



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 1 502 856 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
02.02.2005 Bulletin 2005/05

(51) Int Cl.7: **B65B 11/02**

(21) Application number: **04016810.6**

(22) Date of filing: **16.07.2004**

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PL PT RO SE SI SK TR**
Designated Extension States:
AL HR LT LV MK

(72) Inventor: **Pieri, Danica**
47023 Cesena Province of Forli Cesena (IT)

(74) Representative: **Porsia, Dino, Dr. et al**
c/o Succ. Ing. Fischetti & Weber
Via Caffaro 3/2
16124 Genova (IT)

(30) Priority: **31.07.2003 IT bo20030456**

(71) Applicant: **PIERI S.r.l.**
47020 Pievesestina di Cesena,
Province of Forli' Cesena (IT)

(54) **Method and apparatus for automatically replenishing the reel of film in machines for wrapping palletized loads**

(57) The apparatus comprises: automatic means (8) for modifying the orientation of the spindle (4) which supports the reel of film (B), so as to arrange it from the vertical working position into a horizontal replenishing position, means (29) for extracting from the spindle (4) the core (A) of the empty reel and for conveying it away to collection means (132,32); means (25-36) for aligning, so as to move axially towards the spindle (4) in a lowered position and then introduce onto it, one of the new reels, with the correct orientation, a front end section of the film of sufficient length unwound from each reel; gripper means (38) for gripping the front end of the film, so as to introduce it in front of the pre-stretching rollers (10,10') and the tensioning jockey wheel (22), following which means activate start-up of the wrapping cycle.

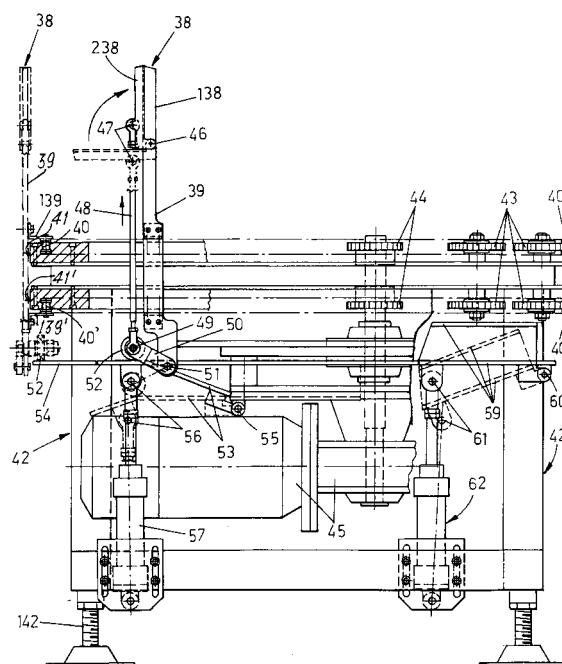


Fig.6

EP 1 502 856 A1

Description

[0001] The invention concerns a method and the associated apparatus for automatically replenishing the reel of film in machines for wrapping palletized loads with stretch film, in particular in so-called ring machines in which the carriage which supports the reel of wrapping film and the motorized unit for pre-stretching the film unwound from this reel travels along an annular, round, horizontal structure which is connected to raising and lowering means and in the centre of which the load to be wrapped with a helically wound turn of the said pre-stretched film is positioned. The front end of the wrapping film is initially retained by a gripper device which is located in a fixed position, laterally with respect to the load, or which may be associated with the said annular structure.

[0002] The method and the apparatus in question differ from the known art with regards to the characteristic features which are described in the accompanying claims and which will become clear from the following description of a preferred embodiment of the said apparatus, illustrated purely by way of a non-limiting example in the figures of the accompanying plates of drawings in which:

Fig. 1 shows a schematic top plan view of the apparatus;

Fig. 2 is an enlarged and top plan view of the machine carriage which carries the reel of wrapping film;

Figs. 3 and 4 are respectively a front and side elevation view of the motorized swing support with the spindle which supports the reel of film on the carriage shown in Fig. 2;

Fig. 5 is a side elevation view of the station which houses the full reels, with the gripper for discharging the core of the empty reel and with the pusher for inserting the new reel;

Fig. 6 is a side elevation view of the gripper which is movable horizontally along a winding path and which grips the front end of the new reel of film, introduces it in between the pre-stretching rollers and the other rollers of the machine carriage and retains it during the first stage of the load wrapping cycle.

[0003] In Figure 1, 1 denotes the horizontal ring of the wrapping machine which is mounted in a known manner and with the possibility of vertical displacement on a support structure 2 and on which there travels, guided in a known manner, a carriage 3 motorized with means which are also known and which, upon operation, cause it to rotate, for example in the direction of the arrow F, about the palletized load to be wrapped C, located on a transportation rollerway driven for example in the direction F1, not visible in the drawings and located in the centre of the ring 1.

[0004] From the details shown in Figures 2, 3 and 4 it

can be seen that the reel B of film is mounted with its cardboard core on a spindle 4 in turn mounted rotatably on the base of an L-shaped cradle 5 which with its ascending part is horizontally pivoted at 6 on a vertical support 7 fixed to the carriage 3 and located underneath the latter. The pivot 6 is for example tangential to the curvature of the carriage 3 and, following rotation of the cradle 5 about the pivot 6, the spindle 4 with the reel is able to pass from the vertical working position into the horizontal position, with an orientation towards the outside of the machine, as shown in Figure 4 by dot-dash lines and in Figure 2 by broken lines. This change-over in the position of the spindle 4 is performed by a linear actuator 8 of the electromechanical type which is hinged at one end, as indicated by 108, with an arm 105 of the cradle 5 and hinged at the other end, as indicated by 208, with a support 9 fixed in a suitably offset manner on the support 7. The vertical and rubberized pre-stretching rollers 10, 10' are located in a known manner underneath the carriage 3 and are actuated at varying speeds by the motor 11 and are also oriented downwards so as to be parallel and at the same height as the reel B when in the vertical position.

[0005] The film Z unwound from the reel B is driven on a first idle and vertical roller 12 rotatably supported by the carriage 3 and then passes over the pre-stretching rollers 10, 10', touching them over a wide section owing to the action of three idle drive rollers which comprise an intermediate static roller 13 located between the rollers 10, 10' and spring-loaded end rollers 14, 14' which operate in contact with the said pre-stretching rollers. The rollers 13, 14, 14' are arranged in a known manner, the first with a static constraining system and the others with an oscillating constraining system and with opposition springs, on a kind of door or hatch 15 hinged at one end with a vertical hinging axis 16 supported by the carriage 3. In order to be able to perform the automatic change-over of the reel of film, it is necessary for the hatch 15 to pass from the working position in which it is shown in Figure 2 by means of continuous lines, into the rest position shown in broken lines. This is performed by means of a linear actuator 17 of the electromechanical type, which is hinged with one end at 117 on a support 18 fixed onto the end of the hatch 15 which is remote from the pivot 16 and hinged with the other end at 217 on a support 19 fixed to the carriage 3.

[0006] The means for driving the film Z unwound from the reel B comprise, upstream of the pre-stretching rollers, a vertical roller 20 made of suitable plastic material and operating in contact with the said reel B so as to rotate it on the spindle 4, at a peripheral speed which is usually the same as that of the first pre-stretching roller 10. The roller 20 is for example supported by an overlying arm 21 oscillating on the axis of the roller 10 and pushed by suitable means not shown against the reel B and the said arm houses a movement transmission mechanism, not shown, which kinematically connects together the rollers 20 and 10, with the correct speed

ratio. Downstream of the pre-stretching rollers, the film Z travels over a jockey wheel 22 parallel to the other rollers, oscillating about a pivot 23 mounted on the carriage 3 and associated with transducers of the known type which, depending on the angular position of the said jockey wheel and the consequent need for film by the load to be wrapped, control in an intelligent manner the rotation of the motor 11 so that the film is supplied to the load under predetermined and constant tensioning conditions. Upon leaving the jockey wheel 22, the film Z passes over an idle roller 24 supported by the carriage 3 parallel to and at the same height as all the other rollers and upon leaving this roller 24 the film is then conveyed to the load to be wrapped C. The innovative modification which has been made by the invention to the means described hitherto essentially consists in the simplified architecture of the cradle 5 which carries the reel support spindle 4, in the possibility which this support has of performing a swing movement through ninety degrees and in the motorization of this swing movement and that of the hatch 15 by means of electromechanical actuators, so as to allow complete automation of the reel change-over cycle.

[0007] The electromechanical actuators 8 and 17 which are mounted on the carriage 3 may be easily actuated by means of supply and control lines similar to those for supplying and controlling the motor 11. During change-over of the reel, the carriage 3 stops in a predetermined position of the round angle, as can be seen from Figure 1, with the spindle 4 which when it performs the ninety degree swing movement and is arranged horizontally outwards, is oriented at right angles and at a short distance from the longitudinal guides of a horizontal frame 25 which rests on the ground with adjustable feet 125 and on which a slide 26 is mounted in a longitudinally slidable manner, said slide 26 being connected to one of the arms of a rectilinear conveyor 27 situated longitudinally on the said frame 25 and operated by a motor unit 28 able to rotate in both directions, with a brake, optionally of the type with electronic speed and phase control, or of the conventional type, assisted by position sensors, all of which in manner which is deducible and can be easily realized by a person skilled in the art on the basis of that described further below. When the slide 26 is in the rest position, the spindle 4, when arranged horizontally, is located axially aligned with the two facing and self-centring jaws of a gripper 29 which is oriented for example downwards and situated on the end of a slide 30 slidable longitudinally owing to the action of special movement means, not shown, along a guide 31 parallel to the said horizontal spindle 4 and mounted in a projecting manner on an upright 131 fixed onto the front end of the slide 26. The slide 30 and the guide 31 may for example form part of a linear actuator of the pneumatic type, for example of a so-called rodless cylinder.

[0008] The means which perform opening and closing of the gripper also consist for example of small pneu-

matic cylinders. Suitable means are envisaged for ensuring that, when the spindle 4 is arranged horizontally, the gripper 29 is moved, open, onto the end section closest to the core of the empty reel situated on the said spindle, after which the said gripper is closed so as to grip the said core and is then retracted by a sufficient amount to extract the core A of the used reel. During a subsequent working step, once a new reel has been mounted on the spindle 4 (see below), the slide 26 is displaced into the maximum travel position on the guide frame 25 so that the gripper 29 moves opposite a chute 132 above which the said gripper opens and allows the empty core A to fall so that, by means of gravity, it is stored inside an adjacent and more spacious container 32.

[0009] A suitable number - for example three or more - of slide/guide units 33, 33', 33" with associated pneumatic movement cylinders 34, 34', 34" are provided directly on the slide 26, parallel to the assembly 30, 31 with the gripper 29, and the slides of these units have, mounted thereon in a parallel arrangement, cradles 35, 35', 35" with identically driven rollers which support respective new reels of film B, B', B" which may rotate or move along their axis when left free by underlying braking pads 36, 36', 36" actuated by actuators for example of the pneumatic type. Each cradle is provided with a special sensor which detects the presence or absence of a reel thereon and which transmits this information to the means which control automatic operation of the system. The reels have the same diameter and with their axis are parallel to and at the same height as the axis of the spindle 4 when in the horizontal position. Each cradle 35, 35', 35" is provided laterally with three supports 37, 37', 37" with friction grippers on which the end and a middle part of a section of sufficient length of the front end of the film unwound from the reel is suspended, being collected in a bundle and positioned at a predetermined height.

[0010] Once the core of the used reel A has been extracted from the spindle 4, the slide 26 is displaced longitudinally so as to align axially with the said spindle the reel of the new reels of film situated closest on the said slide, and after this condition has been achieved, the actuator 34-34" of the cradle assembly 35-35" which carries the said new reel is activated so as to move it towards the spindle 4, as shown in broken lines in Figure 1. With this operation, the front end of the film of the reel which has been moved up, owing its arrangement on the furthest advanced support 37, is positioned along the operating trajectory of a gripping and driving gripper, which is now illustrated with reference to Figures 1 and 6. The gripper in question is denoted by 38 and comprises a jaw 138 fixed vertically on the top end of a vertical shaft which with its lateral lugs 139, 139' is fixed onto the vertical-roller links of a pair of identical, closed, horizontal chains 40, 40' arranged one above the other and slidable in a corresponding pair of identical, shaped, horizontal guides 41, 41' arranged one above the other

and made of any material with a low coefficient of friction, for example Polizene, and are supported by a frame 42 which rests on the ground with its adjustable feet 142.

[0011] With a section which operates on the outside of the guides 41, 41' and which is never affected by the displacement of the gripper 38, the chains 40, 40' are driven on pairs of idle pinions 43 and on a pair of driving pinions 44 connected to a reduction gear unit 45 with a motor rotating in both directions and equipped with brake. The guides 41, 41' are structured so that the associated chains and the consequently the gripper 38 follow a path which, in plan view, is substantially in the form of an L or a C (see Figure 1) and is described more fully below. From Figure 6 it can be seen that the gripper 38 comprises a movable jaw 238 which is hinged at 46 with the shaft 39 and is in turn hinged at 47, at an appropriate distance from the pivot 46, with a tie-rod 48 which is hinged at 49 with a connecting rod 50 hinged at 51 on the bottom end of the shaft 39. The movable jaw 238 is essentially associated with a hinged quadrilateral which comprises a roller 52 on the hinging axis 49, which from the raised position shown in continuous lines, corresponding to raising of the jaw 238 and closing of the gripper 38, is able to pass into the lowered position, indicated by broken lines, corresponding to the open condition of the said gripper. Initially the gripper 38 is open and is in the initial position along its path, indicated by K1 in Figure 1. After the new reel has been moved towards the spindle 4 by the associated support means, the displacement of the open gripper 38 is performed towards the left and it is envisaged that, when the fixed jaw 138 of this gripper arrives in co-operation with the front end of the film of the said reel, retained by the said temporary supports 37, the roller 52 mounts a switching device 53 already in the raised position so that the movable jaw 238 is raised and so that the gripper 38 firmly grips the front end of the film and retains it even when the roller 52 abandons the switching device and passes onto a rail 54 which has a fixed position heightwise and is integral with the frame 42. The switching device 53 is hinged at 55 with a support fixed to the frame 42 and is hinged at 56 with the rod of a pneumatic cylinder 57 also hinged with the frame 42, so that this switching device may be operated so as to be lowered into the position shown in Figure 6 in broken lines, for the reasons explained further below. The travel movement of the gripper 38 stops in the position indicated by K2 in Figure 1, when the front end of the film is positioned beyond the idle roller 12 of the carriage 3.

[0012] The gripper 38 has a heightwise position such that it is able to move, for example, to about half the height of the rollers situated on the carriage 3. During this step the front end of the film is separated from the friction supports 37, the function of which also consists in creating a suitable pocket of film for the first aforementioned step involving the movement of the gripper 38, when passing from K1 to K2. In phase sequence the

bottom brake 36 of the reel being supplied is deactivated (Fig. 5) and a static pusher 58 intervenes (Fig. 1) being also actuated by a pneumatic cylinder supported by a support 158 which inserts the said reel onto the spindle 4, following which the said pusher returns into the rest position and the spindle 4 is raised and is arranged vertically with the new reel. In phase sequence the starting movement of the gripper 38 is activated so that it passes from the position K2 into the position K3, so as to arrange a corresponding section of film in front of the pre-stretching rollers 10, 10' which during this step rotate at the correct speed and in accordance with the advancing movement of the said film, while the reel also rotates at the correct speed owing to the action of the peripheral roller 20 (Fig. 2). By means of the insertion gripper 38, the front end of the film is also made to pass over the jockey wheel 22 and, when the said gripper 38 reaches the position K3, it stops and is situated at a small distance, laterally and at the bottom of the load C to be wrapped. In phase sequence the actuator 17 intervenes so as to close the hatch 15 with the associated drive rollers 13, 14, 14' (Fig. 2) which are arranged in the active position. In phase sequence, while the gripper 38 remains at a standstill and closed at K3, the carriage 3 of the machine starts to move in the direction F in Figure 1 so as to wrap the bottom part of the load with a first wound turn of film and, before this turn is completed, the ring 1 which supports the carriage 3 is suitably raised so that the said first wound turn is terminated above the gripper 38 which is thus prepared for the following working steps.

[0013] By means of a double-acting switching device 59 (Fig. 6) which is hinged at 60 with the frame 42 and hinged at 61 with a pneumatic cylinder 62, the roller 52 of the gripper assembly 38 is lowered, the gripper 38 is opened and in these conditions the said gripper is brought back into the position K1 with reversal of the above movement, without any risk of interference either with the film or with the rollers of the carriage 3 which is in a different angular position and is in any case at a greater height. During this step, the switching device 53 is lowered, so that the roller 52 is able to pass beyond it without interference (Fig. 6), leaving the gripper 38 open and therefore in the required condition for repeating a subsequent working cycle.

Claims

1. Apparatus for automatically replenishing the reel of film in machines for wrapping palletized loads using stretch film, in particular in so-called ring machines, **characterized in that** it comprises:
 - automatic means (8) for modifying the orientation of the spindle (4) which supports the reel of film (B) on the carriage (3) of the machine, so as to arrange it from the vertical working po-

- sition into a horizontal replenishing position, with an orientation towards the outside of the wrapping machine;
- automatic means (17) for opening, during reel replenishment, and for closing, during operation, the hatch (15) with the opposition rollers (13, 14, 14') co-operating with the film pre-stretching rollers (10, 10') which operate on the carriage of the machine;
 - means which, during changing of the reel, stop the carriage (3) of the machine in a predefined position so that the reel support spindle (4), which is arranged horizontally, is able to dialogue operationally with an adjacent change-over station which comprises:
 - means (29) for extracting from the spindle (4) the core (A) of the empty reel and for conveying it away to collection means (132, 32);
 - means (25-36) for aligning, so as to move axially towards the spindle (4) in a lowered position and then introduce onto it, one of the new reels arranged alongside each other on support means with associated means (37) which support, with the correct orientation, a front end section of the film of sufficient length unwound from each reel, there being envisaged means for ensuring that, once insertion of the reel on the spindle has been completed, the latter returns into the vertical position;
 - gripper means (38) for gripping the front end of the film of the reel first moved towards to the spindle and then inserted on the latter, so as to introduce the said front end of the film in front of the pre-stretching rollers (10, 10') and the tensioning jockey wheel (22) which operate on the machine carriage and retain the said front end laterally and at the bottom of the load (C) to be wrapped, following which the said means (17) intervene in order to close the hatch (15) with the opposition rollers and means activate start-up of the wrapping cycle, while the carriage (3) is raised and the said gripper opens (38) and returns into the rest position so as to be able to repeat a new working cycle.
2. Apparatus according to Claim 1), in which the means (8) which modify the orientation of the spindle (4) which supports the reel of film (B) on the carriage (3) of the machine and the means (17) which open and close the hatch (15) with the opposition rollers (13, 14, 14') co-operating with the film pre-stretching rollers (10, 10') consist of electromechanical actuators actuated by electric motors rotating in both directions and able to be easily supplied and controlled via supply and control lines similar to those supplying and controlling the motor (11) which governs the said pre-stretching rollers.
3. Apparatus according to Claim 1), **characterized in that**, during change-over of the reel, when the carriage (3) of the wrapping machine is stopped in a predetermined position of the round angle and the spindle (4) swings through ninety degrees and is arranged horizontally outwards, the said spindle is oriented at right angles and at a short distance from the longitudinal guides of a horizontal frame (25) along which there travels a slide (26) actuated by means (27, 28) which can be remotely controlled and which is designed so that, when it is in the rest position, the said spindle (4), when arranged horizontally, is situated axially aligned with the facing jaws - preferably possessing a pneumatic self-centring movement - of a gripper (29) situated on the end of a slide (30) slidable longitudinally owing to the action of special movement means for example of the pneumatic type on a guide (31) which is parallel to the said spindle (4), horizontal and mounted in a projecting manner from an upright (131) fixed on the front end of the said slide (26), means being envisaged for ensuring that, when the spindle (4) is arranged horizontally, the gripper (29) is brought open onto the closest end section of the rigid core (A) of the empty reel situated on the said spindle, following which the said gripper is closed so as to grip the said core and is then retracted by a sufficient amount to extract the said core from the used reel, it being envisaged that, during a subsequent working step, once insertion of a new reel of film on the spindle (4) has been completed, the said slide (26) is displaced into the maximum travel position on the associated guide frame (25), so that the said gripper (29) is positioned opposite means (132, 32) for collecting and evacuating the empty cores (A) which are cyclically allowed to fall by the said gripper (29) which opens and is prepared for repetition of a new working cycle.
4. Apparatus according to Claim 3), in which a suitable number - for example three or more - slide/guide units (33, 33', 33'') with associated pneumatic longitudinal movement cylinders (34, 34', 34'') are provided on the slide (26), parallel to the assembly (30, 31) for moving the gripper (29), the slides of said units having, mounted thereon in a parallel arrangement, respective cradles (35, 35', 35'') with identically driven rollers which support respective new identical reels of film (B, B', B'') which are able to rotate or move along their axis when left free by underlying braking pads (36, 36', 36'') which can be actuated by actuators for example of the pneumatic type.
5. Apparatus according to Claim 4), in which the said cradles (35, 35', 35'') are equipped with respective sensors which detect the presence or absence thereof of the reel and transmit this information to the

means which control automatic operation of the said apparatus.

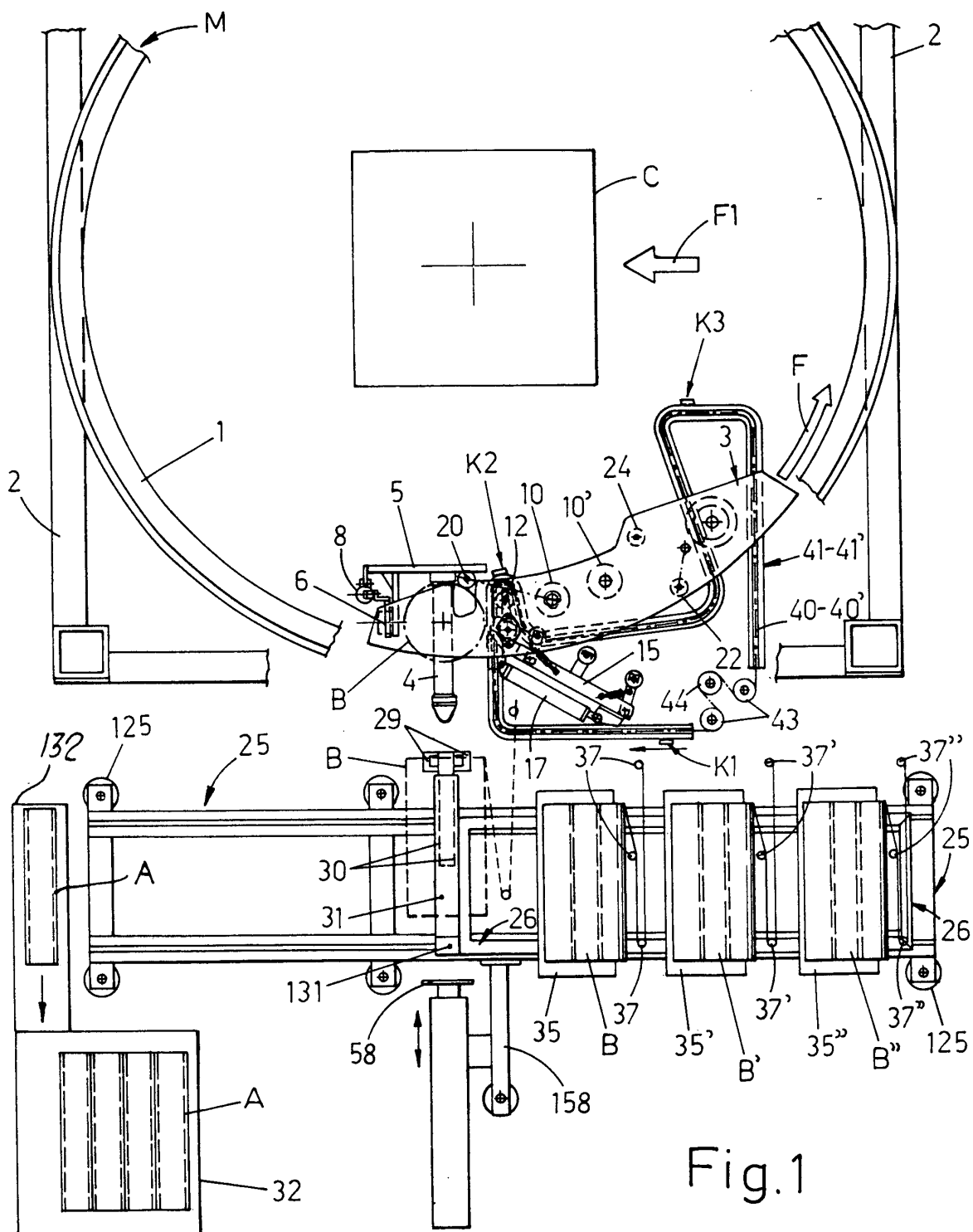
6. Apparatus according to Claim 4), in which each cradle (35, 35', 35'') is provided laterally with supports (37, 37', 37'') with friction grippers on which the end and the middle part of a section of the front end of the film, of sufficient length, unwound from each reel may be suspended, this section being collected in a bundle and such as to be positioned at a predefined height. 5 10
7. Apparatus according to the preceding claims, **characterized in that** it comprises means so that, once the core of the used reel (A) has been extracted from the spindle (4), the said slide (26) is displaced longitudinally so as to align axially with the said spindle the closest of the new reels of film (B, B', B'') and then activate the actuator (34-34'') of the cradle assembly (35-35'') which supports the said new reel, in order to move the latter towards the spindle (4) and ensure that the front end section of the film supplied from this reel and retained by the furthest advanced support (37) is positioned along the operating trajectory of the gripping and driving gripper (38). 15 20 25
8. Apparatus according to Claim 7), in which the said gripper (38) comprises a jaw (138) which is fixed vertically onto the top end of a vertical shaft (39) which with its lateral lugs (139, 139') is fixed onto the vertical-roller links of a pair of identical, horizontal, closed chains (40, 40') arranged one above the other and mounted slidably in a corresponding pair of identical, horizontal, linear guides (41, 41') arranged one above the other and made of any material with a low coefficient of friction, for example Polizene, supported by a frame (42), it being envisaged that with a section which operates outside the guides (41, 41') and which is never affected by the displacement of the said gripper (38), the said chains (40, 40') are driven on pairs of idle pinions (43) and on a pair of driving pinions (44) connected to a reduction gear unit (45) with a motor rotating in both directions and equipped with brake, there being envisaged laterally with respect to the fixed jaw (138) of the gripper (38) a movable jaw (238) which is hinged with the said shaft (39) and in turn hinged, at the appropriate distance from the pivot (46), with a tie-rod (48) hinged with a connecting-rod (50) in turn hinged on the bottom end of the said shaft (39), all of which so that this movable jaw (238) is substantially associated with a hinged quadrilateral which comprises a roller (52) on the bottom hinging axis (49), which from the raised position, corresponding to raising of the movable jaw (238) and to closing of the gripper (38), is able to pass into the lowered position, corresponding to the open condi- 30 35 40 45 50 55

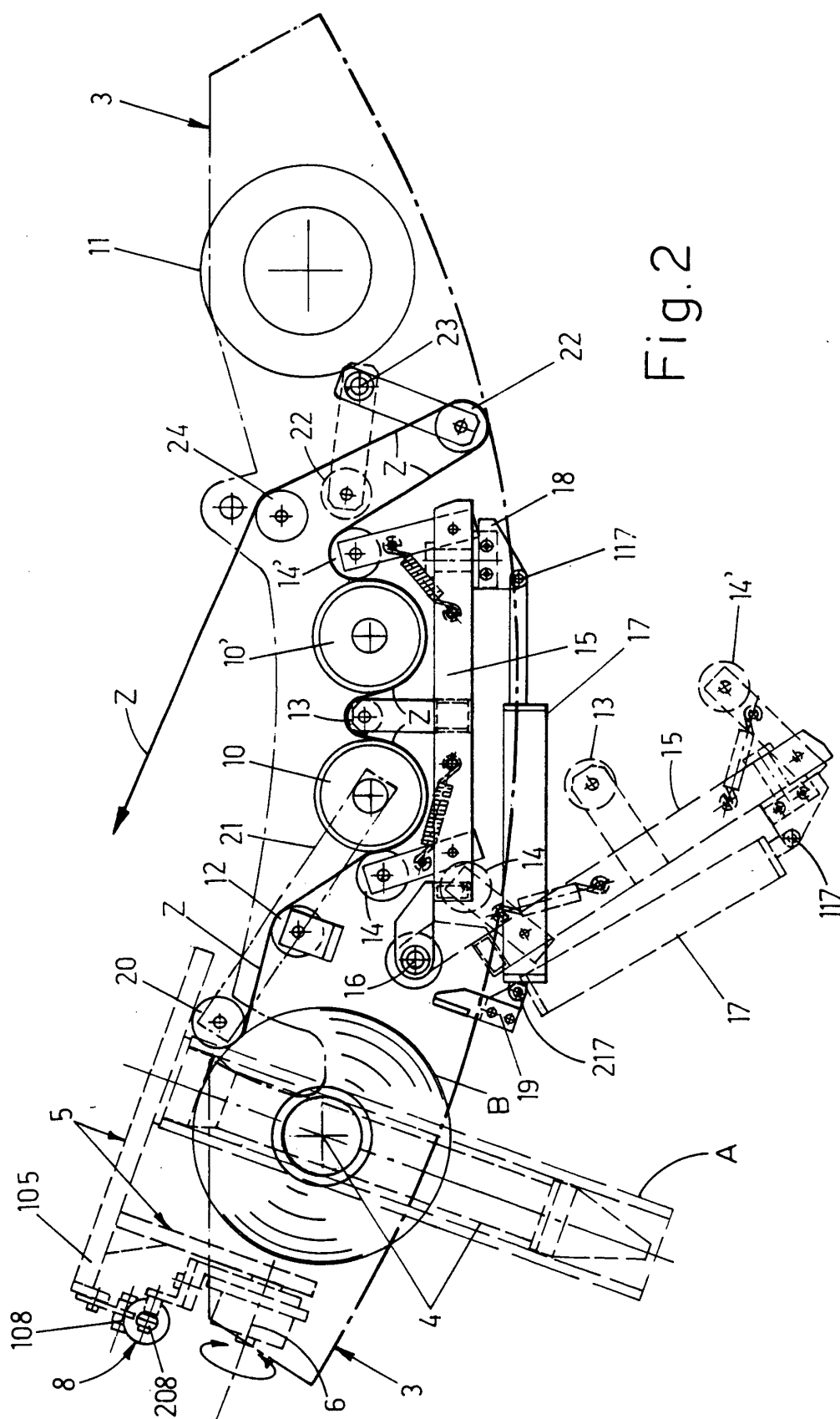
tion of the said gripper.

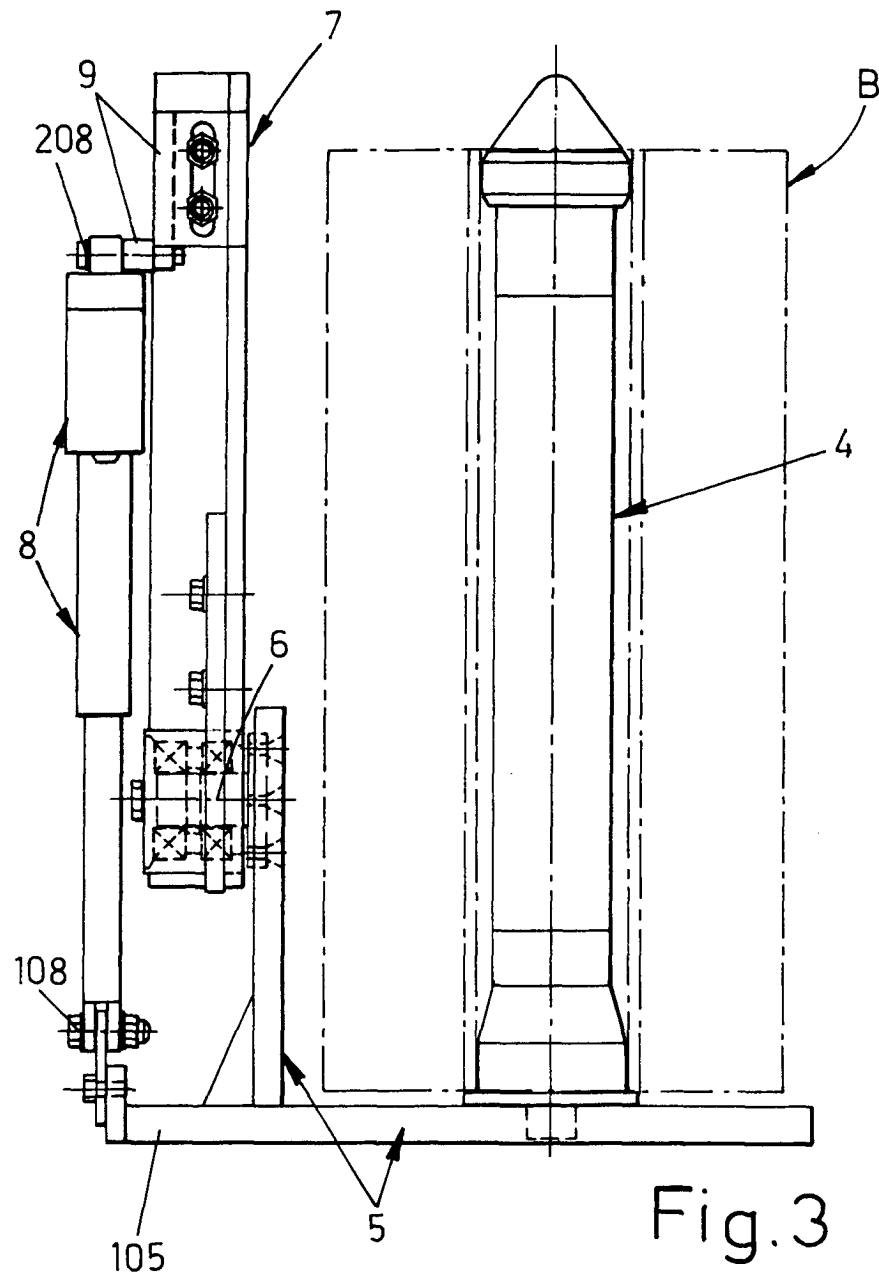
9. Apparatus according to Claim 8), in which the guides (41, 41') are structured so as to cause the associated chains (40, 40') and consequently the gripper (38) to follow a travel path which, in plan view, is substantially L- or C- shaped and in any case useful for correct insertion of the front end of the film unwound from the new reel in between the various rollers of the carriage (3) of the wrapping machine.
10. Apparatus according to Claim 9), **characterized in that** it comprises means for ensuring that, after the new reel has been moved axially towards the spindle (4) by associated supporting and movement means (33-35), the active displacement of the open gripper (38) is performed, it being envisaged that when the fixed jaw (138) of this gripper reaches in co-operation with the front end of the film of the said reel, retained by the said temporary supports (37), the roller (52) associated with the hinged quadrilateral which carries the movable jaw (238) mounts a switching device (53) already in a raised position so that the said movable jaw (238) is raised and the gripper (38) firmly grips the front end of the film and also retains it when the said roller (52) abandons the switching device and passes onto a rail (54) which has a fixed position heightwise and which is integral with a base frame (42), the switching device (53) being pivotably mounted on a support fixed to the said base (42) and being hinged with the rod of a pneumatic cylinder (57) also hinged with the said base (42) so that the said switching device can then be lowered, at the end of the working cycle, so as to allow the return movement of the gripper into the open position, means being envisaged for stopping the travel of the closed gripper (38) when the front end of the film, detached from the temporary friction supports (37), is positioned beyond the first idle roller (12) of the carriage (3) of the wrapping machine.
11. Apparatus according to Claim 10), in which the gripper (38) has a position heightwise such as to move to about half the height of the rollers situated on the carriage (3) of the wrapping machine.
12. Apparatus according to Claim 10), **characterized in that**, when the gripper (38) has stopped beyond the first idle roller (12) of the carriage (3) of the wrapping machine, means are envisaged for deactivating the bottom brake (36) of the reel during supplying and intervention of a static pusher (58) is envisaged, said pusher also being actuated for example by a pneumatic cylinder and inserting axially the said reel onto the spindle (4) and then returning into the rest position, while the said spindle (4) is raised and is arranged vertically with the new reel.

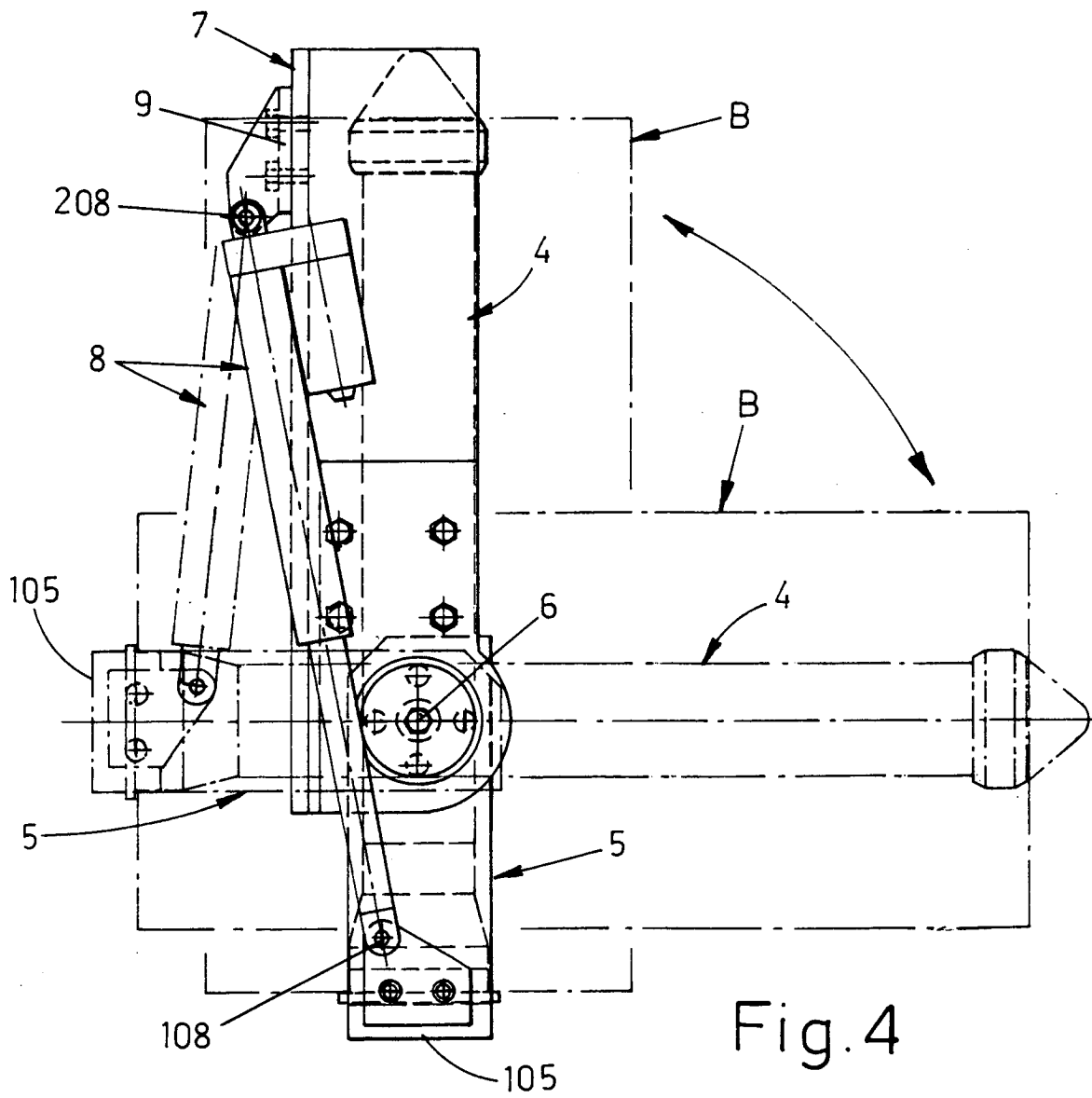
13. Apparatus according to Claim 12), **characterized in that**, once raising of the new reel has been completed, means are envisaged for ensuring that the gripper (38) performs the last part of its working travel so as to arrange a corresponding section of film in front of the pre-stretching rollers (10, 10') and the tensioning jockey wheel (22), means being envisaged for ensuring that, during this step, the pre-stretching rollers rotate at the correct speed and in accordance with the advancing movement of the film, while the reel also rotates at the correct speed owing to the action of the peripheral roller (20), it being envisaged that, at the end of its active travel path, the said gripper (38) is situated at a small distance, laterally and at the bottom of the load (C) to be wrapped and means being envisaged for activating the actuator (17) in phase sequence in order to close the hatch (15) with the associated drive rollers (13, 14, 14') which are arranged in the active position.
14. Apparatus according to Claim 13), **characterized in that**, while the gripper (38) remains at a standstill and closed in the active end-of-travel position, means cause start-up of the carriage (3) of the wrapping machine, so as to wrap the bottom part of the load (C) with a first wound turn of film and, before this turn is completed, means are envisaged for ensuring that the ring (1) on which the carriage (3) travels is suitably raised so that the said first wound turn terminates above the said gripper (38) which can thus be prepared for the following working steps.
15. Apparatus according to Claim 14), **characterized in that**, once the first wound turn of film wrapping the load (C) has been completed, it is envisaged lowering, by means of a double-acting switching device (59) pivotably mounted on the base (42) and hinged with a pneumatic cylinder (62), the roller (52) of the gripper assembly (38) so that the latter opens and may be brought back into the start-of-cycle position, with reversal of the previous movement, without problems of interference either with the film or with the rollers of the carriage (3) which is in a different angular position and is in any case at a greater height.
16. Method for automatically replenishing the reel of film in machines for wrapping palletized loads with stretch film, in particular in so-called ring machines, **characterized by** the automatic succession of the following operating steps:
- arranging a sufficient number of new and identical reels of film (B, B', B'') in a replenishing station, with the said reels arranged parallel to each other and relative to the spindle (4) of the

- carriage of the wrapping machine when it is stopped in the reel changing position and is arranged horizontally. A section of the front end of the film, of sufficient length, unwound from each reel is fixed to respective lateral friction support means (37, 37', 37'');
- opening the hatch (15) with the opposition rollers co-operating with the pre-stretching rollers (10, 10') of the carriage (3) of the wrapping machine;
 - extracting, from the spindle (4), the core (A) of the used reel which during a subsequent step is discharged inside a collection station (32);
 - aligning and axially moving one of the new reels towards the spindle (4);
 - gripping, with an insertion gripper (38), the front end of film of the new reel moved up axially and inserting the said front end of the film, beyond the first idle roller (12) of the carriage (3), with consequent separation of the said front end from the associated friction support means;
 - axial inserting the new reel of film onto the spindle (4) and swinging the latter into the high working position;
 - inserting the front end of the film, using the insertion gripper (38), beyond the pre-stretching rollers (10, 10') and beyond the tensioning jockey wheel (22) of the carriage (3), while in phase synchronism the said pre-stretching rollers and the reel are made to rotate at the correct speed and in the direction of advancing movement of the film;
 - closing the hatch (15) with the opposition rollers acting against the pre-stretching rollers;
 - starting the carriage (3) of the wrapping machine so as to form a first wound turn wrapping the load (C), while the front end of the film is retained by the insertion gripper (38) and while the said carriage is raised so as to ensure that the first wound turn is terminated suitably above its initial part;
 - opening the insertion gripper (38) and bringing it back into the rest position in order to repeat a new working cycle.









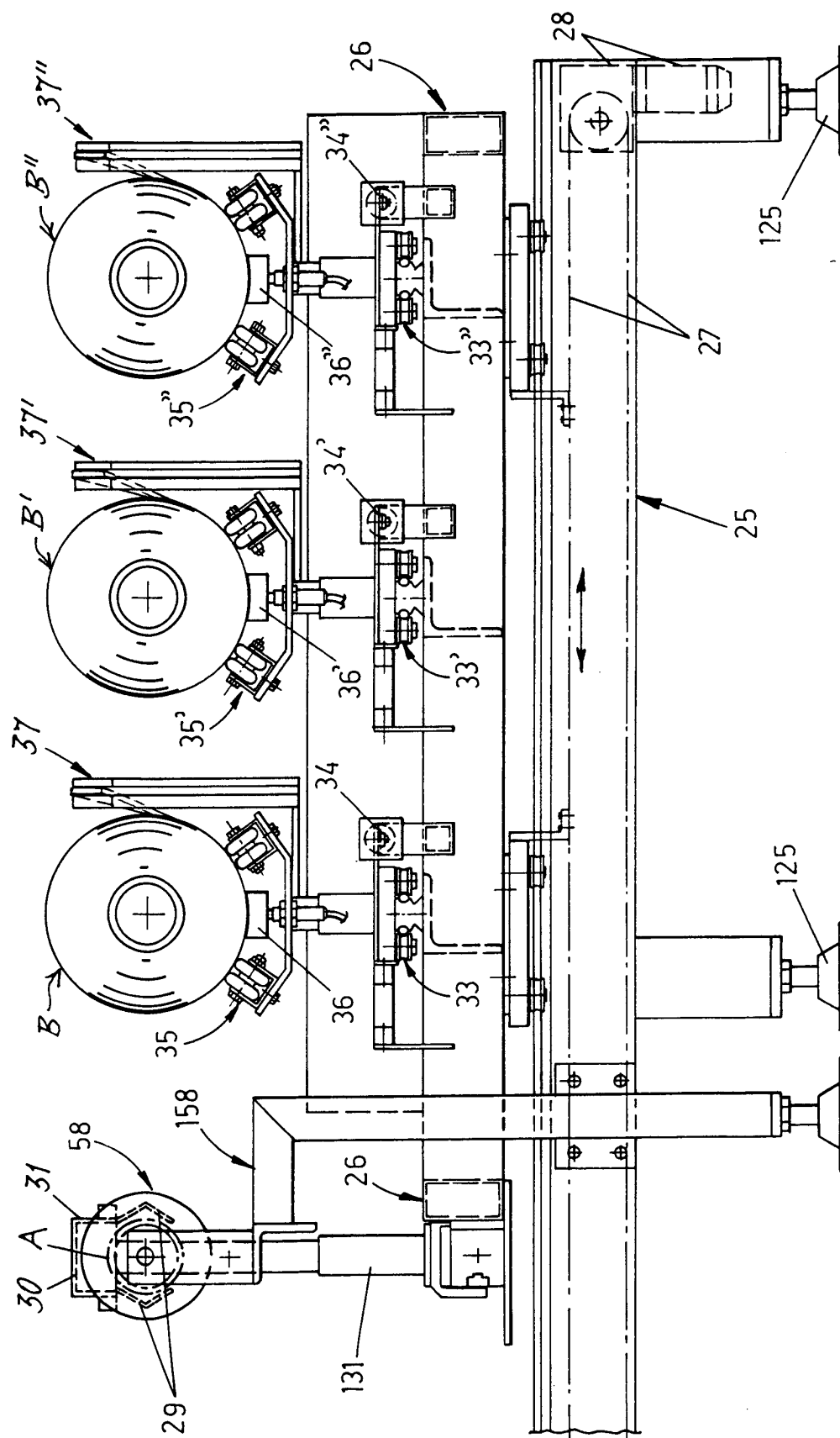


Fig.5

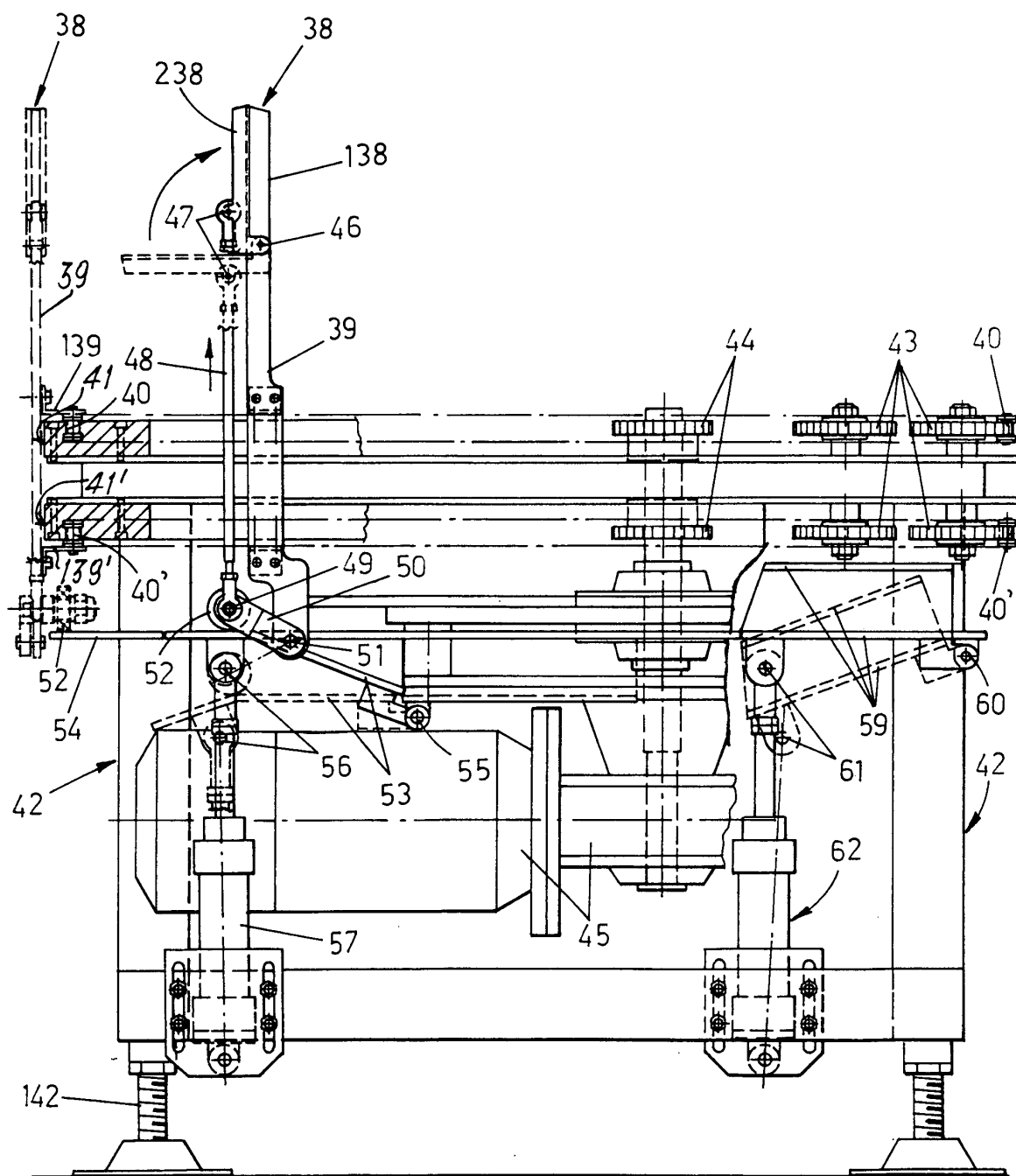


Fig.6



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 04 01 6810

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	EP 1 201 584 A (ILLINOIS TOOL WORKS) 2 May 2002 (2002-05-02) * the whole document *	1,16	B65B11/02
A	US 5 562 385 A (GAMBERINI ANTONIO ET AL) 8 October 1996 (1996-10-08) * figure 1 *	1,16	
A	EP 0 293 352 A (HALOILA M OY AB) 30 November 1988 (1988-11-30) * the whole document *	1,16	
A	US 2003/066269 A1 (FEDERESZYN ROGER) 10 April 2003 (2003-04-10) * the whole document *	1,16	
A	EP 1 097 867 A (AETNA GROUP S P A) 9 May 2001 (2001-05-09) * figures 1-6 *	1,16	
A	EP 1 273 519 A (MAS CONSTRUCCIONES MECANICAS S) 8 January 2003 (2003-01-08) * the whole document *	1,16	TECHNICAL FIELDS SEARCHED (Int.Cl.7) B65B B65H
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 3 November 2004	Examiner Vigilante, M
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			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 04 01 6810

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

03-11-2004

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 1201584	A	02-05-2002	US 6494400 B1	17-12-2002
			CA 2357457 A1	25-04-2002
			EP 1201584 A2	02-05-2002
US 5562385	A	08-10-1996	IT 1263971 B1	05-09-1996
			DE 4425079 A1	19-01-1995
			GB 2279937 A , B	18-01-1995
EP 0293352	A	30-11-1988	FI 872358 A	28-11-1988
			CA 1305402 C	21-07-1992
			DE 3874212 D1	08-10-1992
			DE 3874212 T2	25-02-1993
			EP 0293352 A2	30-11-1988
			ES 2034390 T3	01-04-1993
			US 4914891 A	10-04-1990
US 2003066269	A1	10-04-2003	CA 2400879 A1	28-02-2003
EP 1097867	A	09-05-2001	IT B0990598 A1	07-05-2001
			AT 260805 T	15-03-2004
			DE 60008667 D1	08-04-2004
			EP 1097867 A1	09-05-2001
			ES 2214243 T3	16-09-2004
			JP 2001158554 A	12-06-2001
			US 6553746 B1	29-04-2003
EP 1273519	A	08-01-2003	WO 0170576 A1	27-09-2001
			AU 3293500 A	03-10-2001
			BR 0017196 A	29-04-2003
			CA 2401584 A1	27-09-2001
			EP 1273519 A1	08-01-2003
			US 2003093973 A1	22-05-2003

EPO FORM P0459

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