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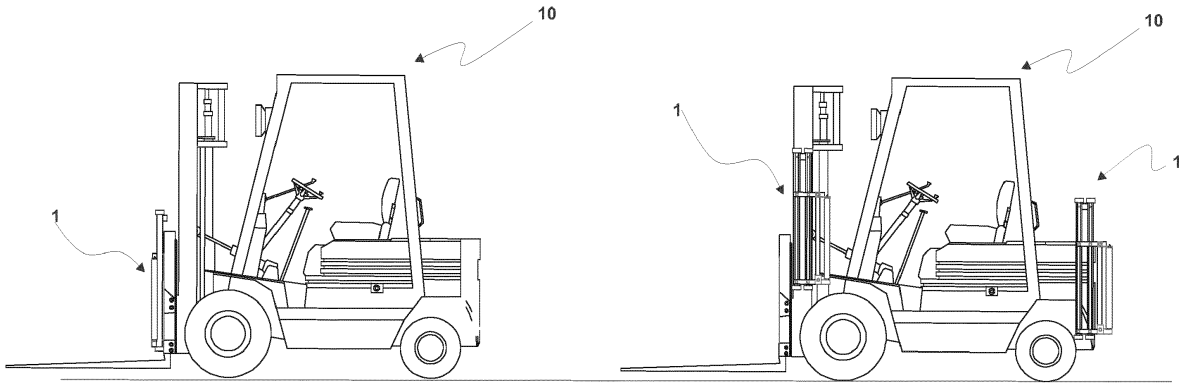
(54) **WRAPPING DEVICE, FOR WRAPPING PRODUCTS USING STRETCH FILM, FIXABLE TO A FORKLIFT**

(57) Wrapping device 1 for wrapping products using stretch film, said wrapping device 1 being fixable to a forklift 10 and comprising a frame 2, a reel support 3 and fastening means configured for removably fixing said frame 2 to the forklift 10, and wherein the reel support 3 comprises at least one roller 4 free to rotate about the axis of symmetry thereof and configured for removably receiving a reel of stretch film.

FIG.1



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Description

SCOPE OF THE INVENTION

[0001] The present invention relates to the field of machines for wrapping pallets. In particular, they are machines that wrap the stored products with a stretch plastic film, generally on pallets, in order to stabilize the contents thereof, facilitating transport and storage.

PRIOR ART

[0002] Goods to be stored or transported are generally arranged on pallets.

[0003] The arrangement of containers or products on pallets is carried out by means of machines called palletizers, which perform the function of superimposing product layers on top of one another.

[0004] In order to improve the pallet stability, a wrapping machine configured for wrapping the entire pallet with a stretch plastic film is generally associated with the palletizer. This ensures greater stability during the subsequent transport and/or storage steps.

[0005] Various types of machines or equipment for wrapping pallets are known in the prior art, which differ mainly in the degree of automation of the solution. The most automated solutions serve a market area related to high-speed goods production, while less automated solutions are more dedicated to low-speed production lines.

[0006] There are therefore completely automatic machines where, by means of a series of conveyors, the pallet is brought from the palletizer to the inside of the wrapper which carries out the entire wrapping and delivers a pallet ready for transport/storage.

[0007] Semi-automatic machines, on the other hand, require the intervention of the operator who generally uses a forklift/forklift truck to place the pallet on the wrapping machine where, using different technologies, rotating pallet or rotating reel, automatic wrapping is performed.

[0008] Both the automatic and the semi-automatic machines described involve important investments that not all companies are able to sustain. Furthermore, they do not always allow the management of product and production flexibility that is fundamental for small/medium-sized companies.

[0009] A further type of machines are those that can be defined as more flexible and therefore suitable for medium/low rates and for different shapes of pallets.

[0010] These machines also allow to be positioned from time to time at the point of the plant where the pallets to be wrapped are positioned.

[0011] These include, for example, those described in document US4095395 where a motorized trucklift is configured for transporting the film reel for wrapping a pallet; said trucklift moves independently, i.e. without operator, and by positioning devices which allow it to rotate around the pallet itself, thereby wrapping it.

[0012] The type of machine described in this document is therefore more suitable to work in less structured contexts that require flexibility, but it is still a machine only dedicated to the wrapping operation, which involves an important investment in terms of costs.

[0013] Analyzing solutions that are less and less automated and therefore more suitable for flexible and low-speed productions, we have for example the device described in document US8938939. Said document describes a trucklift for arranging, on a pallet of products, a stretch plastic film by unwinding from a reel where said pallet is placed on the ground or on conveyors. Said trucklift comprises a frame mounted on wheels configured for supporting and moving it and further comprises elements for adjusting the height of the reel. The trucklift described in this document provides for being moved and guided manually by the operator, who performs the wrapping of the pallet by pushing said trucklift around the pallet itself.

[0014] The trucklift described in document US8938939 defines a solution that is certainly much more cost-effective than the solutions described above, but it is certainly not an efficient solution in terms of operation and time.

[0015] In fact, it is necessary for an operator to pick up the pallet to be wrapped and place it on the ground by means of a forklift or transpallet; the operator must then park the forklift or transpallet, take the trucklift for wrapping and start pushing it manually around the pallet for wrapping.

[0016] A further limitation of this application is related to the very low rate which can be handled.

[0017] An intermediate solution in terms of rate and efficiency is that described in document US4282700 where a wrapping device with stretch film is integrated on a forklift. In this way, the pallet picked up by the forklift is wrapped at the same time as its transport from the place of pick up to that of storage or unloading. Said wrapping device, however, is very complex and involves the use of motorizations dedicated to the rotation and unwinding of the film reel for the execution of the wrapping. Consequently, the solution is efficient, but very expensive.

DESCRIPTION AND ADVANTAGES OF THE INVENTION

[0018] The technical problem underlying the present invention is that of providing a device for wrapping products by means of stretch film, which can be installed on a forklift, structurally and functionally designed to overcome one or more of the limits described above with reference to the prior art cited.

[0019] Within the scope of the aforementioned problem, a main object of the invention is to provide a device for wrapping products by means of stretch film, which can be installed on a forklift, thus enabling the use of means already present at the plants, such as forklifts, to carry out the function of wrappers, involving a minimum investment compared to that necessary for the purchase

of traditional machines.

[0020] It is also an object of the present invention to allow the achievement of good efficiency compared to manual systems.

[0021] A further object of the invention is to provide a device for wrapping products, in the context of a simple, rational and rather cost-effective solution.

[0022] These and other objects are achieved by the features of the invention set forth in the independent claim 1. The dependent claims outline preferred and/or particularly advantageous aspects of the invention.

[0023] In particular, an embodiment of the present invention provides a device for wrapping products by stretch film which can be installed on a forklift, comprising a frame, a reel support and fastening elements configured for removably fixing said frame to the forklift. The reel support in turn comprises at least one roller free to rotate about the axis of symmetry thereof, and configured for removably receiving a reel of stretch film.

[0024] With this solution it is possible to wrap the products, generally arranged on a pallet, by moving the forklift around the pallet itself.

[0025] According to an aspect of the invention, a device for wrapping products by means of stretch film is provided, wherein the frame is configured for being fixed to the forklift by means of magnetic fastening elements.

[0026] With this solution it is possible to position said device on the different metal parts of the forklift (which are affected by the magnetic effect). In this way, the reel can be positioned in the most suitable manner for different wrapping needs.

[0027] A further aspect of the invention is also that of providing a frame configured for being installed directly on a fork of the forklift by means of a substantially clamp system.

[0028] In this way, an extremely strong and secure fixing is achieved, for use also in cases where a considerable stretch of the stretch film is required in order to ensure maximum compactness and stability of the pallet.

[0029] According to an embodiment, the reel is positioned vertically with respect to the forklift walking surface; simultaneously with the movement of the forklift around the pallet, the forks of the forklift itself are progressively raised and in this way the reel is lifted, allowing a full-height wrapping of the pallet to be carried out.

[0030] With this device, horizontal wrapping of the pallet is possible.

It is also an object of the present invention to allow the vertical wrapping of the pallet. In fact, according to a further embodiment, the reel may be positioned horizontally, and therefore parallel to the walking surface. In order to carry out the vertical wrapping of the pallet, said pallet must be kept lifted from the ground during the wrapping operation, preferably by means of a second forklift.

[0031] With this solution, it is also possible to install this device on various types of forklifts. In one embodiment, the device in fact provides a frame having adjustable width so as to allow installation on forks having different dimensions.

[0032] A further advantage of this solution is that it allows an easy disassembly and assembly of the wrapping device being preferably installed on a clamp on the vertical part of the fork of the forklift.

[0033] Said objects and advantages are all achieved by the device for wrapping products by means of stretch film which can be installed on a forklift, object of the present invention, which is characterized by the provisions of the following claims.

BRIEF DESCRIPTION OF THE FIGURES

[0034] This and other features will become more apparent from the following description of some of the configurations, illustrated purely by way of example in the accompanying drawings.

- Figure 1: shows a forklift with a device for wrapping products by means of stretch film applied in different possible positions.
- Figure 2: shows a front and lateral view of the device for wrapping products with stretch film;

Figure 3: shows a front view of the device for wrapping products by means of stretch film with horizontal reel.

DESCRIPTION OF THE INVENTION

[0035] With particular reference to figure 1, a partial view of a forklift 10 is shown on which a wrapping device 1 is installed, for winding products 20, by means of stretch film.

[0036] The products 20 are preferably arranged on a pallet which allows easy handling and storage.

[0037] The pallet of products 20 is generally moved by means of the forklift 10 by an operator who, as will be clear hereinafter, will be advantageously usable also for the application of the film.

[0038] In fact, the wrapping device 1 according to the present invention allows using the same means used for the handling thereof, that is the forklift 10, to be used for wrapping the product 20.

[0039] The wrapping device 1 as shown in figure 2 comprising a frame 2 and a reel support 3; the frame 2 is configured for being installed on the forklift 10. For this purpose, the wrapping device comprises fastening elements 50, which will be described in greater detail below, and which allow the device 1 to be fixed to the forklift 10 in a removable manner.

[0040] Preferably, the fastening elements 50 and the frame 2 are configured in such a way that the reel support 3 protrudes laterally with respect to the overall size of the forklift 10 when the wrapping device 1 is mounted on the forklift 10.

[0041] In a preferred embodiment, the reel support 3 is mechanically associated with the frame 2 and comprises at least one roller 4 free to rotate about the axis

of symmetry thereof.

[0042] Said roller 4 is configured for receiving a reel 30 of stretch film. Said reel 30 can be replaced by picking up the finished one and inserting a new one on the roller 4 without disassembling the wrapping device 1 from the forklift.

[0043] In an embodiment of the present invention, the frame 2 is configured for being fixed to the forklift 10 by means of fastening elements 50 of a magnetic type.

[0044] The magnets may be of different types, such as permanent magnets or electromagnets.

[0045] The wrapping device 1 may therefore be installed in different positions, provided that it is applied to the metal parts of the forklift which are affected by the magnetic effect.

[0046] In this way, the reel can be positioned in the most suitable manner, for different wrapping needs. According to a further embodiment of the present invention, the frame 2 is configured for being installed on a fork 11 of the forklift 10, by means of a substantially clamp-like mechanical fixing and comprises:

- at least two parallel uprights 5 arranged in vertical direction Z with respect to the walking plane of the forklift 10,
- at least one junction element 6 adapted to connect the uprights 5 with one another.

[0047] It should be noted that in this embodiment, shown in figure 2, the fastening elements 50 form part of the same frame 2, being in fact adapted to also define the support structure of the device 1.

[0048] The uprights 5 are preferably tubular or profiled elements, configured for embracing the fork 11 of the forklift by tightening it to a clamp. It should be noted that this solution allows a fast and simple fixing of the device to the fork of the forklift, thus making assembly and disassembly easy; an extremely strong and secure fixing is also achieved, for use even in cases where a considerable stretch of the stretch film is required for maximum compactness and stability of the pallet.

[0049] In addition, this embodiment also provides an optimal solution to the possibility of easily adapting the device to the different shapes and size of the forklift on which it is mounted.

[0050] In particular, for this purpose, the uprights are configured for embracing the fork 11, preferably in the vertical portion thereof, by contact with the sides 12 and 13 thereof.

[0051] The junction elements 6 are configured for adjusting the distance between the uprights 5, adjusting it to the distance between the sides 12 and 13 of the fork 11.

[0052] It is however clear that the fastening elements 50 may also have a different configuration and it may be provided that the forklift is also specifically adapted to receive the fastening elements 50.

[0053] For example, it may be provided that the connection is implemented through the coupling of male/female elements made on the forklift and on the device.

[0054] It is however apparent that the possibility of adjustment offered by the previously described embodiment is particularly advantageous.

[0055] The junction elements 6 may also be configured for supporting the reel support 3. Said junction elements 6 may have different dimensions and shapes depending on whether they serve only as a junction of the uprights 5 or also as a support for the reel support 3.

[0056] In the embodiment shown in the figure there are 3 junction elements 6, of which two act as junction elements of the uprights 5 and at the same time as support for the reel support 3; these have a longer length than the junction element 6 which acts only as a junction element for the uprights 5. In this way, a lateral extension is defined with respect to the fastening elements 50 of the device, which allow the reel support 3 to be installed advantageously cantilevered. With this solution, the forklift 10 is able to perform the rotation maneuvers around the pallet in a more convenient manner without risking to hit the pallet itself.

[0057] In one embodiment of the present invention, the uprights 5 provide at least one slot 51 for the height adjustment of the junction elements 6 and consequently for the height adjustment of the reel support 3.

[0058] By slot 51 it is meant an opening/groove which allows sliding and thus adjusting and subsequently locking the position of the junction elements 6 mechanically connected to the uprights 5. However, it is understood that the above description has an exemplary and non-limiting value, therefore the elements described may be considered as included both in the solution which provides for the magnetic and for the clamped fastening elements 50.

Moreover, any variants may include different types of fastening elements 50 on the same wrapping device 1, that is, for example, both magnetic and clamp elements; said variants, which are necessary for technical and/or functional reasons, are considered from now on as falling within the same protective scope defined by the following claims.

[0059] According to an aspect of the invention, two possible configurations of the reel support 3 are contemplated:

- reel support 3 comprising at least one roller 4 positioned in vertical direction Z.
- reel support 3 comprising at least one roller 4 positioned in horizontal direction, with respect to the walking surface of the forklift 10.

[0060] The two configurations described above allow the wrapping of the product pallet both horizontally and vertically.

[0061] In particular, the horizontal wrapping of the pallet preferably takes place according to the following operating steps:

the operator places the product pallet 20 on the ground

or on a suitable support; he then gets off the forklift 10 to take a strip of stretch film from the reel 30 and makes it integral with the product 20, either by using adhesive tape or by binding it to the pallet or in the most suitable manner for the type of product 20 to be treated.

[0062] The operator rises again on the forklift 10 and guides the forklift according to a rotation path around the product 20 pallet.

[0063] During this rotation, the reel 30 unwinds and releases the film which gradually wraps the product 20.

[0064] Simultaneously with the movement of the forklift 10 around the product 20 pallet, the operator may lift the forks 11 in such a way as to allow wrapping along the entire height of the pallet or part thereof.

[0065] The rotation of the forklift 10 around the product 20 pallet continues until the degree of wrapping and therefore of protection required is reached.

[0066] As regards the vertical wrapping of the product 20 pallet, this is preferably done with the aid of a second forklift which keeps the product 20 pallet lifted off the ground during wrapping operations.

[0067] As in the previous case, the operator takes a strip of stretch film from the reel 30 and makes it integral with the product 20, either by using adhesive tape or by binding it to the pallet or in the most suitable manner for the type of product 20 to be treated.

[0068] The wrapping operations are performed by a first forklift 10 on which the wrapping device 1 is installed according to a sequence which preferably provides for moving the forklift 10 sideways to the pallet so that the roller 30 is below the pallet, kept lifted from the ground; once the reel 30 has come out of the pallet, the forks 11 rise up to exceed the height of the pallet, then the forklift 10 moves sideways to the pallet so that the reel 30 moves above the pallet of product 20, to subsequently descend sideways to the pallet, from the side opposite to the one previously wrapped. The cycle described is repeated until the degree of wrapping and therefore of protection required has been achieved.

[0069] It is understood, however, that the foregoing has a value of non-limiting example, therefore, possible variants of detail that may be necessary for technical and/or functional reasons are considered to be falling within the same protection scope defined by the following claims.

Claims

1. Wrapping device (1) for wrapping products (20) using stretch film, said wrapping device (1) being fixable to a forklift (10) and comprising a frame (2), a reel support (3) and fastening elements (50) configured for removably fixing said frame (2) to the forklift (10), and wherein the reel support (3) comprises at least one roller (4) free to rotate about the axis of symmetry thereof and configured for removably receiving a reel (30) of stretch film.

2. Wrapping device according to claim 1, wherein the frame (2) is configured for being fixed to the forklift (10) by fastening elements (50) of the magnetic type.

3. Wrapping device according to claim 1, wherein the frame (2) is configured for being mechanically fixed to a fork (11) of the forklift (10).

4. Wrapping device (1) according to claim 1, wherein the frame (2) comprises:

   - at least two parallel uprights (5) arranged in vertical direction (Z) with respect to the walking plane of the forklift (10),
   - at least one junction element (6) adapted to connect the uprights (5) with one another,

   said uprights (5) being configured for enclosing the fork (11) in the vertical portion thereof, through contact with sides (12) and (13) of the fork (11).

5. Wrapping device (1) according to claim 2, in wherein said at least one junction element (6) is configured for adjusting the distance between the uprights (5) adjusting it according to the distance between the sides (12) and (13) of the fork (11).

6. Wrapping device (1) according to claim 2 or 3, wherein the reel support (3) is installed on said at least one junction element (6).

7. Wrapping device (1) according to one of claims 2 to 4, wherein the uprights (5) comprise at least one slot (51) for the height adjustment of the junction elements (6).

8. Wrapping device (1) according to one of the preceding claims, wherein the reel support (3) comprises at least one roller (4) positioned, in use, in a substantially vertical direction (Z).

9. Wrapping device (1) according to one of claims 1 to 5, wherein the reel support (3) comprises at least one roller (4) positioned, in use, in a horizontal direction with respect to a walking plane of the forklift (10).

10. Wrapping device (1) according to one of the preceding claims, wherein the fastening elements (50) and the frame (2) are configured in such a way that the reel support (3) protrudes laterally with respect to the overall size of the forklift (10) when the wrapping device (1) is mounted on the fork of the forklift (10).

11. Wrapping device (1) according to claim 4, wherein the junction elements (6), which support the reel support (3), define a side extension with respect to the fastening elements (50) of the device.

12. Forklift (10) comprising a wrapping device (1) according to one of the preceding claims.

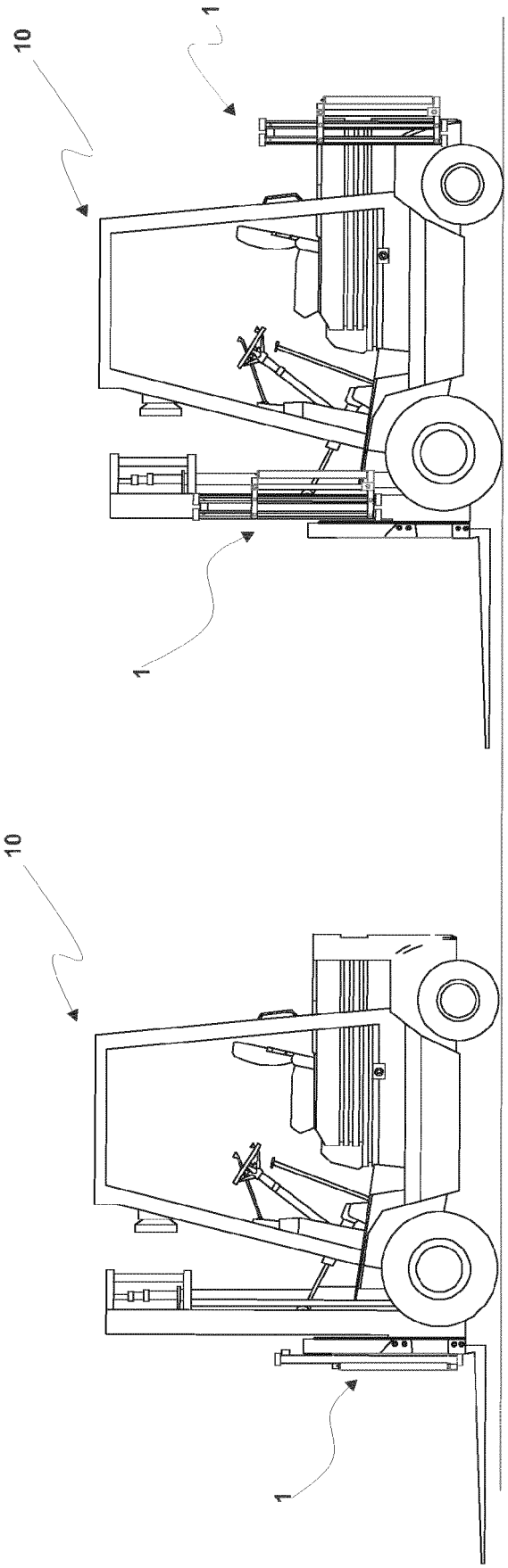


FIG.1

FIG. 2

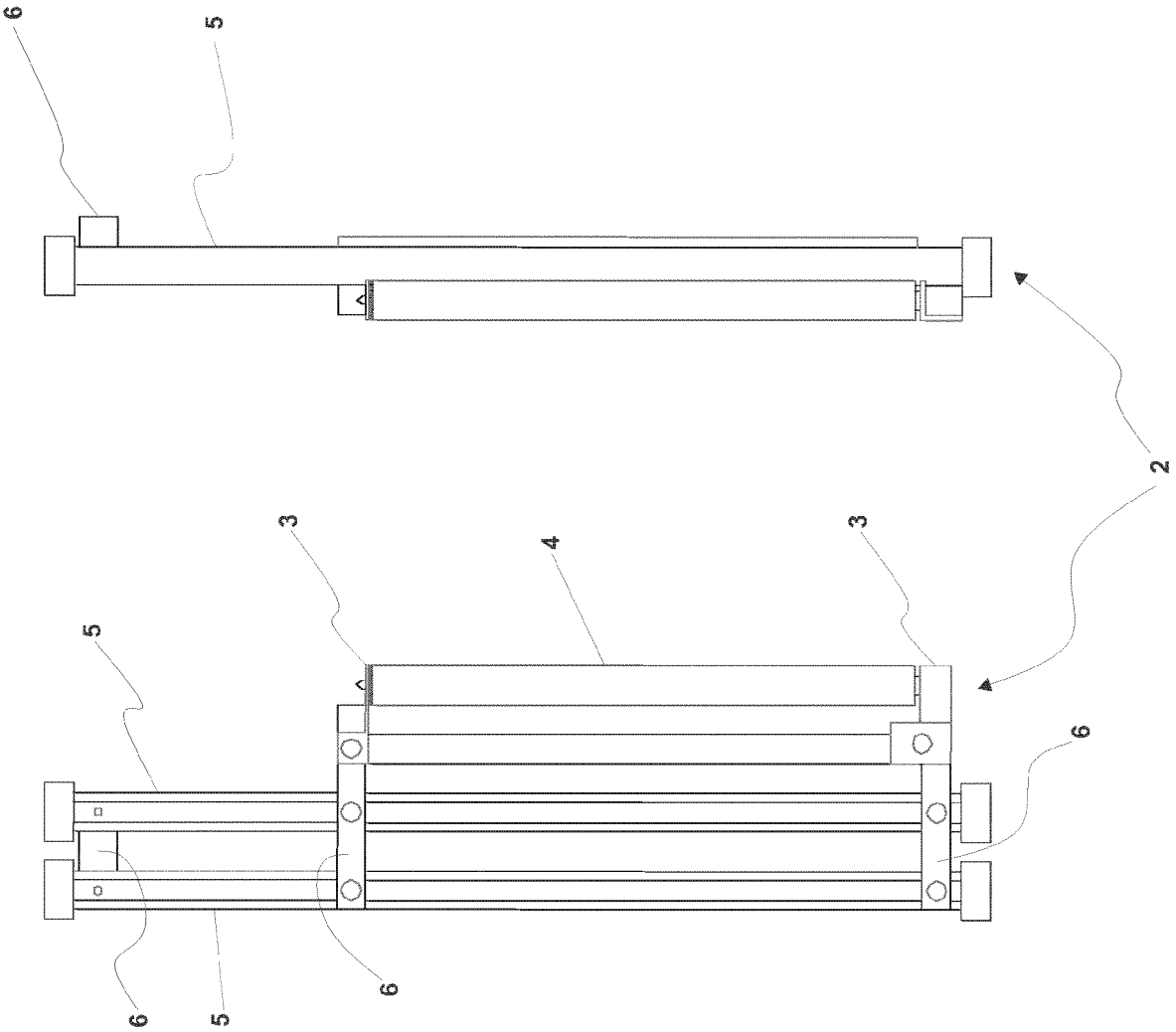
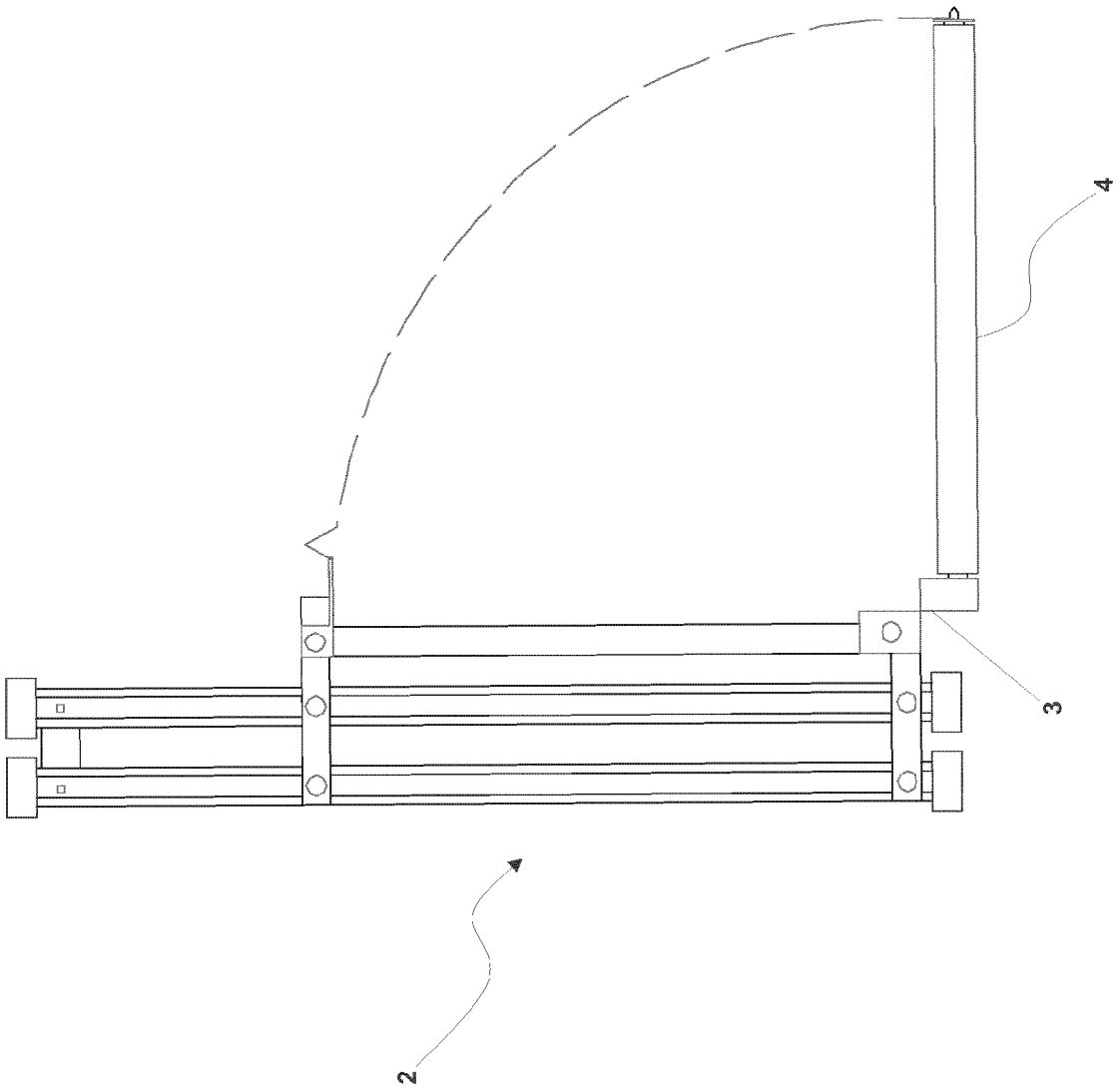


FIG. 3



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EUROPEAN SEARCH REPORT

Application Number
EP 18 19 2566

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	JP 2004 268955 A (SEIKO SANGYO) 30 September 2004 (2004-09-30) * paragraphs [0006], [0012] - [0014]; figures 1-4 * -----	1,3,8, 10,12	INV. B65B11/02 B66F9/06
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X	EP 0 234 763 A1 (OIESTAD JENS) 2 September 1987 (1987-09-02) * column 1, lines 29-32; figures 1-6 * * column 3, lines 1-3, 12-15, 21-25 * -----	1,3,8, 10,12	

TECHNICAL FIELDS SEARCHED (IPC)

B65B
B66F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	13 November 2018	Garlati, Timea

CATEGORY OF CITED DOCUMENTS

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13-11-2018

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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