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(54) **Device and method for automatically loading reels of film onto wrapping machines**

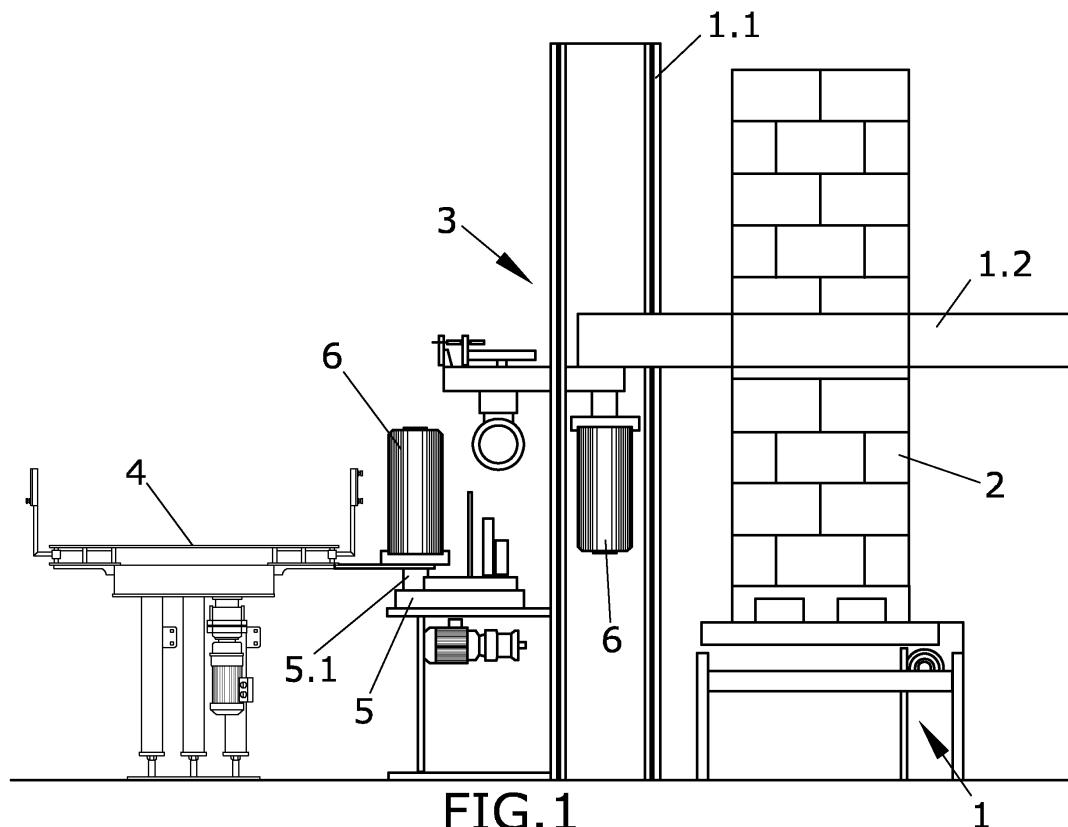
(57) The present invention relates to a device and a method for automatically loading reels (6) of film onto wrapping machines. Wrapping machines comprise a frame whereon a reel carrier (3) is situated.

The automatic loading device is characterised in that it comprises at least the following elements:

- A loading table (4) for the new reel (6) of film for storing

at least one reel of film and retaining the free end of the film.

- A threading table (5) supplied by the loading table (4) that has a means of retaining and releasing the end of the film thereon, moving forwards and backwards between a position for transferring the reel from the loading table to the threading table and a position for transferring the reel to the reel carrier (3) where the film is threaded.



Description

OBJECT OF THE INVENTION

[0001] The present invention relates to a device and a method for automatically loading reels of film onto wrapping machines. Film-wrapping machines, for both palletised and grouped loads, generally have a reel carrier whereon the reel of film is situated, it being necessary to replace it when it runs out. This operation is normally carried out manually by the operator, which not only requires a great physical effort on the operator's part, but also makes it necessary to stop the machine's production for a long time.

[0002] The machine into which the automatic loading device that is the object of the invention is integrated comprises a frame whereon the reel carrier is situated, having a means of ascending, descending and rotating in relation to the structure of the machine, a means of securing at least one reel of film and a means of retaining the free end of the film.

[0003] The automatic loading device is characterised in that it comprises at least the following elements:

- A loading table for the new reel of film that comprises a means of storing at least one reel of film and a means of retaining the free end of the film.
- A threading table supplied by the loading table that comprises a means of storing at least one reel of film from the loading table, a means of retaining and releasing the end of the film therefrom, and a means of moving the table forwards and backwards between a position for transferring the reel from the loading table to the threading table and a position for transferring the reel to the reel carrier, and a means of threading the free end of the film onto the reel carrier.

[0004] Another object of this invention is the method for automatically loading reels of film onto wrapping machines according to the aforementioned device.

BACKGROUND OF THE INVENTION

[0005] Wrapping machines make it possible to package a pallet or a grouped load using a stretch film by means of the combined action of a rotation and a forward movement.

[0006] The stretch film is situated on reels that must be replaced from time to time. This task has traditionally been performed manually, which is very time consuming, as well as requiring the machine to be stopped to perform this operation.

[0007] Normally the reels are changed by the operator approximately every 45 minutes, which means that the operator must pay constant attention to the machine, this presenting two fundamental drawbacks, the first being the need to be ready for when the film runs out and the

second being the physical effort required from the operator due to the heavy weight of the reels.

[0008] The present invention solves the aforementioned problem by providing a device and a method that make it possible to change the reels automatically, thus facilitating the work of the operators and reducing the interruptions in the normal operating cycle and maximising the wrapping time. On receiving a signal indicating the end of the plastic film in the wrapping process, the device that is the object of the invention will replace the finished reel with a new reel. Other wrapping machines that automatically load the reel of film are also known. One example is European patent application number EP1655225 entitled "A method and an apparatus for the automatic change of the reel of extensible film in wrapping machines for the packaging of palletized loads."

[0009] The aforementioned application discloses an apparatus and a method for automatic loading that has a table whereon at least one reel of film is loaded and which has a means of threading the reel onto the tool carrier. However, the invention disclosed presents disadvantages, including the fact that if the load capacity of the reels for the wrapping machine is to be increased, it is necessary to multiply the automatic loading module by the number of reels that are to be stored thereon. This causes a large increase in the final cost of the machine, and increases its manufacturing complexity and maintenance.

[0010] The present invention overcomes the aforementioned disadvantages by using a loading system that has a first loading table that can store at least one reel and that supplies a second threading table, so that this threading table has a single module, regardless of the number of reels to be stored whilst waiting to be loaded onto the machine. Another advantage is that the new reels are loaded by the operator remotely, away from the automatic reel loading area, so the risk of the operator becoming trapped by the machine is considerably reduced.

[0011] Therefore, with the device and method that are the object of this invention it is possible to increase the production and safety of the machine, as there is no direct handling thereof when loading the reel and threading the film, as these processes are carried out automatically. Another advantage of the device is that the reels can be changed at any time without having to stop the machine.

DESCRIPTION OF THE INVENTION

[0012] Film wrapping machines for stationary pallets have a main frame whereon an element that wraps the load is situated, with the ability to ascend, descend and rotate around the load, and which also has at least one reel of film so that it forms a spiral of film around the load and wraps it. This element is commonly called a reel carrier.

[0013] When the reel runs out of film, the empty core must be changed for a new reel. The present invention

provides an automatic change of reel in order to avoid the need to change it manually, thus preventing bottle-necks and long periods for which the machine is stopped to change the reel whilst also improving the safety for the operator, minimising the number of mechanical elements involved, thereby also improving the manufacturing and maintenance costs of the wrapping machine.

[0014] The machine into which the automatic loading device that is the object of the invention is integrated comprises a frame whereon the reel carrier is situated that, as has been mentioned above, has a means of ascending, descending and rotating in relation to the structure of the machine, as well as a means of securing at least one reel of film and a means of retaining the free end thereof.

[0015] The device for automatically loading reels of film that is the object of the invention is characterised in that it comprises at least the following elements:

- A loading table for the new reel of film that comprises a means of storing at least one reel of film and a means of retaining the free end of the film on the reel.
- A threading table supplied by the loading table that comprises a means of storing at least one reel from the loading table, a means of retaining and releasing the end of the film therefrom, and a means of moving the table forwards and backwards between a position for transferring the reel from the loading table to the threading table and a position for transferring the reel to the reel carrier, and a means of threading the free end of the film onto the reel carrier.

[0016] For the purpose of the present description threading should be taken to mean the retention of the free end of the film by the elements of the machine.

[0017] Another object of the invention is the method for automatically loading reels of film onto wrapping machines, which is characterised in that it comprises at least the following steps:

A first step that comprises loading the reel onto a loading table and manually threading the end of the film.

A second step that comprises transferring the reel from the loading table to a threading table together with the means of retention of the film from the loading table.

A third step that comprises moving the threading table forward from the initial loading position to a position for transferring the reel to the reel carrier where the axes of the means of retention of the reel on the reel carrier and that of the new reel situated on the threading table are vertically aligned.

A fourth step that comprises the reel carrier capturing the reel of film situated on the threading table and threading the free end of the film onto the reel carrier.

DESCRIPTION OF THE DRAWINGS

[0018] The present description also has a set of non-limiting, illustrative plans by way of an example of the preferred embodiment of the invention.

Figure 1 is a schematic view of a wrapping machine that comprises a preferred embodiment of the automatic loading device that is the object of the present invention.

Figure 2 is a schematic perspective view of the loading table and threading table assembly shown in figure 1.

Figure 3 is a schematic plan view of the threading table shown in figure 1.

Figure 4 is a schematic perspective view of the reel carrier shown in figure 1.

Figure 5 is a schematic plan view of the assembly consisting of the reel carrier, threading table and loading table shown in figure 1 in the position of loading the reel onto the reel carrier.

Figure 6 is a schematic cross-sectional view of a preferred embodiment of the means of retention of the reel on the reel carrier.

PREFERRED EMBODIMENT OF THE INVENTION

[0019] Figure 1 shows a preferred embodiment of a wrapping machine (1) that has a structure (1.1), generally in the form of columns, with a frame (1.2) that ascends and descends in relation to the structure (1.1) and that can also rotate. Solidly joined to this frame (1.2) there is a reel carrier (3) that has a reel (6) in the preferred embodiment. Thus, the reel (6) moves around the load (2). Figure 1 also shows a first loading table (4) for the new reel (6) and a threading table (5).

[0020] In the preferred embodiment the loading table (4) comprises a frame (4.1) whereon the means of storing the reel (6) and the means of threading or retaining the free end of the film on the reel (6) are situated.

[0021] In the preferred embodiment the means of storing the reel (6) consists of a platform (4.2) whereon the new reel (6) is situated in a vertical position. The platform (4.2) is situated at one end of the loading table (4). The operator situates the reel (6) on the platform (4.2), takes the end of the film on the reel (6) and positions it in the means of retention thereof, so that the film can be threaded manually. This means consists of an extension (4.3) that is solidly joined to the platform (4.2), which has elements for retaining the free end of the film that comprises at least one pair of wheels (4.3.1) between which the end of the film is disposed.

[0022] In the preferred embodiment shown in the figures the extension (4.3) of the platform (4.2) has a means of retaining the film at two different points, so that the access to the film area situated between the two retention points is left free. The usefulness of this embodiment will be described below. This means consists of the fact that

the extension (4.3) has an inverted U-shaped frame (4.3.2), each branch thereof (4.3.2) having a pair of wheels (4.3.1).

[0023] In the preferred embodiment shown in figure 2, the loading table (4) allows two reels (6) to be stored, and it may have more platforms (4.2) in order to increase the number of reels that can be stored. The reels (6) can be loaded even when the machine is in operation, thus minimising the time wasted while replacing the reels (6), as it allows the machine to store more than one reel (6).

[0024] To feed the threading table (5), as the loading table (4) of the preferred embodiment has more than one platform (4.2) on which to situate the reels (6), it has a means of rotating (4) around a vertical axis, so that this means of rotation positions the platform (4.2) loaded with the new reel (6) in the right place to be transferred to the threading table (5).

[0025] In the next step the reel (6) is transferred from the loading table (4) to the threading table (5). At least one of the platforms (4.2) of the loading table (4) is situated in a raised position above the threading table (5). The threading table (5) comprises a means of collecting the reel (6) from the loading table (4), a means of retaining the end of the film on the reel (6), threading it onto the reel carrier (6) and releasing the end of the film.

[0026] In the preferred embodiment the means of collecting the reel (6) from the loading table (4) in the second step of the method that is the object of the invention comprises a lifting table (5.1) that takes the platform (4.2) with the new reel (6) when raised from the threading table (5) and then descends again, thus placing it on the threading table (5). The lifting table (5.1) of the preferred embodiment is actuated pneumatically.

[0027] The reel carrier (3), the preferred embodiment of which is shown in figure 4, comprises an upper frieze (3.1) that has flat bars (3.2) whereby it is joined to the ascending, descending and rotating frame (1.2), which in turn is joined to the structure (1.1) of the wrapping machine. It also has a means of securing at least one reel (6), and a means of retaining the free end of the film on the reel (6). In the preferred embodiment this means of retaining the free end of the film consists of a set of rollers (3.3) between which the free end of the film is retained.

[0028] In the preferred embodiment there are two groups of cylinders (3.3), a first group of cylinders (3.3.1) that are fixed in relation to the reel carrier (3) and a second group of cylinders (3.3.2) that move in relation to the first ones (3.3.1). The reel carrier (3.3) comprises a means of moving the mobile cylinders (3.3.2) forwards and backwards in relation to the fixed cylinders (3.3.1). Therefore, in the threading operation, the mobile cylinders (3.3.2) move to allow the free end of the film on the reel (6) to pass through the space between the mobile cylinders (3.3.2) and the fixed cylinders (3.3.1). Subsequently, when the mobile cylinders (3.3.2) move back to their normal working position, the film will be trapped between the cylinders (3.3.1, 3.3.2) and the reel carrier (3) will

have been threaded.

[0029] In the device that is the object of the invention both the reel carrier (3) and the threading table (5) are involved in threading the new reel (6).

[0030] The combination of the means of threading of the threading table (5) and the reel carrier (3) comprises a means of retaining the free end of the film of the extension (4.3) and a means of taking the free end between the fixed rollers (3.3.1) and mobile rollers (3.3.2) of the reel carrier (3) when it is in its lowered position to automatically load the reel (6) onto the reel carrier (3), and the threading table (5) has a means of releasing the free end of the film once it has been threaded.

[0031] When the new reel (6) is positioned on the threading table (5) from the loading table (4), both the platform (4.2) and the extension (4.3) for retaining the end of the film that is connected thereto (4.2) are situated over the threading table (5). The means of retaining the end of the film of the threading table (5) consists of a clip (5.2) that moves on the threading table (5) so that it passes between the two branches of the "U" shape (4.3.2) of the extension (4.3), collecting the film therefrom (4.3).

[0032] The means of threading the film onto the reel carrier (3) once the reel (6) is positioned on the threading table (5) consists of a combination of the following movements:

A movement of the threading table (5) towards the reel carrier (3).

A movement of the clip (5.2) through the space between the mobile cylinders (3.3.2) and the fixed cylinders (3.3.1) of the reel carrier (3).

[0033] The purpose of moving the threading table (5) towards the reel carrier (3) is so that the axis (5.1.1) of the pneumatic table (5.1) whereon the new reel (6) is situated will be vertically aligned with the axis of the means of securing the reel (6) on the reel carrier (3).

[0034] In the preferred embodiment the means of moving the threading table (5) towards the reel carrier (3) consists of a telescopic arm (7) that moves the threading table (5) assembly from a position where a new reel (6) is loaded onto the threading table (5) in which the arm is retracted, and a position for loading onto the reel carrier (3) in an extended position (see figure 5).

[0035] The means of moving the clip (5.2) between the fixed cylinders (3.3.1) and mobile cylinders (3.3.2) consists of a threading track (5.3) whereon the clip (5.2) moves, which has a first section (5.3.1) in which the clip (5.2) collects the free end of the film from the extension (4.3) and a second section (5.3.2) that describes a straight path that passes between the cylinders (3.3.1, 3.3.2) in the extended position of the telescopic arm (6).

[0036] In accordance with the above, the means of retaining the free end of the film in the fourth step of the method that is the object of the invention moves along a threading track (5.3) where firstly the free end of the reel (6) is retained, then the means of retention passes be-

tween the cylinders (3.3) of the reel carrier (6) and finally the free end of the film is released by the means of retention corresponding to the threading table (5).

[0037] This clip (5.2) cycle is repeated each time a reel (6) is automatically loaded onto the reel carrier (3), so the threading track (5.3) has a closed path. More specifically, it has an essentially quadrangular shape with rounded vertices in order to facilitate the movement of the clip (5.2).

[0038] The clip (5.2) is opened by a cam (5.3.1.1) situated in the first straight section (5.3.1) that actuates the clip (5.2).

[0039] Once threaded the film is released by the clip (5.2) by means of a second cam (5.3.1.2) situated in the second long section.

[0040] Once this operation has been carried out, the mobile rollers (3.3.2) return to their original position, trapping the end of the film on the reel (3.1) between the fixed rollers (3.3.1) and mobile rollers (3.3.2). The threading table (5) is then retracted.

[0041] The reel carrier (3) is initially situated in a raised position and once the threading table (5) is positioned in an extended position so that the axis (5.1.1) of the new reel (6) situated on the threading table (5) is vertically aligned with the axis of the means of securing the reel (6) on the reel carrier (3), the latter (3) descends so that the means of securing the reel (6) on the reel carrier (3) penetrates into the core of the new reel (6) situated on the threading table and picks it up (6).

[0042] The means of securing the reel (6) of film on the reel carrier (3) and releasing it comprises a mandrel (3.4) that has at least one retractable lower support (3.4.1). The mandrel (3.4) also has an upper stop (3.4.2) that limits the reel (6).

[0043] The retractable lower support (3.4.1) has wings (3.4.1.1) that are pivotally joined to the mandrel (3.4), whose tendency to pivot and let the reel (6) pass is counteracted by a pushing rod (3.5) situated inside the mandrel (3.4).

[0044] The means of releasing the reel (6) of film consists of a rocking lever (3.6) joined by one of its ends to the pushing rod (3.4) and by the other end to a means of actuating the rocker (3.6) that consists of an electric magnet (3.7).

[0045] The device for automatically loading the reel (6) also comprises a means of removing the empty core of the reel (6) of film situated on the reel carrier (3). This operation is performed before loading the new reel (6) and essentially comprises the following steps:

[0046] A first step wherein the threading table (5) moves from the initial loading position to a position in which it unloads the empty core, in which a means of retaining the empty core is vertically aligned with the empty core.

[0047] A second step wherein the means of retention of the threading table (5) grips the empty core.

[0048] A third step wherein the reel carrier (3) releases the empty core and it is raised, the empty core being

taken by the means of retention of the threading table (5).

[0049] A fourth step wherein the threading table (5) is retracted to a position in which the empty core is disposed of.

[0050] Therefore, the means consists of the combination of an element retaining the empty core situated on the threading table (5) and the reel carrier (3) releasing the empty core. The means of retention consists of a telescopic manipulating device (5.4) with clips (5.4.1) that can rotate around its vertical axis.

[0051] To remove the empty core the threading table (5) moves into a position in which the clips (5.4.1) of the telescopic manipulating device (5.4) can grip the empty core, which is released and at that moment the reel carrier (3) is raised and the empty core is held by the telescopic manipulating device (5.4). The threading table (5) is retracted and the telescopic manipulating device (5.4) rotates and releases the empty core.

Claims

1. Device for automatically loading reels of film onto wrapping machines, which comprises a frame (1.2) whereon a reel carrier (3) is situated that has a means of ascending, descending and rotating in relation to the structure (1.1) of the machine, a means of securing at least one reel (6) of film and releasing the reel (6) and a means of retaining the free end of the film, **characterised in that** it comprises at least the following elements:

- A loading table (4) for the reel (6) of film that comprises a means of storing at least one reel (6) of film and a means of retaining the free end of the film.

- A threading table (5) supplied by the loading table (4) that comprises a means of storing at least one reel (6) of film from the loading table (4), a means of retaining and releasing the end of the film therefrom, and a means of moving the table (5) forwards and backwards between a position for transferring the reel (6) from the loading table (4) to the threading table (5) and a position for transferring the reel (6) to the reel carrier (3), and a means of threading the free end of the film onto the reel carrier (3).

2. Device for automatically loading reels of film onto wrapping machines, according to claim 1, **characterised in that** the loading table (4) comprises a frame (4.1) whereon the means of storing at least one reel (6) is situated, consisting of at least one platform (4.2) situated at one end of the frame (4.1).

3. Device for automatically loading reels of film onto wrapping machines, according to claim 2, **characterised in that** the means of retaining the end of the

film on the reel (6) comprises an extension (4.3) that is solidly joined to the platform (4.2) whereon the reel (6) is situated, which comprises at least one pair of wheels (4.3.1) between which the end of the film is disposed.

4. Device for automatically loading reels of film onto wrapping machines, according to claim 3, **characterised in that** the extension (4.3) of the platform (4.2) has a means of retaining the end of the film at two points, thus allowing access to the area of film situated between the two retention points.
5. Device for automatically loading reels of film onto wrapping machines, according to claim 4, **characterised in that** the means of retaining the end of the film at two points consists of the extension (4.3) having an inverted U-shaped frame (4.3.2), each branch of which has a pair of wheels (4.3.1).
6. Device for automatically loading reels of film onto packaging machines, according to claim 2, **characterised in that** the loading table (4) has more than one platform (4.2) for storing reels (6).
7. Device for automatically loading reels of film onto wrapping machines, according to claim 6, **characterised in that** the loading table (4) can rotate around a vertical axis.
8. Device for automatically loading reels of film onto wrapping machines, according to claim 1, **characterised in that** the means of the threading table (5) for collecting the new reel (6) from the loading table (4) comprises a lifting table (5.1) that raises the platform (4.2) together with the reel (6) above the loading table (4) and then descends again, placing the reel (6) on the threading table (5).
9. Device for automatically loading reels of film onto wrapping machines, according to claim 8, **characterised in that** the lifting table (5.1) is actuated pneumatically.
10. Device for automatically loading reels of film onto wrapping machines, according to claim 1, **characterised in that** the means of the reel carrier (3) for retaining the free end of the film comprises a set of vertical rollers (3.3) between which the film is trapped.
11. Device for automatically loading reels of film onto wrapping machines, according to claim 10, **characterised in that** the means of retaining the end of the film on the reel carrier (3) comprises a set of fixed rollers (3.3.1) and mobile rollers (3.3.2) that have a means of moving in an essentially horizontal forwards and backwards direction so that the mobile

rollers (3.3.1) are separated from the fixed rollers (3.3.2), opening up a free space between them (3.3.1, 3.3.2) to allow the free end of the film to pass through.

12. Device for automatically loading reels of film onto wrapping machines, according to claims and 5, **characterised in that** the means of collecting the free end of the film on the threading table (5) comprises a clip (5.2) that moves on the threading table (5) so that it passes between the two branches of the "U" shape (4.3.2) of the extension (4.3) taking the film therefrom (4.3).

13. Device for automatically loading reels of film onto wrapping machines, according to claims 1, 11 and 12, **characterised in that** the means of the threading table (5) for threading the end of the film onto the reel carrier (3) comprises the combination of two movements:

A movement of the threading table (5) towards the reel carrier (3).

A movement of the clip (5.2) through the space between the mobile cylinders (3.3.2) and the fixed cylinders (3.3.1) of the reel carrier (3).

14. Device for automatically loading reels of film onto wrapping machines, according to claim 13, **characterised in that** the means of moving the threading table (5) towards the reel carrier (3) consists of a telescopic arm (7) that moves the threading table assembly (5).

15. Device for automatically loading reels of film onto wrapping machines, according to claim 13, **characterised in that** the means of moving the clip between the cylinders (3.3) of the reel carrier (3) consists of a threading track (5.3) whereon the clip (5.2) moves, which has a first section (5.3.1) in which the clip (5.2) collects the free end of the film from the extension (4.3) and a second section (5.3.2) that describes a straight path that passes between the cylinders (3.3.1, 3.3.2) in the extended position of the telescopic arm (6).

16. Device for automatically loading reels of film onto wrapping machines, according to claim 15, **characterised in that** the threading track (5.3) has a closed path.

17. Device for automatically loading reels of film onto wrapping machines, according to claim 15, **characterised in that** the clip (5.2) is opened by a cam (5.3.1.1) that presses the clip (5.2) situated in the first straight section (5.3.1) of the threading track (5.3).

18. Device for automatically loading reels of film onto wrapping machines, according to claim 15, **characterised in that** the clip (5.2) releases the film by means of a cam situated in the last straight section.
19. Device for automatically loading reels of film onto wrapping machines, according to claim 1, **characterised in that** the means of securing the reel (6) of film on the reel carrier (3) and releasing it comprises a mandrel (3.4) that has at least one retractable lower support (3.4.1).
20. Device for automatically loading reels of film onto wrapping machines, according to claim 19, **characterised in that** the mandrel (3.4) also has an upper stop (3.4.2) that limits the reel (6).
21. Device for automatically loading reels of film onto wrapping machines, according to claim 19, **characterised in that** the retractable lower support (3.4.1) has wings (3.4.1.1) that are pivotally joined to the mandrel (3.4).
22. Device for automatically loading reels of film onto wrapping machines, according to claim 21, **characterised in that** the inside of the mandrel (3.4) comprises a pushing rod (3.5) that prevents the tendency of the lower retractable support (3.4.1) to pivot.
23. Device for automatically loading reels of film onto wrapping machines, according to claim 22, **characterised in that** the means of releasing the reel (6) of film consists of a rocking lever (3.6) joined by one of its ends to the pushing rod (3.4) and by the other end to a means of actuating the rocker (3.6).
24. Device for automatically loading reels of film onto wrapping machines, according to claim 23, **characterised in that** the means of actuating the rocker (3.6) consists of an electric magnet (3.7).
25. Device for automatically loading reels of film onto wrapping machines, according to claim 1, **characterised in that** the reel carrier (3) comprises a means of removing the empty core.
26. Device for automatically loading reels of film onto wrapping machines, according to claim 25, **characterised in that** the means consists of a telescopic manipulating device (5.4) situated on the threading table (5) that has clips (5.4.1) for retaining the empty core and which can rotate around a vertical axis.
27. Method for automatically loading reels of film onto wrapping machines, according to any of the previous claims, **characterised in that** it comprises at least the following steps:
- A first step that comprises loading the reel (6) onto a loading table (4) and threading the end of the film.
 - A second step that comprises transferring the reel (6) from the loading table (4) to a threading table (5) together with the means of retaining the film.
 - A third step that comprises moving the threading table (5) forward from the initial loading position to a position for transferring the reel (6) to the reel carrier (3) where the axis of the means of retention of the reel (6) on the reel carrier (3) and that of the new reel (6) situated on the threading table (5) are vertically aligned.
 - A fourth step that comprises the reel carrier (3) capturing the reel (6) of film situated on the threading table (5) and threading the free end of the film onto the reel carrier (3).
28. Method for automatically loading reels of film onto wrapping machines, according to claim 27, **characterised in that** the free end of the film is threaded manually in step 1.
29. Method for automatically loading reels of film onto wrapping machines, according to claim 27, **characterised in that** the second step of transferring the reel (6) from the loading table (4) to the threading table (5) comprises a lifting table (5.1) that raises the reel (6) above the loading table (4) and then descends again, placing the reel (6) on the threading table (5).
30. Method for automatically loading reels of film onto wrapping machines, according to claim 27, **characterised in that** the fourth step comprises the means of retention of the threading table (5) retaining the end of the film, threading the end onto the reel carrier (3) and the means of retention of the threading table (5) releasing the end of the film.
31. Method for automatically loading reels of film onto wrapping machines, according to claim 30, **characterised in that** the means of retaining the free end of the film on the reel carrier (3) comprises a set of mobile cylinders (3.3.2) and a set of fixed cylinders (3.3.1), the mobile cylinders (3.3.2) moving in the fourth step in relation to the fixed cylinders (3.3.1) so that they define a space between them through which the end of the film on the reel (6) can pass, the mobile cylinders (3.3.2) subsequently moving towards the fixed cylinders (3.3.1) so that the film is trapped between the cylinders (3.3.1, 3.3.2), thus threading the reel carrier (3).
32. Method for automatically loading reels of film onto wrapping machines, according to claim 31, **characterised in that** the means of retaining the free end

of the film in the fourth step moves along a threading track (5.3) where firstly the free end of the reel (6) is retained, then the means of retention passes between the cylinders (3.3) of the reel carrier (6) and finally the free end of the film is released by the means of retention corresponding to the threading table (5). 5

33. Method for automatically loading reels of film onto wrapping machines, according to claim 27, **characterised in that** there is an additional step in which the empty core of the film on the reel carrier (3) is unloaded before the first step. 10

34. Method for automatically loading reels of film onto wrapping machines, according to claim 33, **characterised in that** the unloading of the empty core comprises the following steps: 15

- A first step wherein the threading table (5) moves from the initial loading position to a position in which it is vertically aligned with the empty core. 20
- A second step wherein the means of retention of the threading table (5) grips the empty core. 25
- A third step wherein the reel carrier (3) releases the empty core and it is raised, the empty core being taken by the means of retention of the threading table (5).
- A fourth step wherein the threading table (5) is retracted to a position in which the empty core is disposed of. 30

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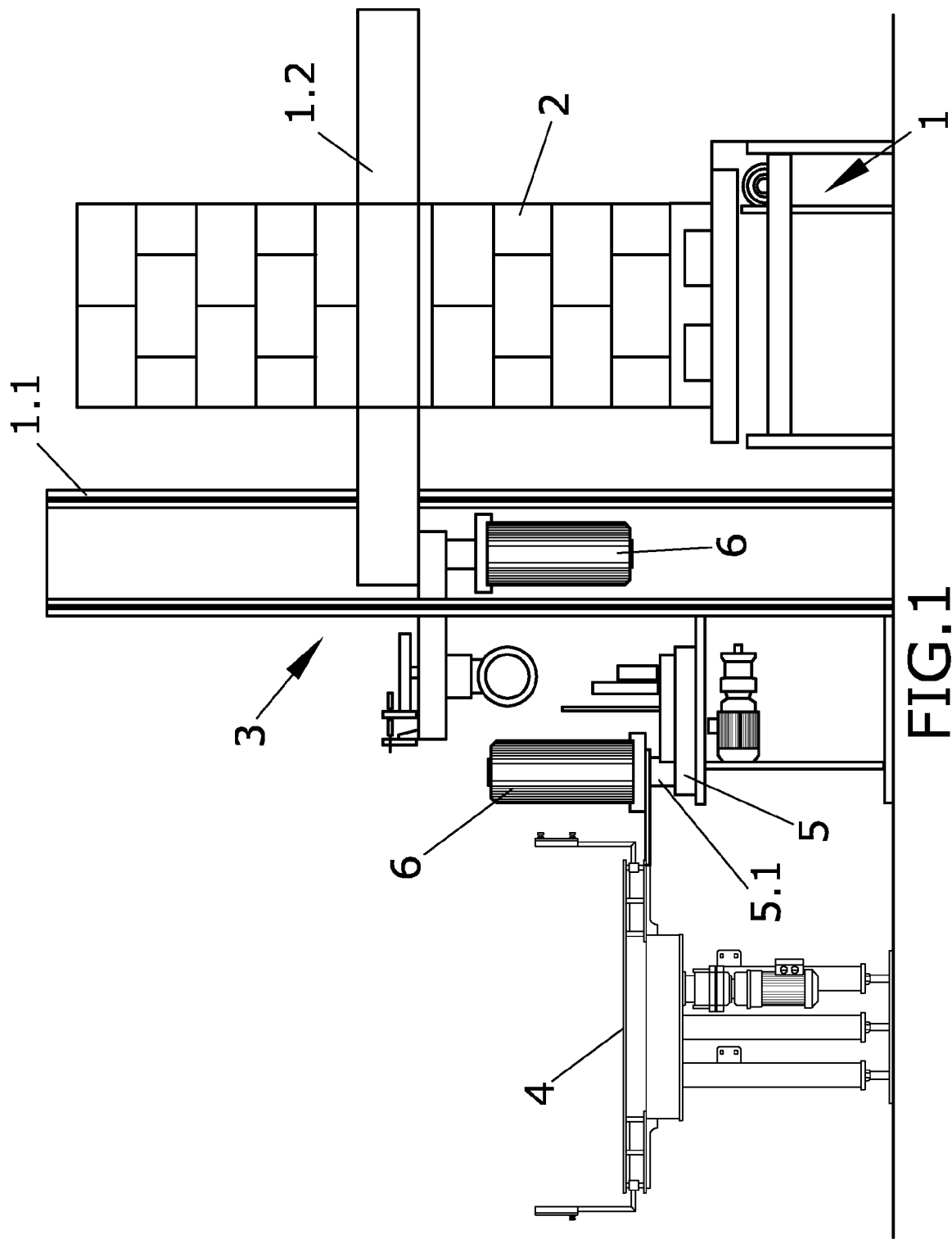


FIG. 1

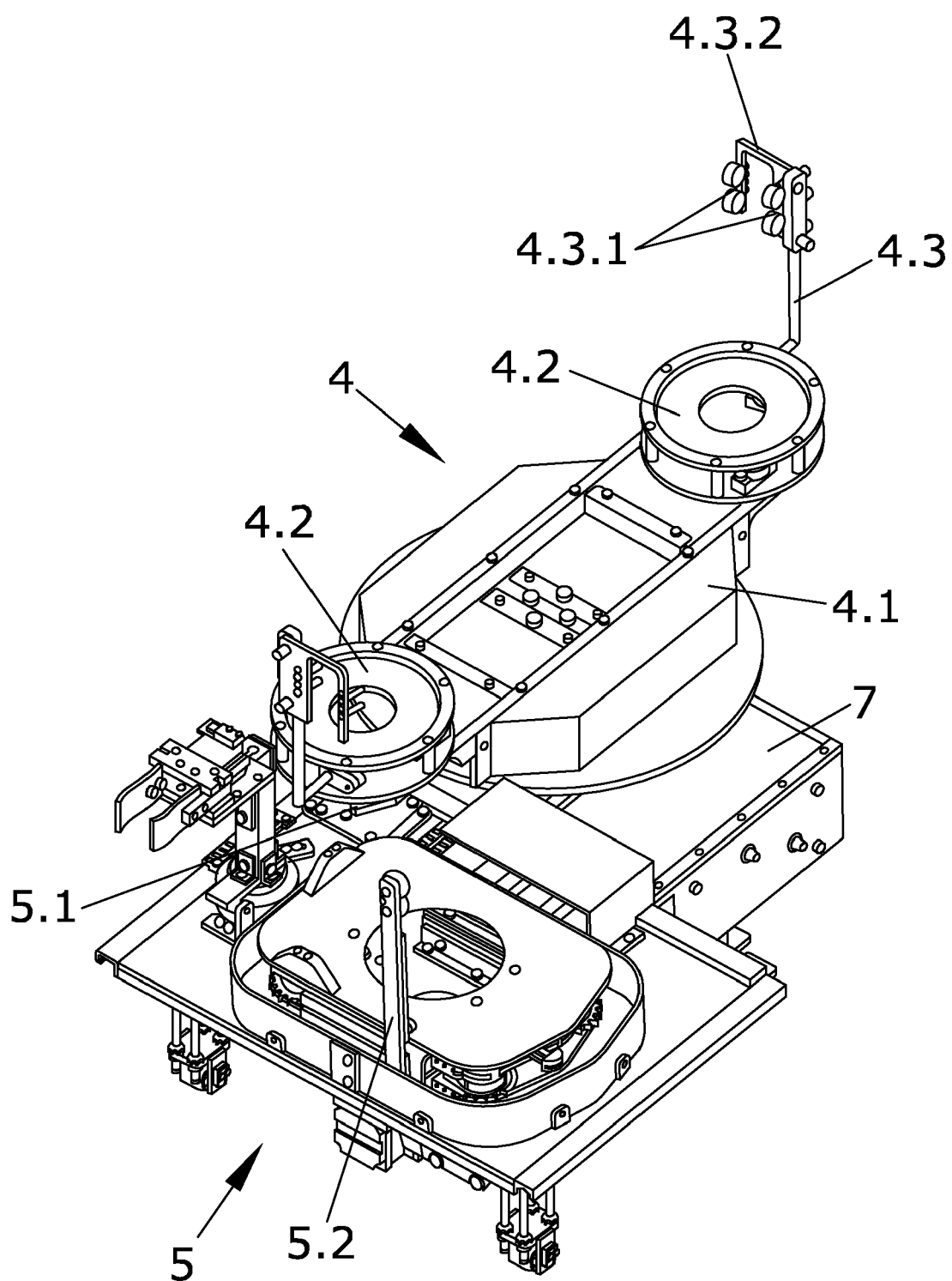


FIG.2

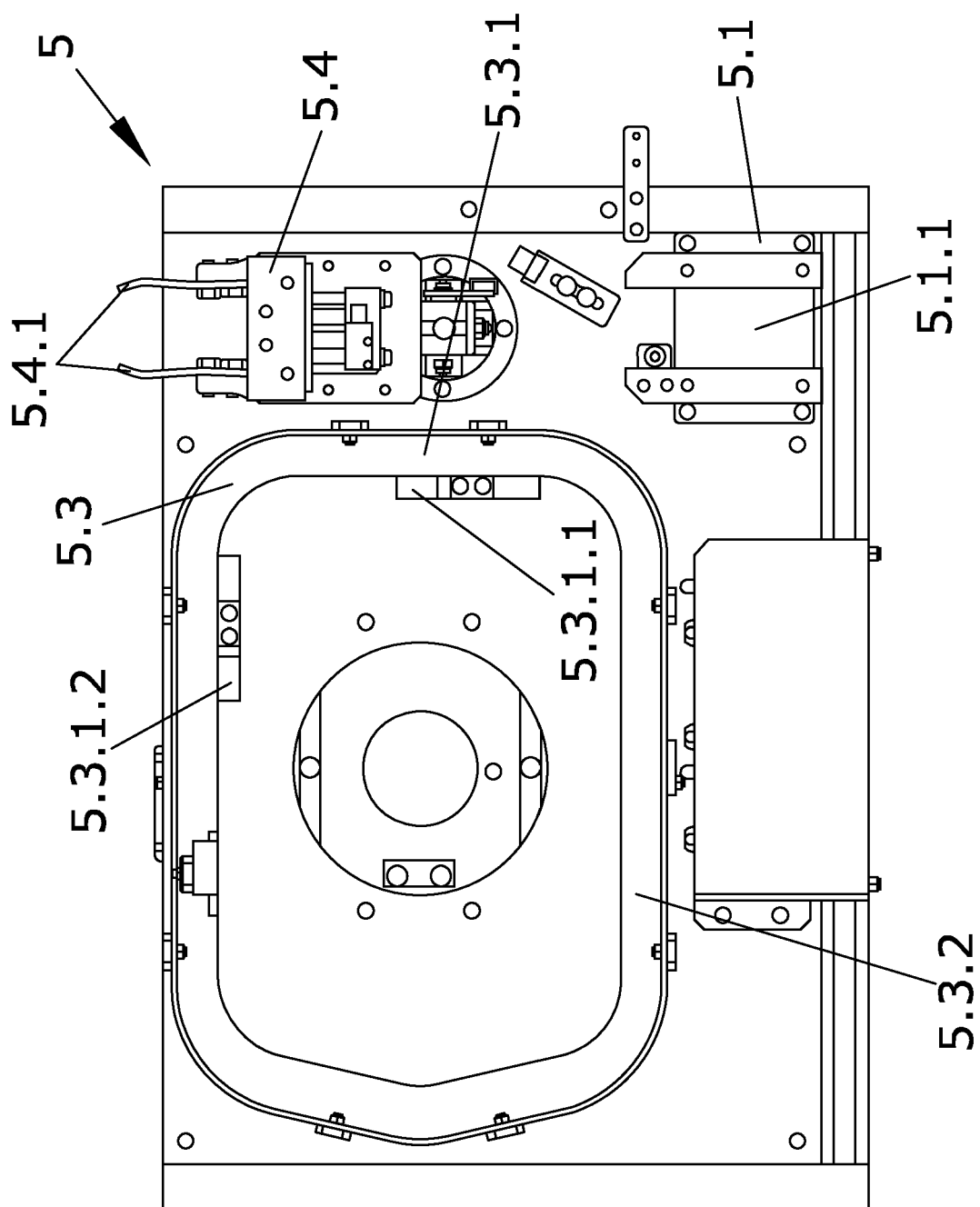


FIG. 3

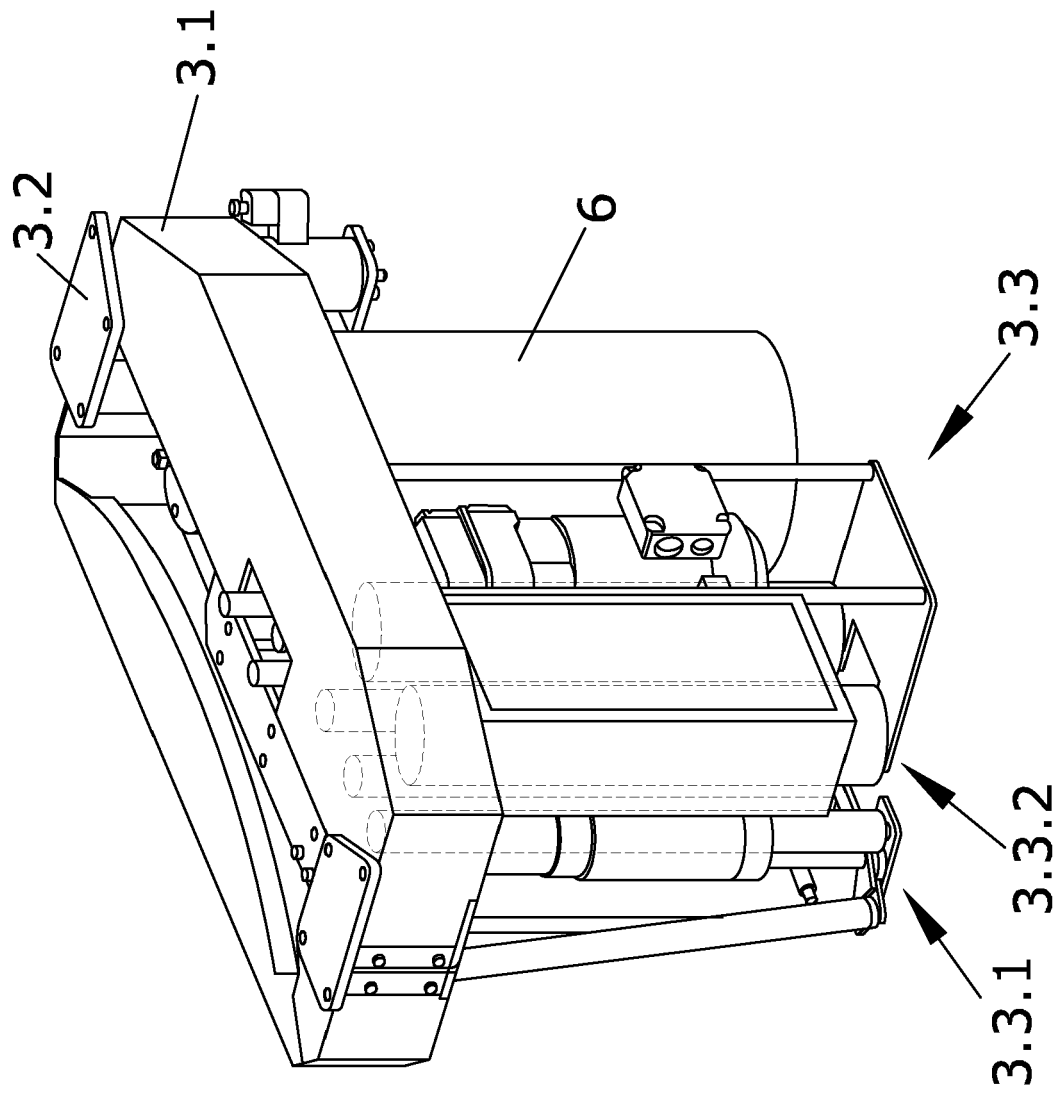


FIG. 4

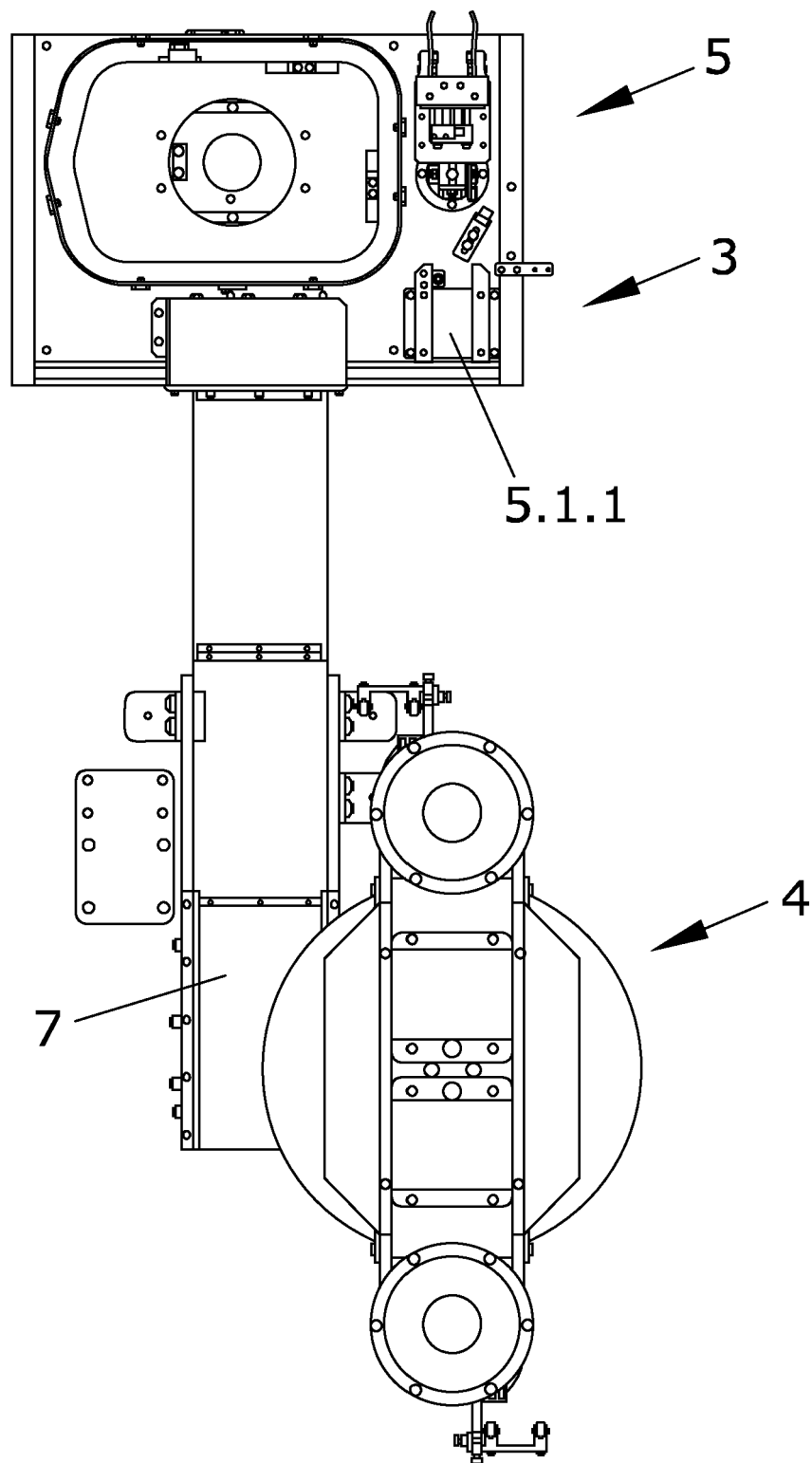


FIG.5

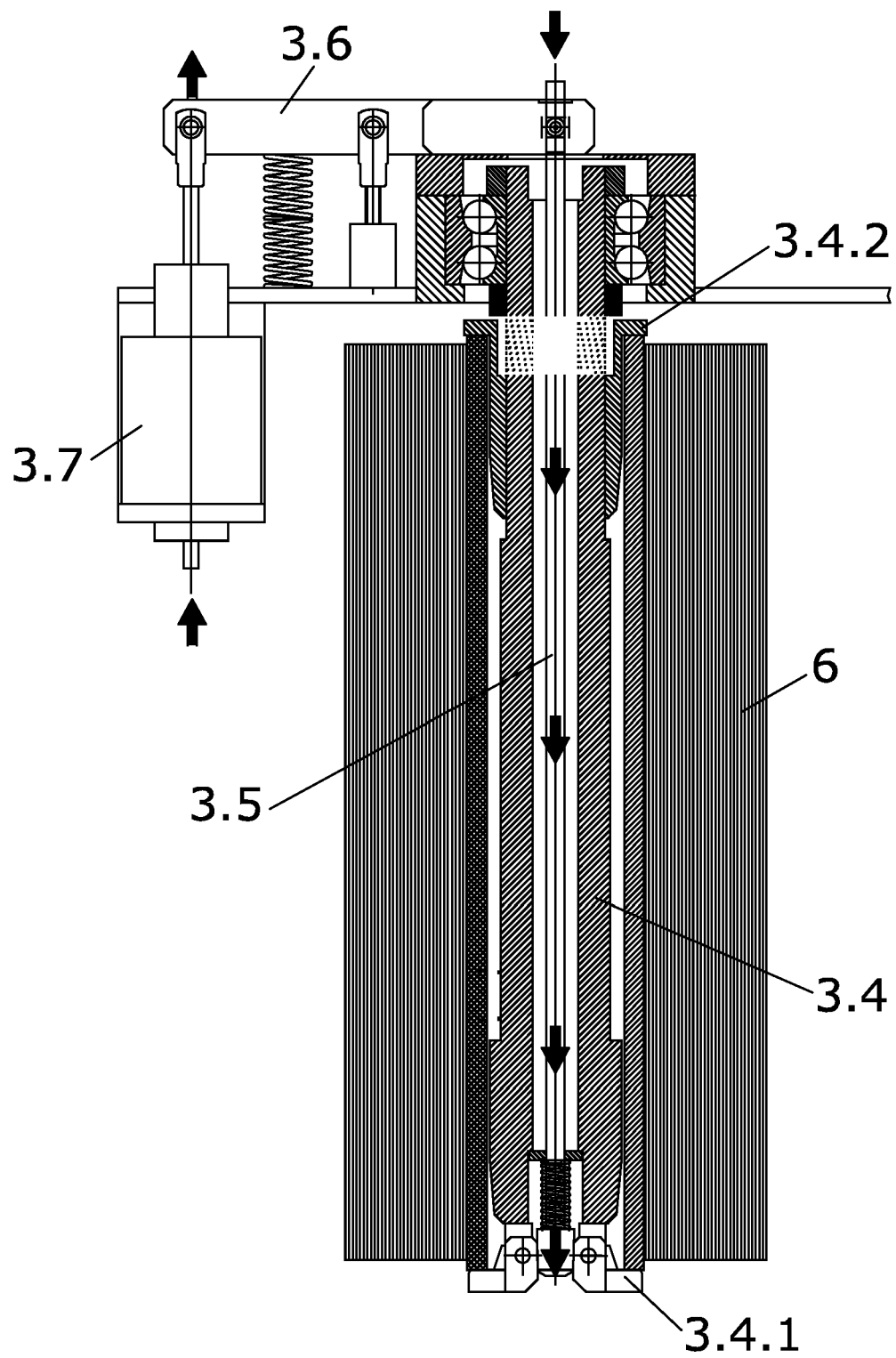


FIG.6



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EUROPEAN SEARCH REPORT

Application Number
EP 07 38 1051

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			B65B B65H
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 6 December 2007	Examiner Jagusiak, Antony
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03 82 (P04C01)

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EP 07 38 1051

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06-12-2007

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