belt organ to rest upon when moved to its loading and/or unloading position, in particular when driven in rotation in this loading and/or unloading position.

19. Storage system according to one of the preceding claims, wherein the station comprises a stationary conveyor belt organ with which the conveyor belt organ of the respective one of the carrier shelves connects during a stop.

20. Storage system according to one of the preceding claims, wherein the unloading station connects to a wrapping installation.

21. Storage system according to one of the preceding claims, wherein the unloading station is arranged at another position along the track than the loading station.

22. Use of the storage system according to one of the preceding claims for the sorting of textile articles, in particular washed textile articles to be folded and packaged.

23. Method for operating a storage system according to one of the preceding claims, comprising the steps of:
- moving the plurality of longitudinal carrier shelves along the conveying track;
- stopping an aimed carrier shelf in front of the loading and/or unloading station;
- loading or unloading the carrier shelf stopped in front of the station by driving its conveyor belt organ in rotation.

24. Method according to claim 23, further comprising the step of:

- moving the conveyor belt organ of the respective one of the carrier shelves connecting to the station during a stop, to a loading and/or unloading position sideways of the conveying track, in particular in front thereof.

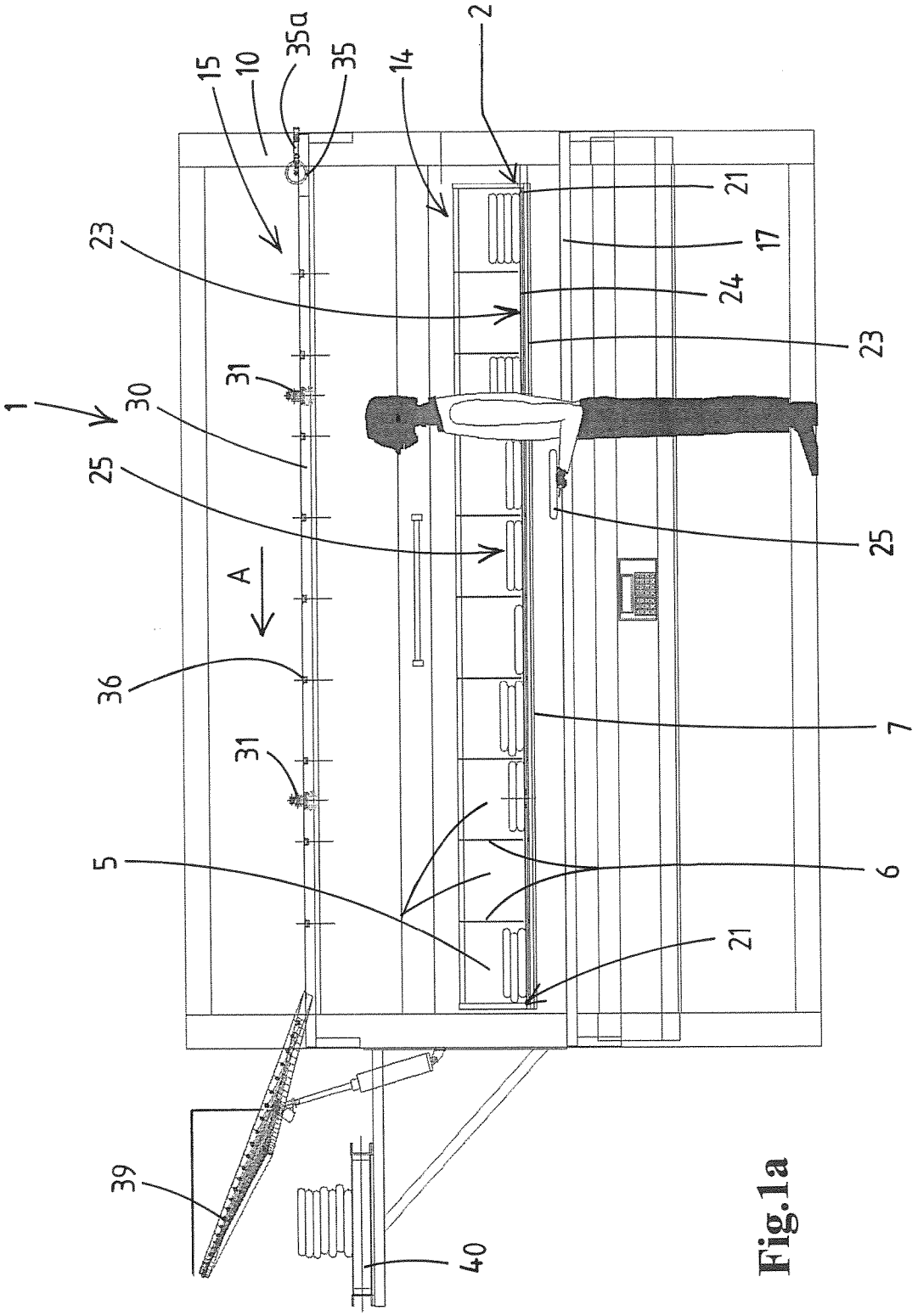

Fig.1a

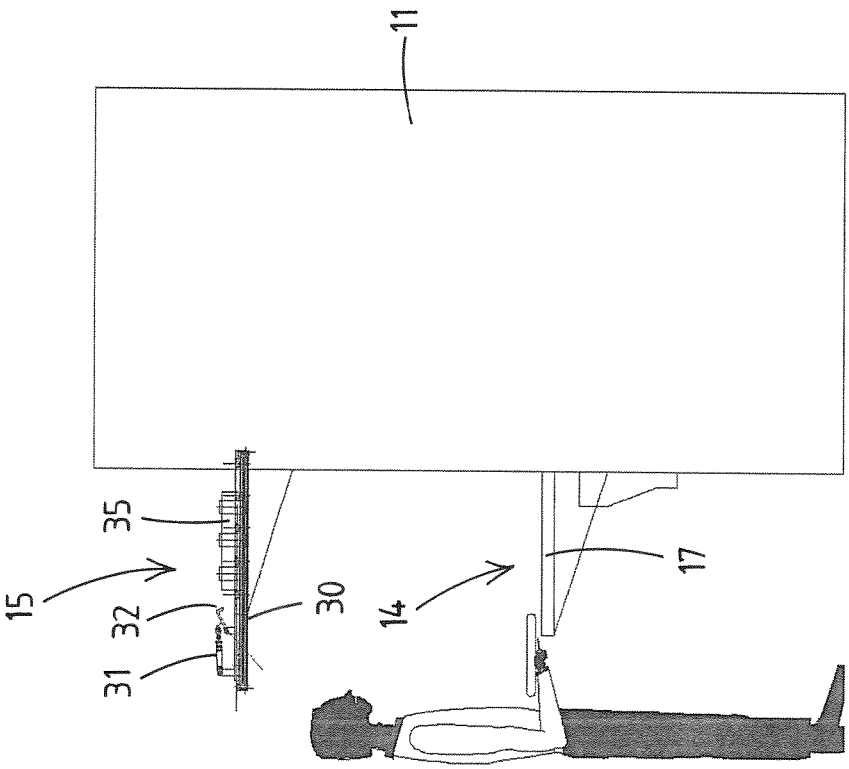

Fig.1b

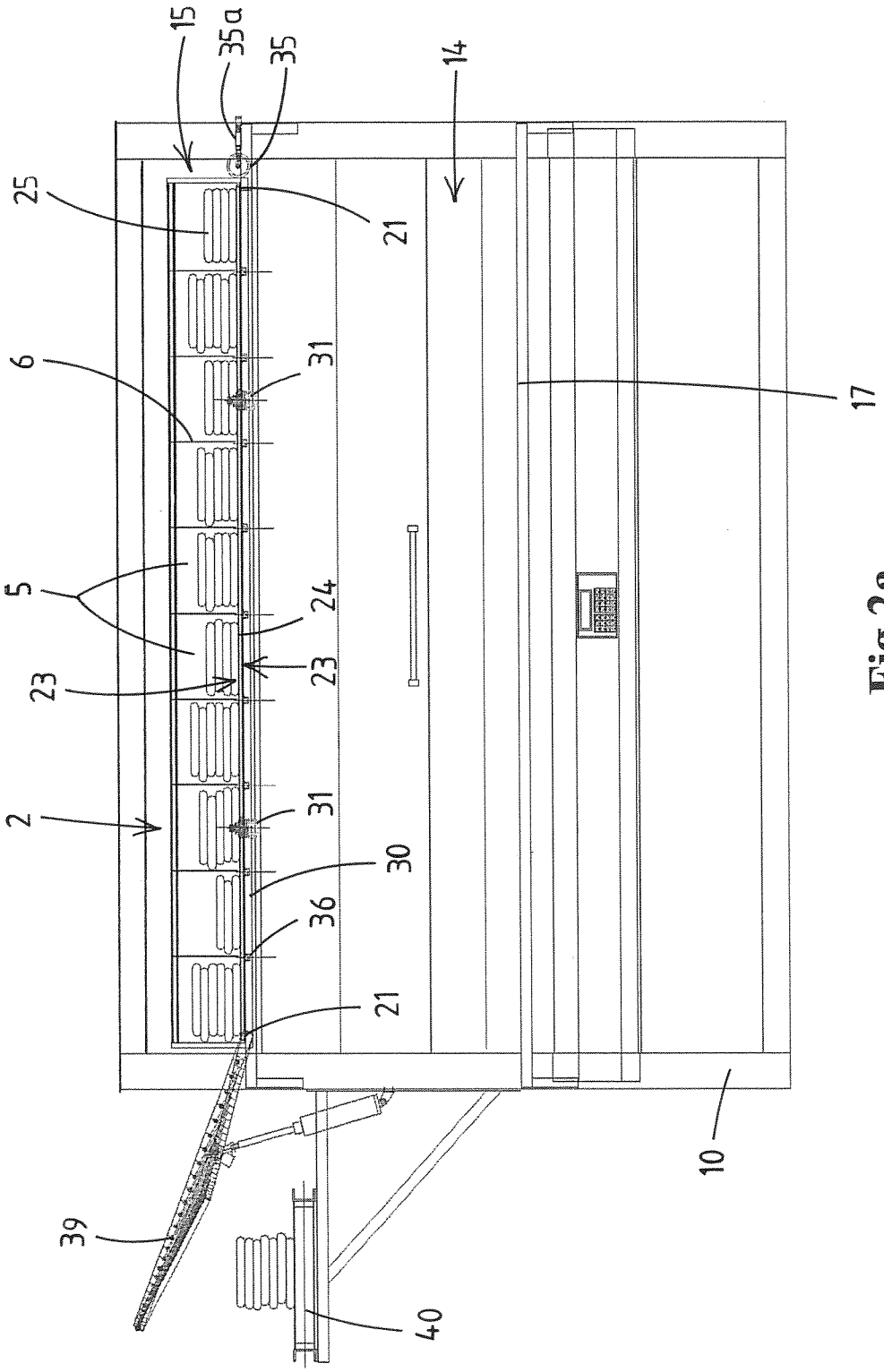

Fig.2a

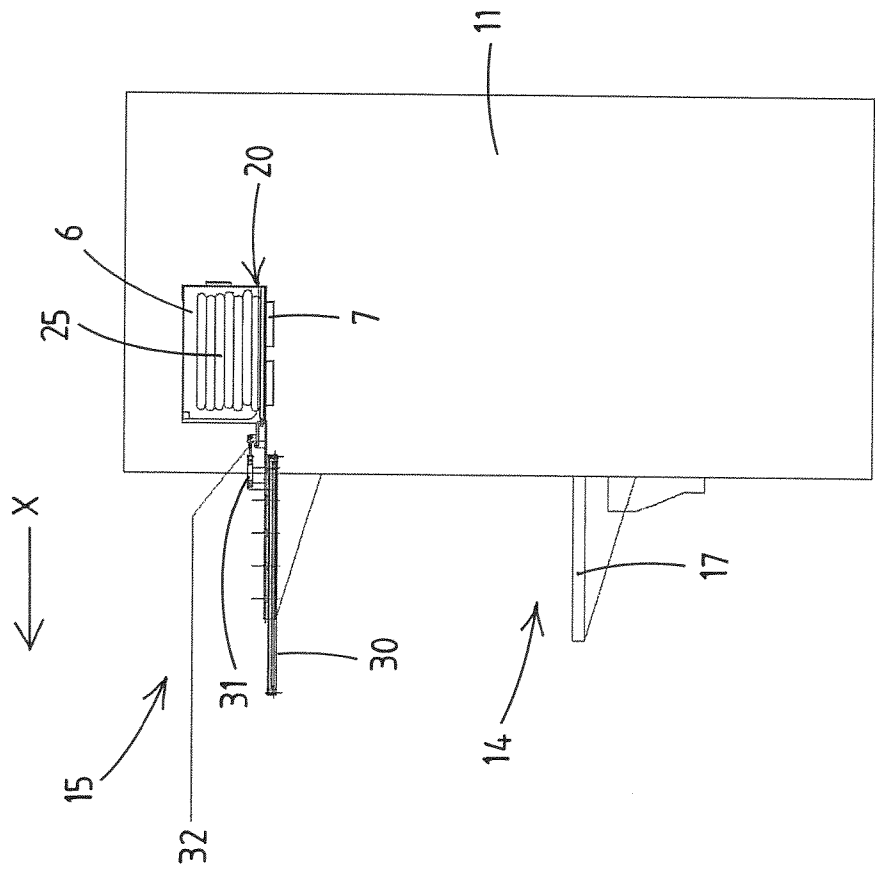

Fig.2b

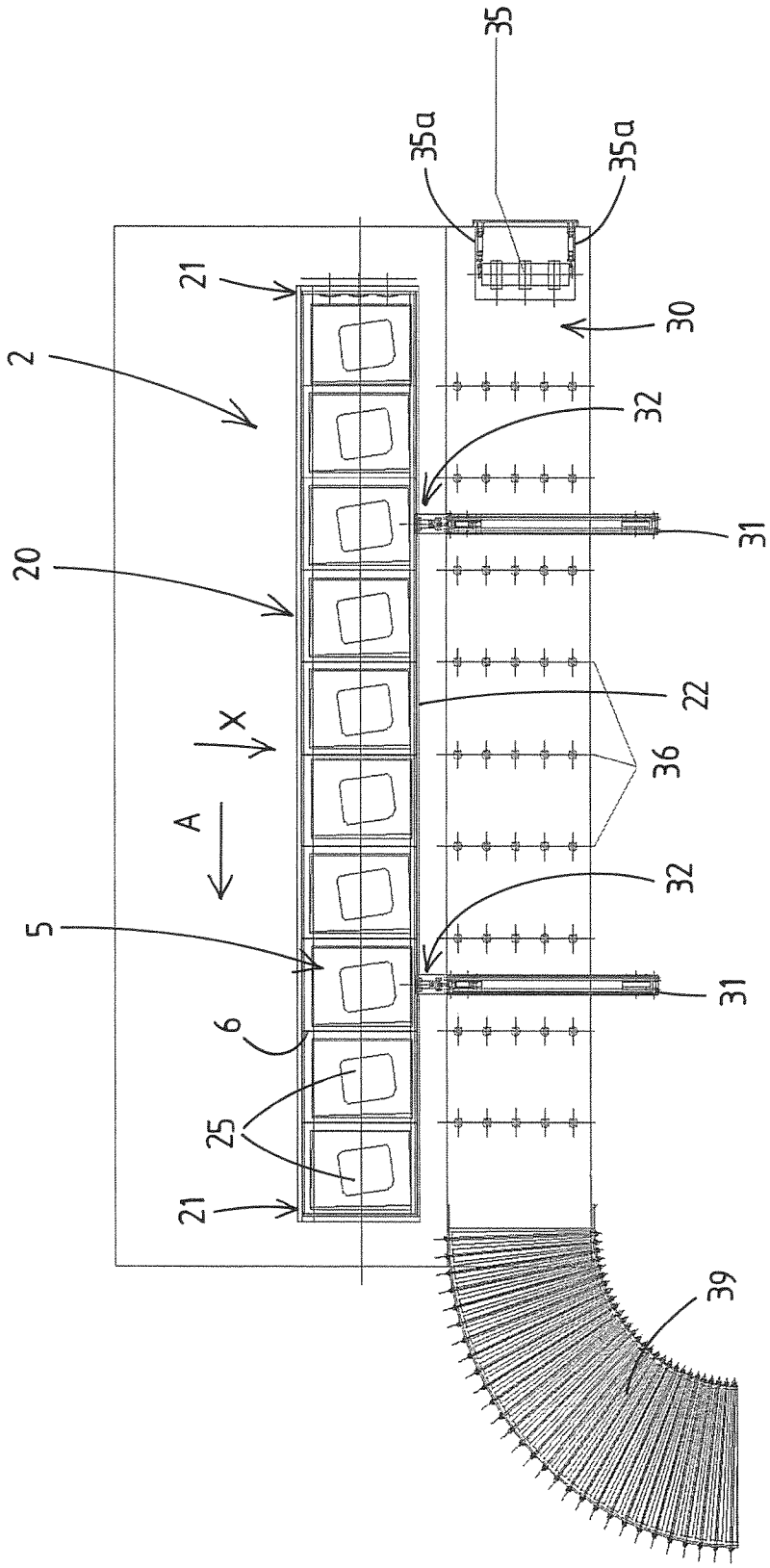

Fig.2c

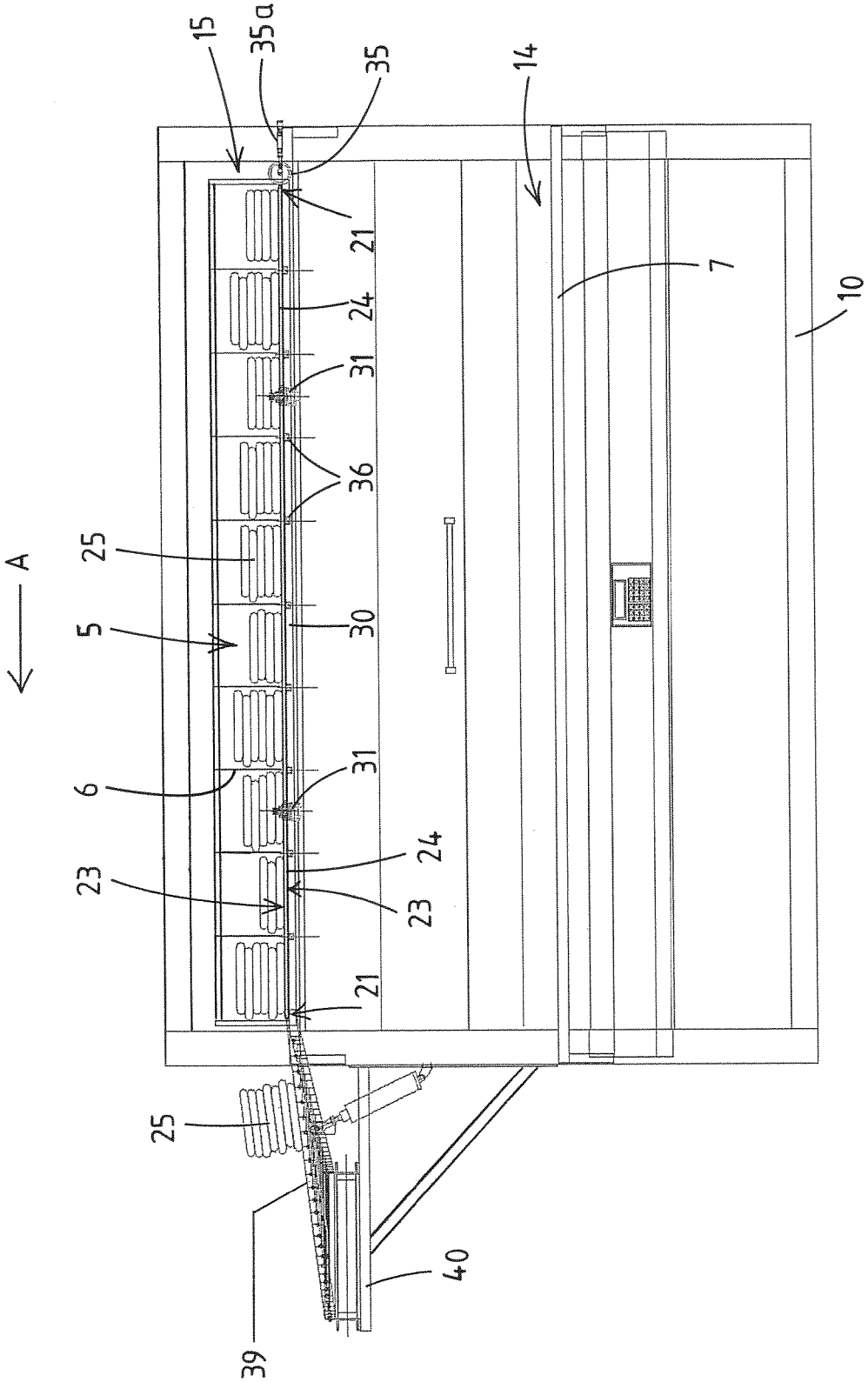

Fig.3a

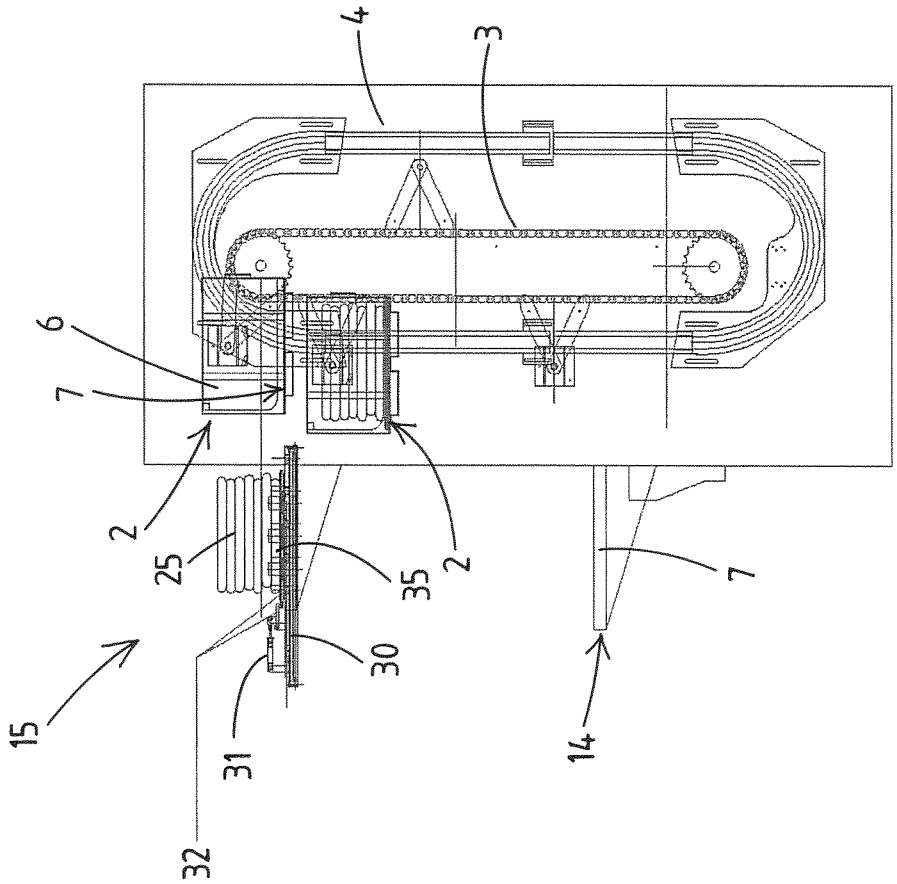

Fig.3b

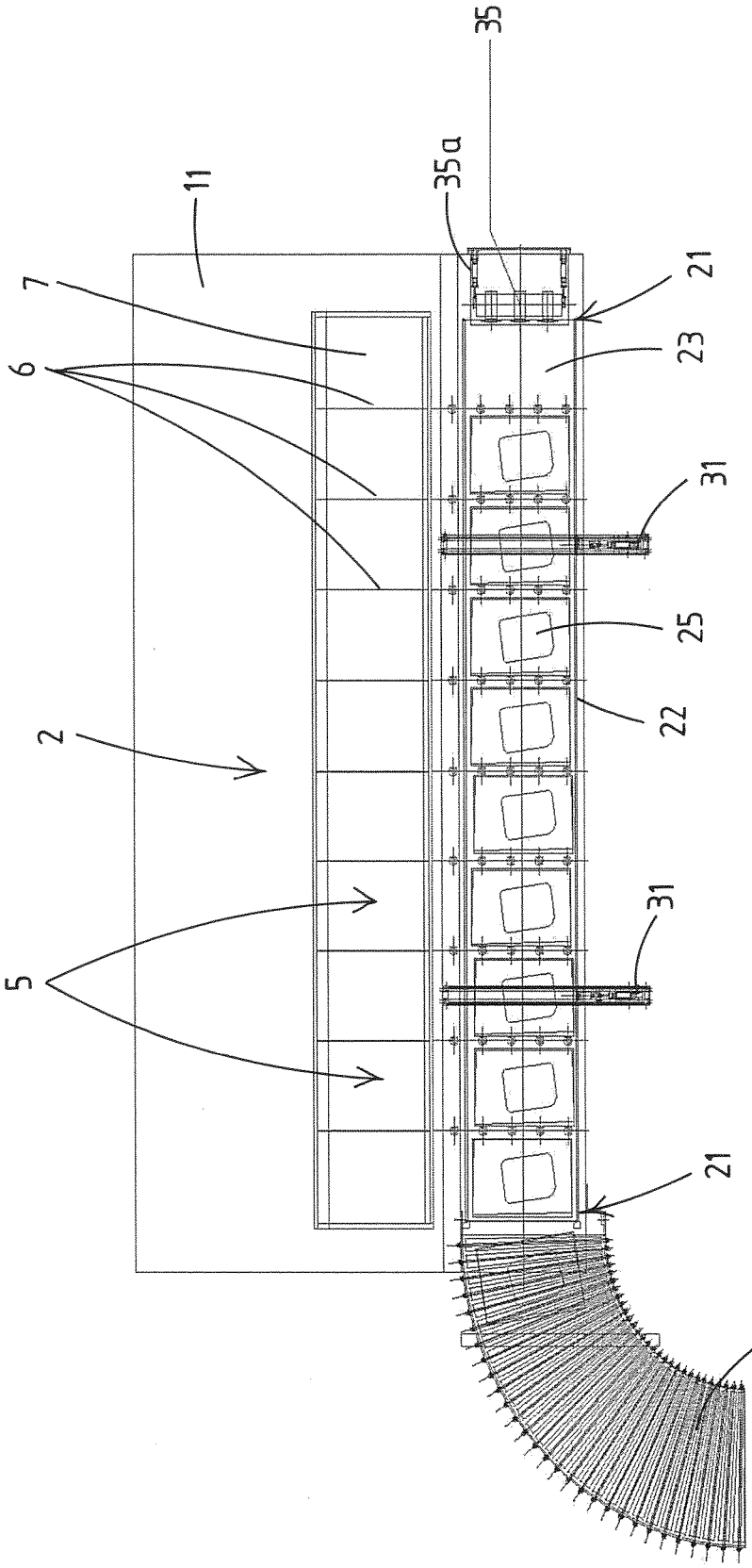

Fig.3c

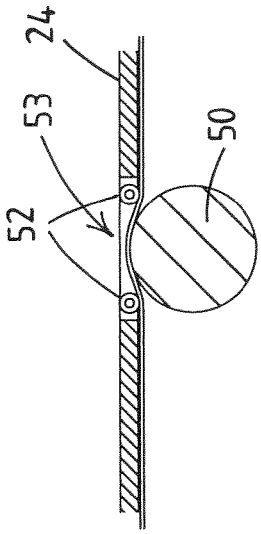

Fig.5

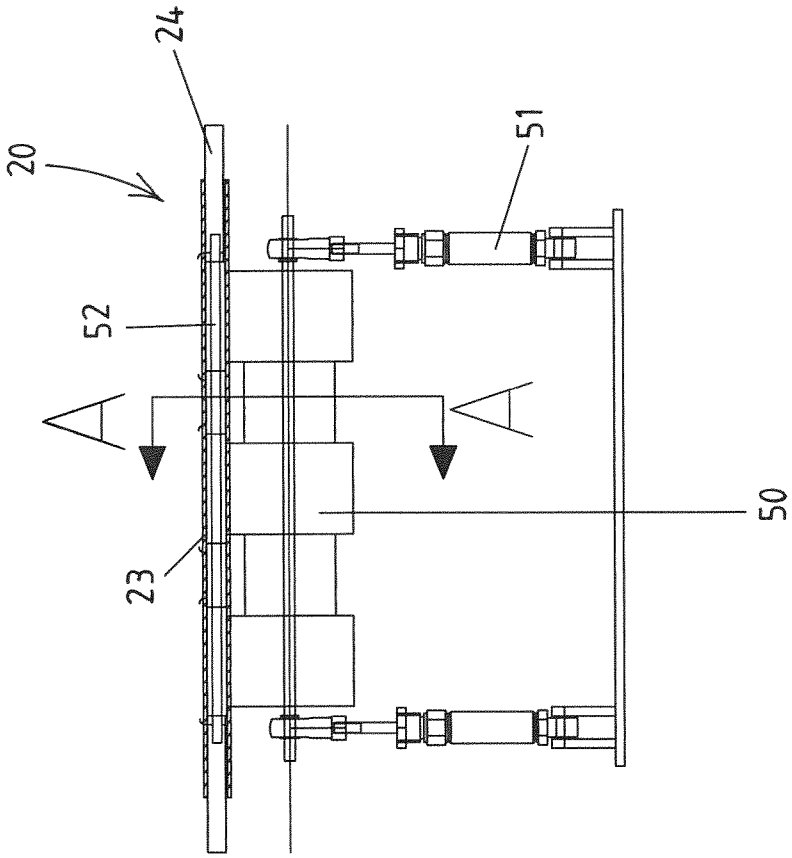

Fig.4

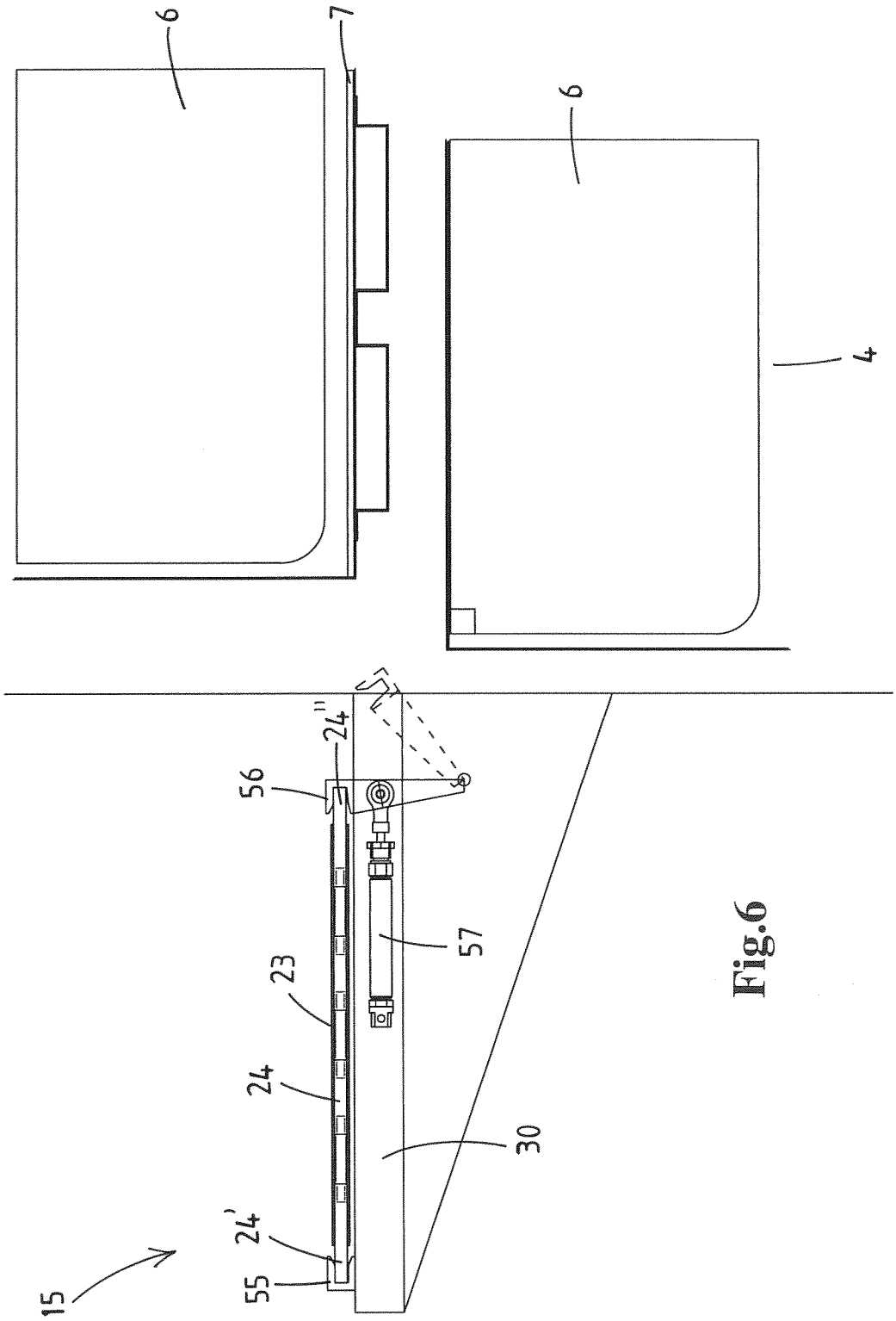

Fig.6

INTERNATIONAL SEARCH REPORT

International application No
PCT/NL2011/050365

A. CLASSIFICATION OF SUBJECT MATTER
INV. B65G1/127
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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 12 46 575 B (HAMMELSBECK DIENST K G) 3 August 1967 (1967-08-03)	1,4,9, 14,15, 19,20, 22,23
Y	the whole document	6,7

X	WO 03/080483 A1 (SLAGTERIERNES FORSKNINGSINST [DK]; JEPSEN ERIK LUND [DK]; FOLKMANN PET) 2 October 2003 (2003-10-02) claims 1,2; figure 1	1,9,19, 21,23

X	DE 972 029 C (HILBERT GUENTER-SIEGFRIED DIPL) 6 May 1959 (1959-05-06) claims 1-3; figure 1	1,4,9, 21,23

Y	DE 87 06 291 U1 (MEGAMAT GMBH & CO) 2 July 1987 (1987-07-02)	6,7
A	page 4, lines 21-25; figure 1	5

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

☒ See patent family annex.

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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

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"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

"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.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
20 July 2011	27/07/2011

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	Grentzius, Wim

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/NL2011/050365

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 1246575 B	03-08-1967	NONE	
WO 03080483 A1	02-10-2003	AU 2003218633 A1	08-10-2003
		DK 200200471 A	28-09-2003
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DE 8706291 U1	02-07-1987	NONE	