



(51) International Patent Classification:
B65H 19/22 (2006.01) *B65H 19/26* (2006.01)
B65H 18/10 (2006.01)

(21) International Application Number:
PCT/IB2011/053843

(22) International Filing Date:
2 September 2011 (02.09.2011)

(25) Filing Language: Italian

(26) Publication Language: English

(30) Priority Data:
PI2010A000112 8 October 2010 (08.10.2010) IT

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(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ,
CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO,
DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,
HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP,
KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD,
ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI,
NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU,
RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ,
TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA,
ZM, ZW.

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG,
ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ,
TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,
EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU,
LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK,
SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
GW, ML, MR, NE, SN, TD, TG).

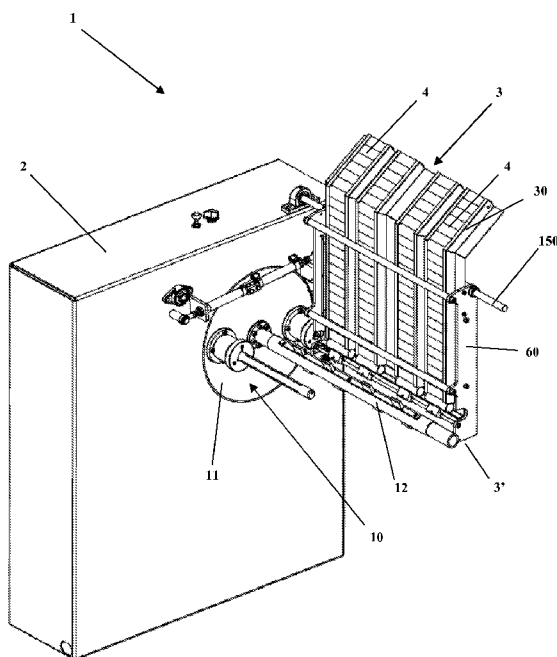
Published:

— with international search report (Art. 21(3))

[Continued on next page]

(54) Title: A WINDING SECTION FOR THE AUTOMATIZED PRODUCTION OF ROLLS OF BAGS

FIG. 1



(57) Abstract: The present invention concerns a winding
section (1) for winding a continuous band (200) of bags
around one or more cores (4). The section includes a feed
path (200) of the band, a winding device (10) for winding
the band around the core (4) and appropriate tear means
(60, 60', 61, 61', 150) to cause the tear of the band (100) in
correspondence of the completion of a winding and to fa-
cilitate the beginning of a subsequent winding. In accor-
dance with the invention, the winding device (10) includes
a shaft (12) to which two rotatable discs (11) are connect-
ed rigidly provided each one of them with a first (16) and a
second spindle (17). The spindles are both sliding axially
with respect to the disc and also rotatable axially to realize
the winding of a roll in formation. A mobile core loader
(3) and a movement system (50, 51, 55, 100) are also in-
cluded, the last one synchronized in such a way that when
a spindle (16, 17) is in rotation to complete a first winding
the second spindle is retracted in such a way that the load-
er is set in axis with it to spear the cores after its extrac-
tion. Subsequently, the moving apart of the loader (3) is
controlled and, in proximity of the completion of the first
winding, the whole device (10) is made to rotate around its
axis (12) that causes an inversion of position between the
two spindles (16, 17). The second spindle extracted is now
set in rotation in such a way that, after the tear, it initiates
a new winding while the first one is retracted so as to make
the roll formed fall.



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- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

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TITLEA WINDING SECTION FOR THE AUTOMATIZED PRODUCTION OF ROLLS
OF BAGS5 Technical field

The present invention refers to the technical field relative to the machines suitable for the production of plastic bags and sacks.

In particular way, the invention refers to an
10 innovative device for the automation applied to the production of plastic sacks wound on cores.

Background Art

Machines for the production of plastic bags wound on plastic or cardboard cores have long been known. The roll
15 thus realized is composed of a continuous band formed by a succession of bags subdivided one from the other by a perforation line of a pre-determined pitch. The continuous band is generally wound around the said cylindrical core, axially holed, in such a way that the roll can be
20 subsequently arranged in a rotatable manner on the axis of a distributor. In such a way, the user can easily unroll a bag and detach it from the remaining roll by applying a traction that causes the tear along the perforation line. Such types of bags are very common and frequently used in
25 the food industry, for example in supermarkets in order to put fruit or other food products into a bag.

The production line of such rolls of bags includes an unwinding section by means of which a continuous plastic band is unrolled from a mother reel. The mother
30 reel can have a width variable on the basis of the number of rolls that want to be produced and generally superior to the meter so as to be able to obtain at the same time even four or more rolls.

A longitudinal cutting and welding section is

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arranged in succession to the unwinding section in such a way that the band unwound from the mother reel is subdivided into many tracks, welded laterally and bent centrally. In such a manner, starting from a single band
5 of a pre-determined width, a plurality of continuous bands of inferior width is formed.

Last, the perforation section is included, which creates the tear line between a bag and the subsequent one along the band formed.

10 The continuous band of bags is now wound into an appropriate winding section.

In accordance with the background art, such a section includes the intervention of an operator who arranges manually on a spindle a plurality of cores on
15 which the bands will be re-wound. The operator must subsequently arrange manually the spindle in the machine and remove it as soon as the winding has been completed. Then, the operator will have to remove manually the rolls produced and arrange a new spindle in such a way as to
20 begin a new winding.

It is clear that such a type of machine is of low performance, since the manual intervention of an operator strongly slows down the production cycle. Moreover, it is clear that the use of an operator in order to perform such
25 a manual work implies extra production costs.

Disclosure of invention

It is therefore the aim of the present invention to provide a winding section for a machine suitable for the production of rolls of bags that solves at least in part
30 the said inconveniences.

In particular, it is the aim of the present invention to provide a winding section that is absolutely automatized, in such a way as to allow a significant increase in the productivity and at the same time reduce

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the need for human intervention.

These and other aims are thus obtained from the present winding section for a machine suitable for the production of rolls of bags in accordance with claim 1.

5 The winding section (1) comprises:

- A feed path of the band (200);
 - A winding device (10) for winding the band around the core (4) and;
 - Tear means (60, 60', 61, 61', 150) configured to cause
- 10 the tear of the band (100) in correspondence of the completion of a winding and facilitate the beginning of a subsequent winding.

In order to realize such an automation, the winding device (10) includes a support (11) rotatable around a

15 longitudinal axis (12) and provided with at least a first (16) and a second spindle (17) connected to the support (11) in a rotatable manner around their longitudinal axis, for realizing the winding of the roll in formation, and being further sliding axially between an extended

20 position, wherein they result emerging from the support (11) in a substantially orthogonal manner to it to realize the winding, and a retracted position.

The winding section (1) further comprises:

- A mobile core loader (3) and;
- 25 - A movement system (50, 51, 55, 100).

The controlling movement system (50, 51, 55, 100) is synchronized in such a manner that when it conducts a spindle (16, 17) in rotation in extended position to complete a first winding of a roll in formation, it moves

30 the second spindle back from the extended position to the retracted position. In such a manner the roll formed, eventually present on such a spindle, automatically falls, while, at the same time, the spindle itself results already arranged to load new cores for a new winding. In

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such sense, the controlling movement system now controls the rotation of the loader (3) to bring it in axis with the said retracted second spindle. The subsequent extraction of such a second spindle spears the cores
5 arranged on the loader and arranges it for the new winding. At this point, the controlling movement system controls the moving apart of the loader (3) in such a way that, in proximity of the completion of the first winding, it can activate the subsequent rotation of the whole
10 support (11) around its axis (12) and that causes an inversion of position between the two spindles (16, 17). In such a manner, the second spindle, placed in rotation first or during such a rotation of inversion, now intercepts the feed path for the band (200) and, after the
15 tear of the band with the said tear means, begins a new winding on the cores. The controlling movement system now controls the retroaction of the first spindle conducted by the support in the loading and unloading position previously occupied by the other spindle, so as to cause
20 the fall of the rolls formed.

The cycle then continues exactly as described with the new rotation in axis of the loader and the extraction of the spindle for grasping the cores.

Further advantages can be deduced from the dependent
25 claims.

Brief description of drawings

Further characteristics and advantages of the present winding section 1, according to the invention, will result clearer with the description that follows of
30 one of its embodiments, made to illustrate but not to limit, with reference to the annexed drawings, wherein:

- Figure 1 shows in an axonometric view a half of the present section;
- Figure 2 shows a lateral view of the axonometry of

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figure 1;

- Figure 3 shows an overall axonometric view of the winding device 10 belonging to the present winding section 1;

5 - Figure 4 shows an axonometric view of the whole winding section 1 provided with carter or frames 2 with a longitudinal axis of the section highlighted with a dotted line;

10 - Figure 5 shows in an axonometric view a detail of the core loader as arranged in axis with the spindle;

- Figure 6 shows the same axonometric view wherein the core loader is instead rotated out of axis with respect to the spindle;

15 - Figure 7 shows in an axonometric view a detail of the device of longitudinal movement of the spindles;

- Figures 8 and 9 show in a lateral view a longitudinal section (plane belonging to the longitudinal axis) of the whole machine of figure 4;

- Figures from 10 to 18 show the functioning phases.

20 Description of some preferred embodiments

With reference to figure 1, it is represented, in an axonometric view, a part of the winding section 1 for the formation of a continuous roll of bags in accordance with the invention. The other part, as better explained below, 25 has been omitted here just for the sake of the purposes of descriptive clarity of the drawings, since it is substantially identical.

Figure 1 therefore represents a support frame 2 for the mechanical winding elements, that is a loader 3 and a 30 winding device 10 best visible in figure 3.

In particular, in figure 1 it is highlighted the loader 3 closed on one of its ends by means of a base 3' and into which the cores 4 are placed for the winding, which result arranged extended in a piled up manner one on

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top of the other. The base 3' thus impedes the fall by gravity of the cores contained into it. Figure 2 shows a frontal view relative to the axonometry of figure 1 in order to better highlight the core loader 3 with the
5 closure 3'.

The loader, as also highlighted in figure 1, is mounted oscillating around a rotation axis 150 supported by the frame 2. In particular, the oscillation is obtained by means of the extraction/retraction of an actuator 55
10 (see figure 2 or figure 8 and figure 9).

More in detail, the loader 3 includes a sling 60 provided with the said rotation axis 150 and into which one or more binaries for piling up the cores 30 are fixed. In the preferred embodiment described in figure 1, four
15 binaries are included in such a way as to realize four winding tracks, as better clarified in the present description below.

Figure 1 and figure 2 further highlight a rotative device 10 (better highlighted in an axonometric view of figure 3) comprising two discs 11 connected in a rotatable
20 manner by a shaft 12.

More precisely, a disc 11 is arranged with respect to the frame 2 in a rotatable manner around the central rotation axis 12. The central rotation axis, as better
25 shown in figure 3, is a shaft 12 that is connected rigidly to a further opposed disc 11 and in turn supported by its own support frame 2. In such a manner, with a single motorization a disc 11 can be activated capable of dragging in rotation also the disc 11 opposed by means of
30 the shaft 12.

Figure 4 better highlights an overall view with the said frames 2 to which the respective rotative devices 10 are connected.

Going further into the descriptive detail of the

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rotative device 10 (see again figure 2 and figure 3), it is highlighted how the two discs 11 include each one of them a first winding element 13 and a second winding element 14 arranged in such a way as to result symmetrical according to a central symmetry with respect to the shaft 12 of rotation of the disc. The winding element 13 and the winding element 14 comprise respectively a disc 13' and a disc 14' mounted fixed on the disc 11. The disc 13' supports a spindle 16 on which cores 4 can be loaded, as the disc 14' mounts a spindle 17 on which cores 4 can be loaded for the winding, as will be better described in detail in the functioning below. The spindles (16, 17) are mounted in both a rotatable manner and an axially sliding manner with respect to their support disc (13'; 14') in such a way that an appropriate actuation system (50, 51) can control their longitudinal extraction and retraction, while a motorization 100, better described in detail below, controls their rotation around their connection axis.

Figure 3 highlights well the spindle 17 belonging to the disc 14' completely retracted while, in contrast, the spindle 16 belonging to the disc 13' results extended.

Figure 1, the lateral view of figure 2 and the axonometric detail of figure 5, therefore, depict a functioning condition wherein the loader is oscillated in a position wherein the cores are perfectly in axis with the spindle 17. In such a manner, as a consequence of an extraction of the spindle, the cores extended in the loader are driven in the spindle itself like a ring to the finger.

The spindle is for that purpose of the expansion type so as to block on it the cores speared.

The axonometric view of figure 6 better highlights the subsequent phase wherein the spindle 17 has been

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extracted, consequently spearing the two cores 4 while, subsequently, the loader has been rotated in retracted position around the axis 150.

Although figures 5 and 6, for simplicity purposes, show in detail just one spindle 17 exiting from just one disc 11, it is clear from figure 3 and from the present description that the preferred embodiment of the invention includes two discs 11, equal and opposed, and therefore two identical spindles (16, 17) per disc 11 that work in a perfectly symmetric manner.

In such sense, figure 5 represents in fact just two tracks 30 speared from the spindle belonging to a disc 11, but it is to be intended that a disc 11 opposed is included and from which another 17 exits to spear the cores arranged in the other two tracks 30 omitted in such a figure.

Continuing with the constructive description of the invention, figure 7 and figure 3 highlight the control system of the extraction and the retraction of the spindles (16, 17). In particular, a sliding bar 50 is highlighted on which a sliding block 51 results mounted slidably. The sliding block includes a grasping system (for example plier-like) with which to grasp the corresponding spindle when, after the rotation of the disc 11, this is arranged in axis with it. Figure 3 in fact shows the grasping phase of a spindle (in this case the spindle 17) which has been retracted with the backward motion of the sliding block 51.

The rotation of the two spindles 16 and 17, as also the rotation of the central shaft 12 and therefore of the two discs 11, is controlled by an appropriate motorization system 100 by which each element can rotate in an absolutely independent manner from the other.

Figure 3 in fact highlights two motors 110 per part

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(preferably of the "brushless" type) and just one ratiomotor 120 which, by means of transmission belts and pulleys, transmit the rotation to the said elements in an independent manner.

5 In particular, as represented in figure 3, two belts 400 and 410 per part connect each one respectively the central axis 12 to a spindle (16, 17), thus controlling their rotation around their axis.

 In particular, two pulleys are used that are mounted
10 idle on the axis 12 and connected by means of the said belts each one to a pulley arranged on the disc 11 and integral to a spindle in such a way that a rotation can be transmitted from the motors to the spindles independently from the rotation of the shaft 12. In fact, the fact that
15 the said pulleys are mounted idle on the axis 12 implies that the rotation of the spindles continues undisturbed independently from the rotation itself of the shaft 12. In such a manner, their rotation continues undisturbed also during the rigid rotation phase of the disc 11 around its
20 axis 12, allowing to continue the winding also during the exchange. The ratiomotor 120, by means of the shaft 130 and the belts 420 and 430, allows to vary, according to the need, the speed of rotation of the spindles (16, 17), which are absolutely independent one from the other.

25 The first belt 440 controls the rotation of the shaft 12.

 A part of the motorization is visible in the axonometric view of figure 4 and highlights the disc 1 which is rotatable with respect to the frame itself. The
30 rotation of the disc is therefore controlled by "step" substantially of 180° in such a way as to be able to exchange any time the position of the spindles 16 and 17, taking them in the insertion position in correspondence of the sliding block.

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As shown in subsequent figures 8 and 9, the winding section 1 further comprises appropriate tear means (60, 60', 61, 61', 150) which, once a winding around one of the two spindles is finished, allow the tear of the band 200 and, at the same time, the beginning of a new winding around the second spindle arranged in stand-by position.

The said tear means therefore comprise a pressing element (60, 60') and a counter-pressing element (61, 61') constituted each of them by a roller (60; 61) mounted in a rotatable manner around an arm (60'; 61'). Both the arm 60' and the arm 61' are in turn hinged in such a way that pressing element and counter-pressing element result oscillating. Figures 8 and 9 in fact show a succession wherein the pressing element (60, 60') is rotated clockwise to intercept the path of the band 200, while, at the same time, the counter-pressing element also rotates clockwise to increase the tension on the band.

The combined action of the pressing element and the counter-pressing element induce a tension on the band that causes the tear.

The rollers of the pressing element and the counter-pressing element are assembled idle on respective arms with a certain degree of mechanical resistance to the rotation as to induce the said tension on the band 200.

The rotation of the pressing element and the counter-pressing element is made possible by means of actuators, as highlighted in figures 8 and 9.

An air blow 250 is arranged integral to the pressing element in such a way that when the tear took place the air maintains the band against the spindle to begin a new winding (see for example figure 12).

For the realization of the blow, for example, a flexible pipe connected to the pressing element can be used, provided with a nozzle on one side and connected to

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a compressed air source on the opposite side.

Having structurally described all the basic elements of the invention, we now pass onto a description of its functioning.

5 Just for simplicity purposes, the functioning is represented with figures that depict just one disc 11.

Figure 10 shows a normal winding phase of the band 200 by means of the rotation of the spindle 17 on which the cores 4 are arranged. In this phase, the spindle 16 is
10 loaded with other cores 4 and remains in stand-by position so as not to interfere with the winding. At the same time, in this winding configuration, also the loader 3 is rotated externally to the disc in a rest position, as well as the pressing element 60, in such a way as not to
15 interfere with the winding.

Figure 10 also shows, for further descriptive clarity, a lateral view of the same disc 11. Such a lateral view is however rotated of 90° anti-clockwise with respect to its frontal view in such a way as to highlight
20 well the two spindles.

As soon as we get closer to a pre-established number of wound sacks (an appropriate software handles the count) the spindle 16 is placed in rotation around its axis while, at the same time, the rotation of the disc 11
25 around its axis 12 is activated in such a way as to invert the position of the spindles. Such an inversion phase is clearly schematized in subsequent figure 11 and highlights a rotation of 180° of the disc 11 around its rotation axis 12. In such a manner, the two spindles exchange their
30 position, allowing the beginning of the tear phase. During such a rotation phase the two spindles rotate together at an appropriate speed.

The tear phase is realized with the pressing element and the counter-pressing element which are appropriately

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rotated in such a way that the pressing element gets in contact against the new spindle 16, while the counter-pressing element tensions further the band. In particular, as shown in figure 11, a clockwise rotation of the pressing element is included that brings it in contact against the new spindle 16 which rotates around its axis with a tangential speed that coincides with the advancing speed of the band. At the same time, also the counter-pressing element rotates clockwise in such a way as to pull further the band 200. The combination of the contact of the pressing element against the band that slips on the new spindle 16 and the displacement of the counter-pressing element generate the sufficient tension for the tear.

In order to begin the new winding, the pressing element continues to maintain the contact against the spindle 16 for the sufficient fraction of time so as to force the head 90 of the band to wind around the spindle 16 in rotation, in particular around the cores 4 fixed to the said spindle. The air blow 250, arranged integral to the pressing element 60, facilitates the beginning of the new winding, forcing the head 90 of the band to remain in adherence against the spindle in rotation.

Subsequent figure 12 shows the roll formed provided with the tail 80 of the band broken and the head 90 of the band that begins to wind on the core 4, arranged in rotation on the spindle 16.

Once the winding begins, the pressing element and the counter-pressing element go back to the rest position.

Figure 13 and figure 14 show the subsequent phases wherein the new winding has begun and at the same time the unloading of the rolls just formed takes place. Such an unloading phase includes, thanks to the independent motors used, the stop of the rotation of the spindle 17 and the

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subsequent longitudinal retroaction of the spindle 17 by means of the sliding block 51, sliding on the guide 50 of figure 3. The retroaction of the spindle 17, as shown in figure 14, therefore causes the fall of the rolls formed
5 which are, for example, collected by an appropriate mobile unloading platform 70.

At this point, while the spindle 16 is still in the rotation phase to proceed with the winding of the new rolls in formation, it is necessary to arrange new cores
10 on the spindle 17.

For this purpose, figure 15 shows an anti-clockwise rotation of the loader 3 which brings the cores in axis with the spindle 17.

Subsequently, as shown in figure 17 and in figure
15 18, the axis 17 is made to slide longitudinally through the sliding block 51 along the guide 50 in such a way as to spear the cores arranged on the loader in axis.

The loader is at this point rotated in rest position, as shown in figure 19.

20 The cycle is therefore complete since the winding continues and the spindle 17 is now provided with cores 4 for the winding. In such sense, as soon as the winding in course is completed, the cycle described is repeated starting from figure 10 so that, once a winding is
25 completed, an exchange and an unloading of the roll formed take place automatically.

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CLAIMS

1. A winding section (1) for winding a continuous band (200) of bags around one or more than one cores (4) and comprising:

- A feed path of the band (200);
- A winding device (10) for winding the band around the core (4) and;
- Tear means (60, 60', 61, 61', 150) configured to cause the tear of the band (100) in correspondence of the completion of a winding and facilitate the initiation of a subsequent winding;

and characterized in that the winding device (10) comprises a support (11) rotatable around a longitudinal axis (12) and provided with at least a first (16) and a second spindle (17) connected to the support (11) in a rotatable manner around their longitudinal axis to realize the winding of the roll in formation and further slidably mounted axially between an extended position, wherein they result emerging from the support (11) in a substantially orthogonal manner to it for realizing the winding, and a retracted position;

the winding section (1) further comprising:

- A mobile core loader (3) and;
- A controlling movement system (50, 51, 55, 100);

and wherein the said controlling movement system (50, 51, 55, 100) is synchronized in such a way that when it conducts a spindle (16, 17) in rotation in extended position to complete a first winding of a roll in formation, it moves the second spindle back from the extended position to the retracted position so as to rotate subsequently the loader (3) in axis with the said second spindle and spear the cores

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arranged on the loader with the said second spindle after its extraction from the retracted position to the extended position, the said controlling movement system being further synchronized to control subsequently the removal of the loader (3) and, in proximity of the completion of the first winding, control the subsequent rotation of the support (11) around its axis (12) that conducts to an inversion of position between the two spindles (16, 17) so that the second spindle extracted and placed in rotation intercepts the feed path of the band (200) and, after the tear of the band, initiates a new winding while a retroaction of the first spindle causes the fall of the rolls formed.

2. A winding section (1), as claimed in claim 1, wherein the said tear means (60, 60', 61, 61', 150) comprise a pressing element (60, 60') in combination with a counter-pressing element (61, 61') and arranged to intercept the feed path of the band in such a way as to induce a tension that causes the tear.

3. A winding section (1), as claimed in claim 2, wherein the said pressing element comprises a rotatable roller (60) around an arm (60') and wherein the arm is hinged in such a way as to move between a tear position wherein the roller is conducted in contact against the spindle (16, 17) and a rest position external to the feed path of the band, the said counter-pressing element (61, 61') comprising a roller (61) arranged in such a way as to intercept the feed path of the band and wherein, further, the roller is rotatable around an arm (61') hinged in such a way that a contextual rotation of the roller (61) towards the feed path of

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the band and of the roller (60) on the spindle cause a state of tension on the band.

4. A winding section (1), as claimed in claim 3, wherein
5 the said rollers (60, 61) are assembled idle with such a degree of resistance to the rotation as to induce a slowing down on the advancement speed of the band.
5. A winding section (1), as claimed in one or more of
10 claims from 2 to 4, wherein blowing elements (250) are further provided arranged on the pressing element (60, 60') and directed in such a way as to be able to intercept the broken band so as to oblige the head (90) of the broken band to wind on the spindle (16,
15 17) placed in rotation.
6. A winding section (1), as claimed in claim 1, wherein the core loader is assembled oscillating around a hinge axis (150) and rotated through an actuator (55).
20
7. A winding section (1), as claimed in claim 1, wherein the said controlling movement system comprises a sliding block (51) that slides linearly on a track (50), the track being arranged with respect to the
25 support (11) in such a way that the sliding block arises in contact against an end of the spindle to grasp it.
8. A winding section (1), as claimed in claim 1 or 7,
30 wherein the said controlling movement system comprises a motorization (100) to control the rotation of the spindles (16, 17) and the rotation of the support (11), the rotation of the spindles being independent between the spindles and further independent from the

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rotation of the support (11).

9. A winding section (1), as claimed in one or more of the preceding claims, wherein the said winding device
5 has a central symmetry with respect to the axis (12) and comprises two supports (11) opposed and joined rigidly between them through a shaft (12).
10. A winding section (1), as claimed in one or more of the preceding claims from 1 to 9, wherein the said
10 support (11) is disc-shaped.
11. A production section for producing rolls of bags comprising:
15 - An unwinding section for unwinding a mother reel of band;
- A fold and weld section for folding the band and welding it in such a way as to obtain a continuous succession of bags;
20 - A perforation section for realizing a tear line between a bag and the subsequent one;
and characterized in that it comprises a winding section (1) of the band of bags around one or more than one cores (4) as per one or more of the preceding
25 claims from 1 to 10.
12. A method for realizing the automated winding of a continuous band (200) of bags around one or more than one cores (4) through a winding section (1) as per one
30 or more of the preceding claims from 1 to 10 and comprising the operations of:
- Feed of the continuous band (200) of bags along the feed path;
- Formation of a roll through the winding of the band

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around at least a core (4) arranged in rotation and;

- Tear of the band (200) in correspondence of the completion of the roll in formation;

- Unloading of the roll formed and initiation of a new winding;

and characterized in that the operations of formation of the roll, tear and initiation of new winding are controlled through the synchronized movement of the core loader (3) and of the winding device (10), the said operations comprising:

- Set in rotation of a spindle (16, 17) of the winding device (10) and arranged in extended position to complete the winding of a roll of bags in formation;

- Retraction of the second spindle of the winding device and subsequent arrangement of the core loader (3) in such a way as to result in axis with it;

- Subsequent extraction of the second spindle in such a way as to grasp the cores arranged in the loader in axis with it;

- Moving away of the loader;

- Subsequent rotation of the support (11) around its rotation axis (12) in proximity of the completion of the said roll in formation in such a way as to invert the positions of the spindles (16, 17) making the second spindle intercept the feed path of the band;

- Tear of the band in correspondence of the completion of the roll in formation and initiation of a new winding through the set in rotation of the second spindle;

- Block of the rotation of the first spindle and retraction of the first spindle to cause the fall of the rolls formed and repetition of the cycle for the number of pre-established windings.

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FIG. 1

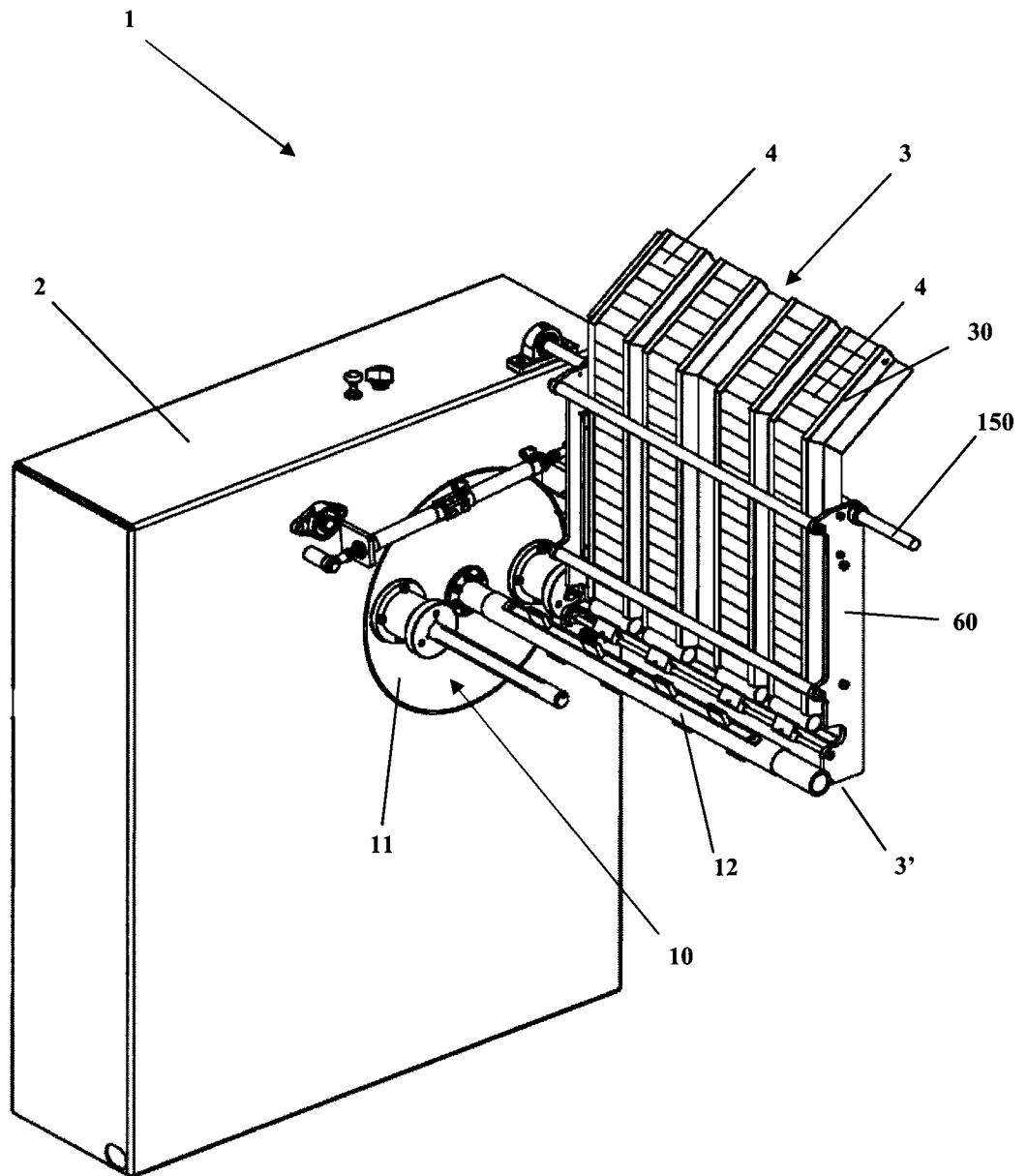
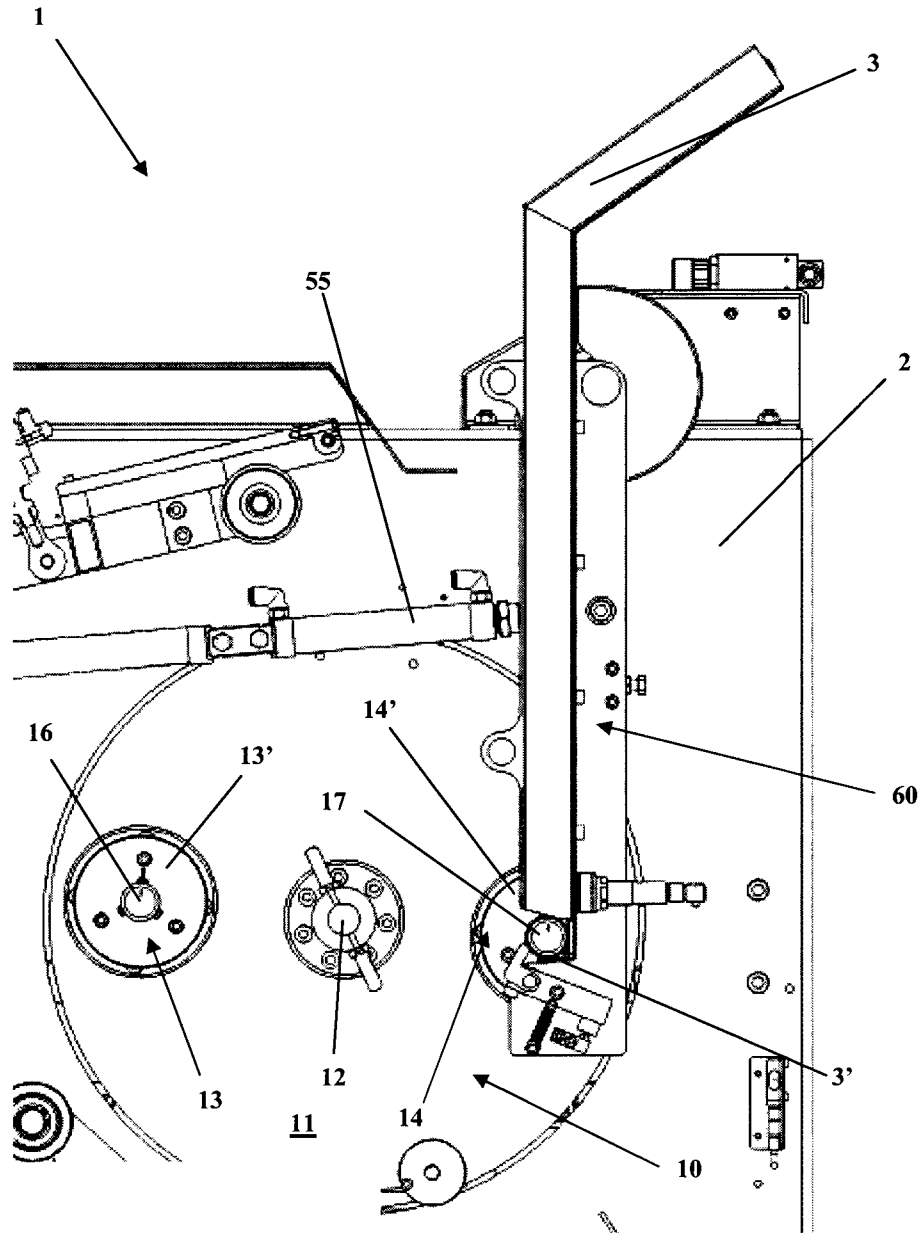
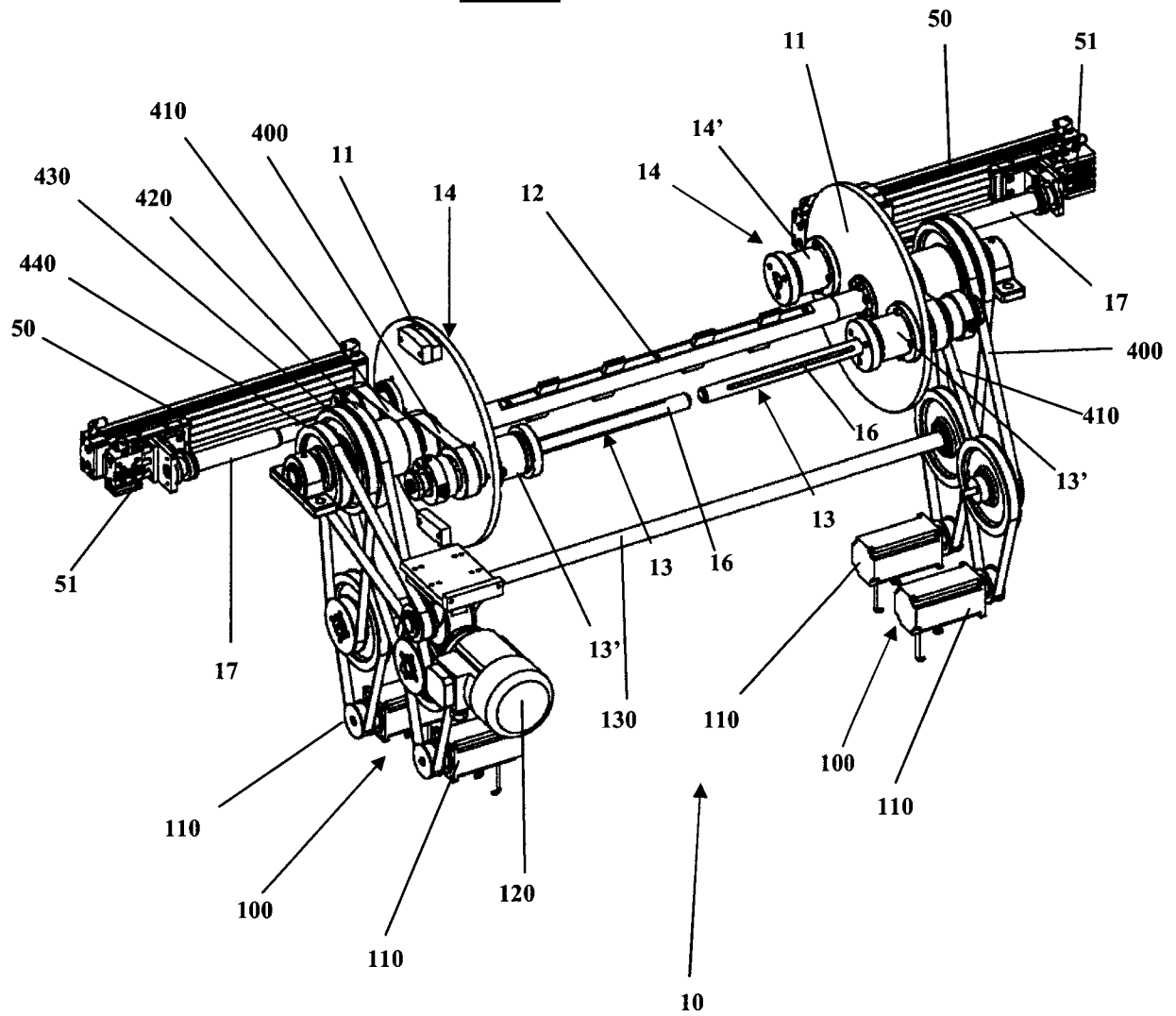


FIG. 2

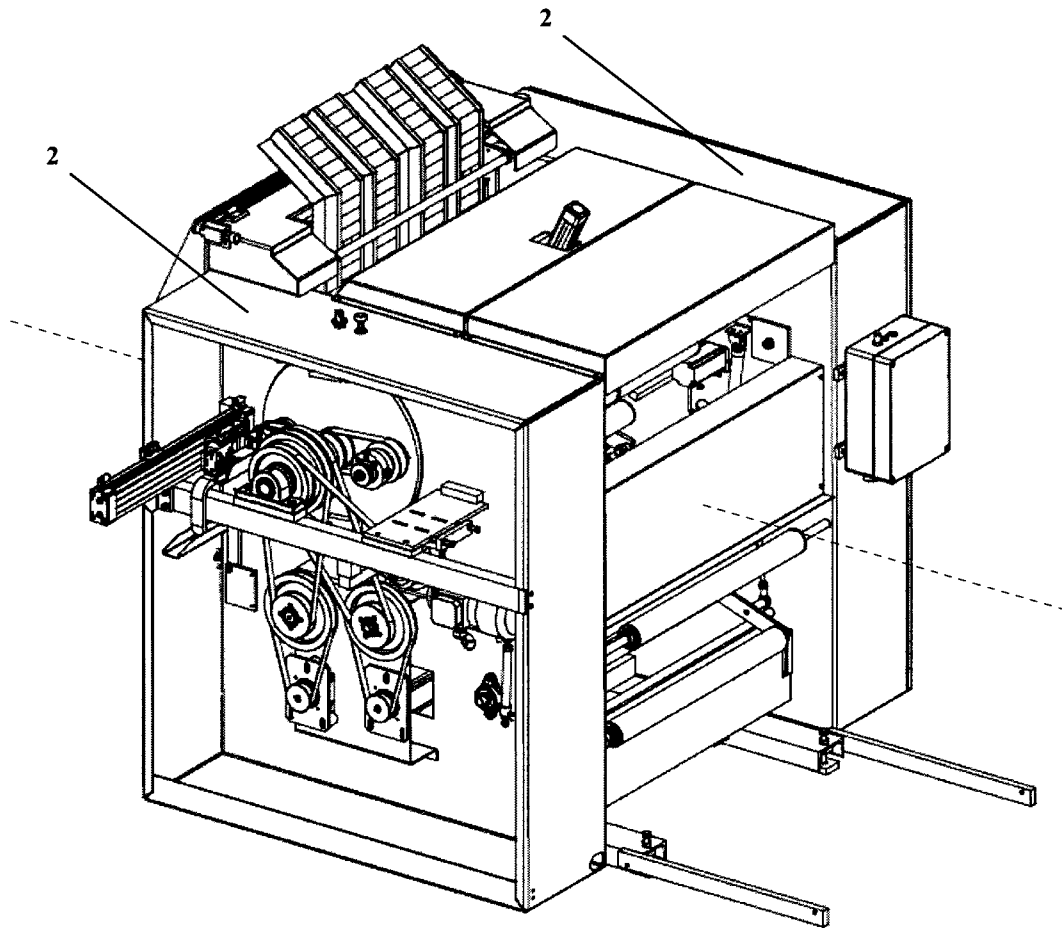


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FIG. 3

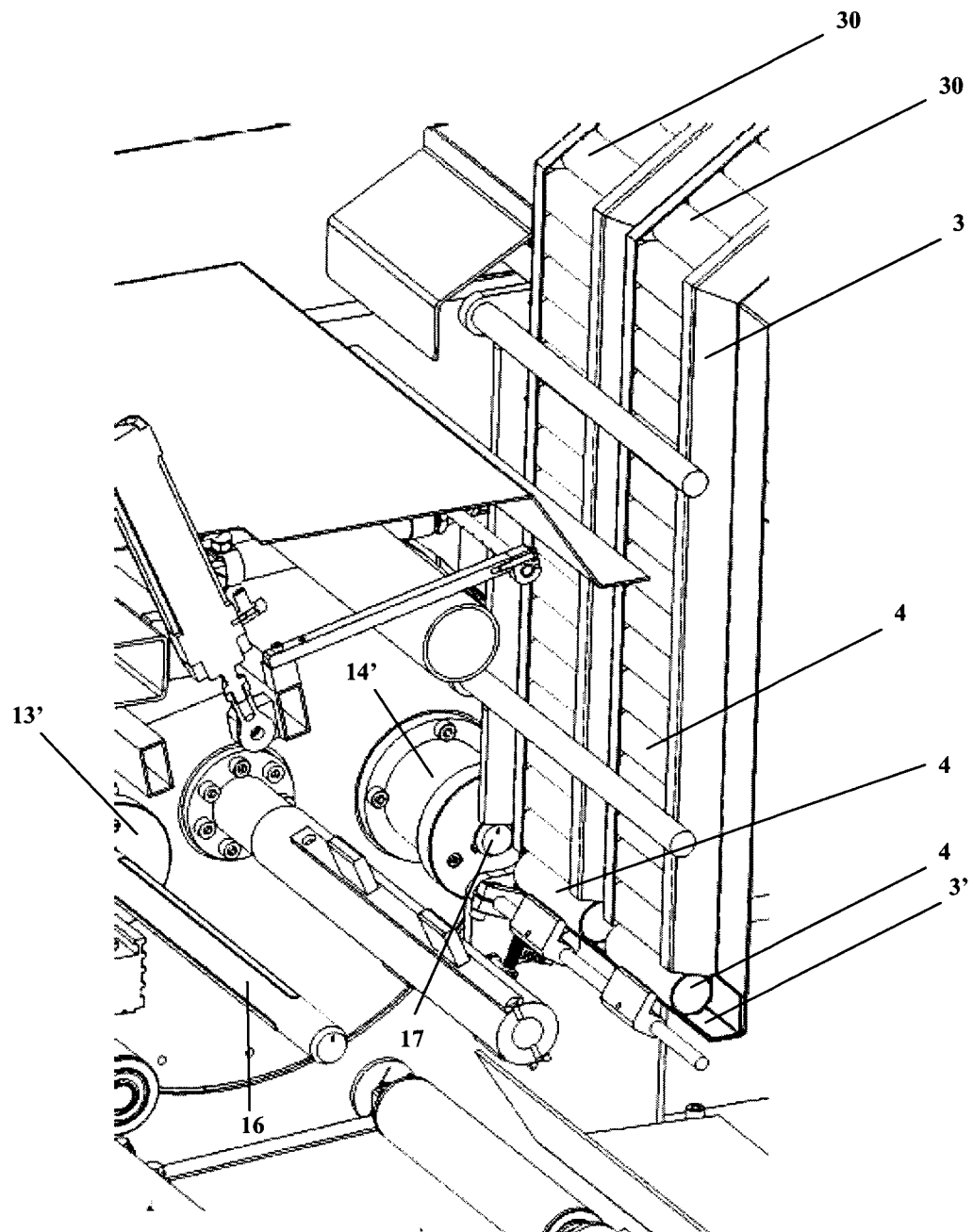
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FIG. 4



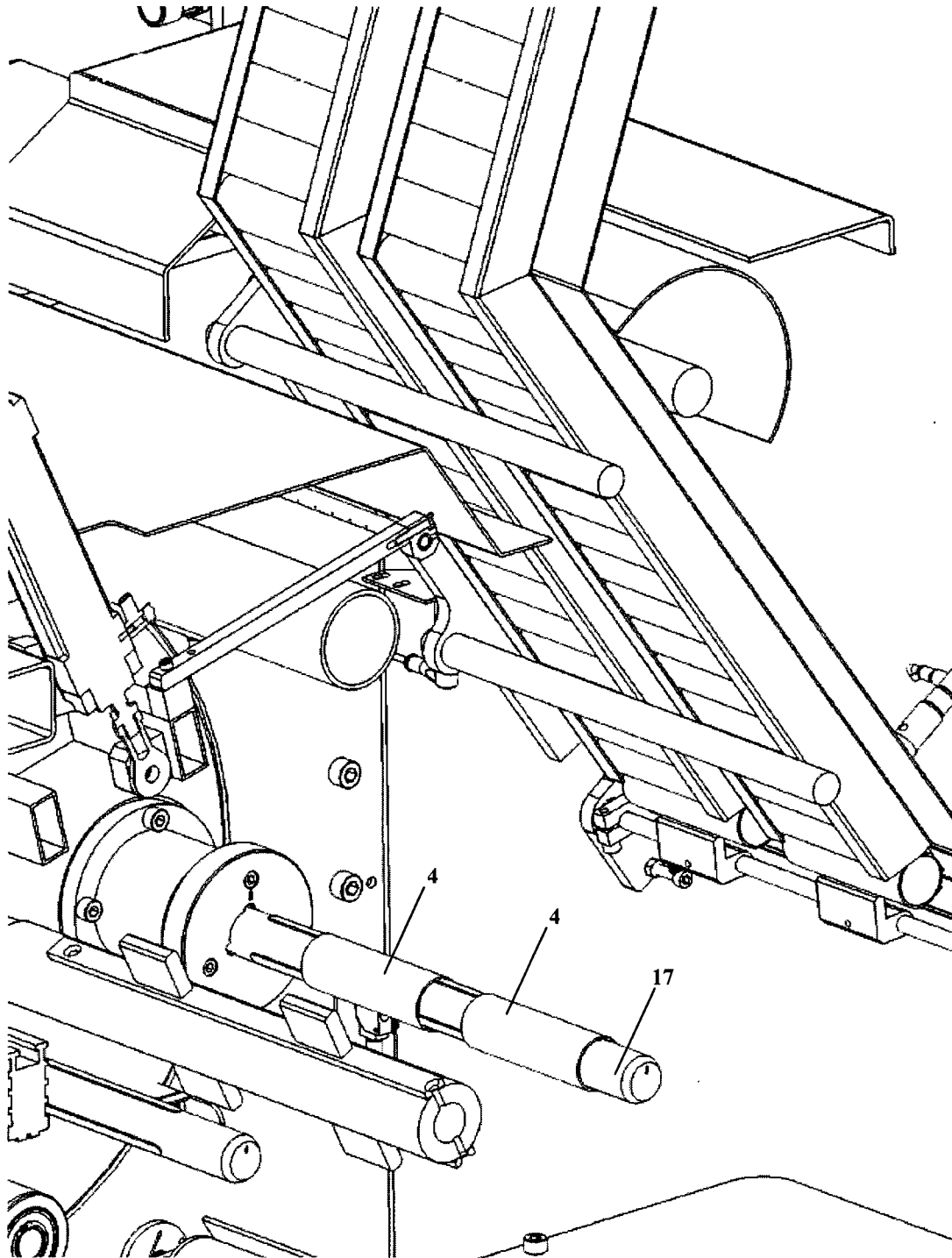
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FIG. 5



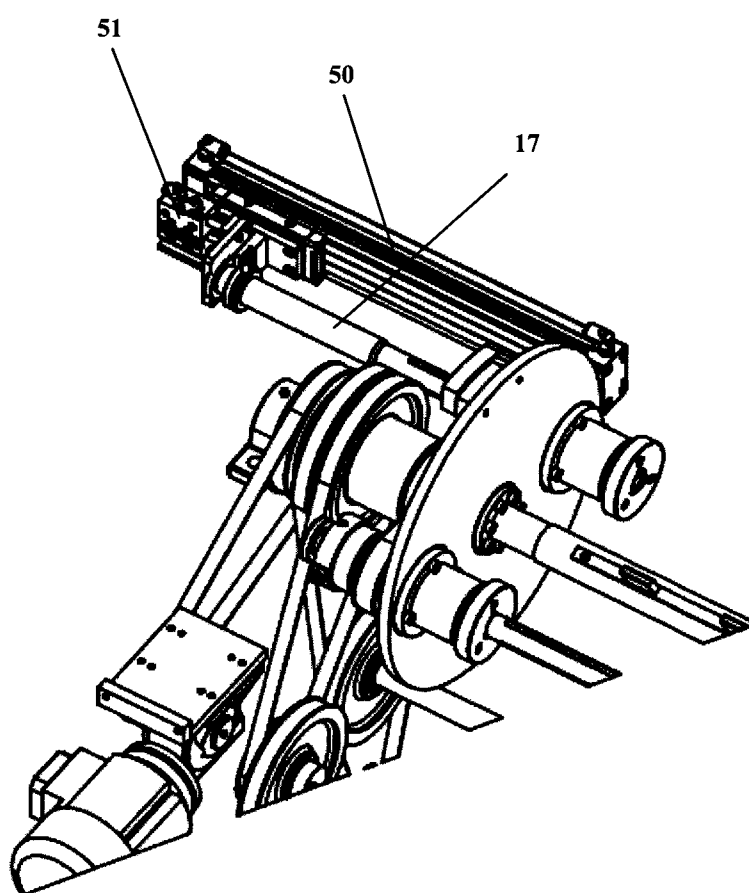
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FIG. 6



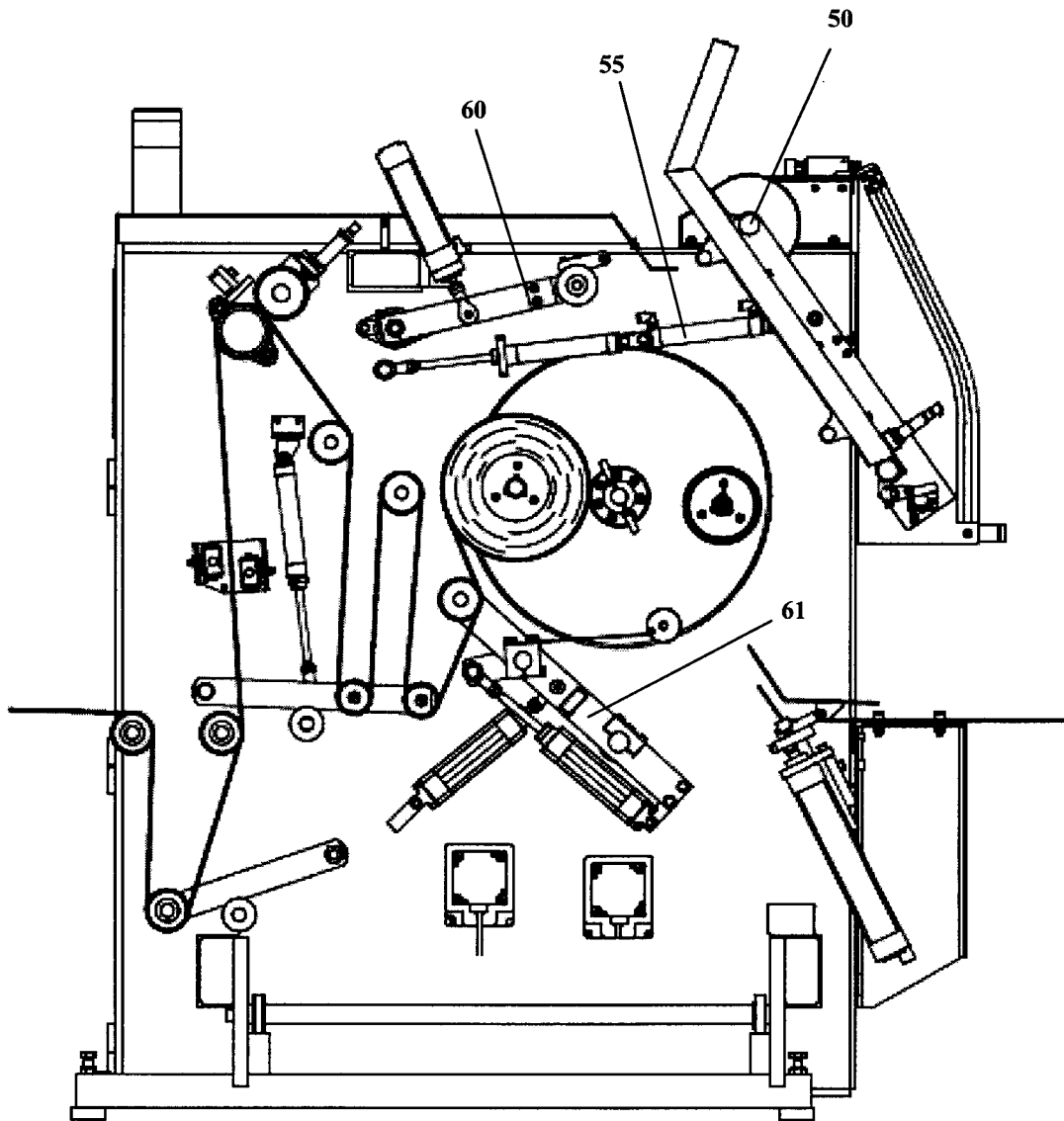
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FIG. 7



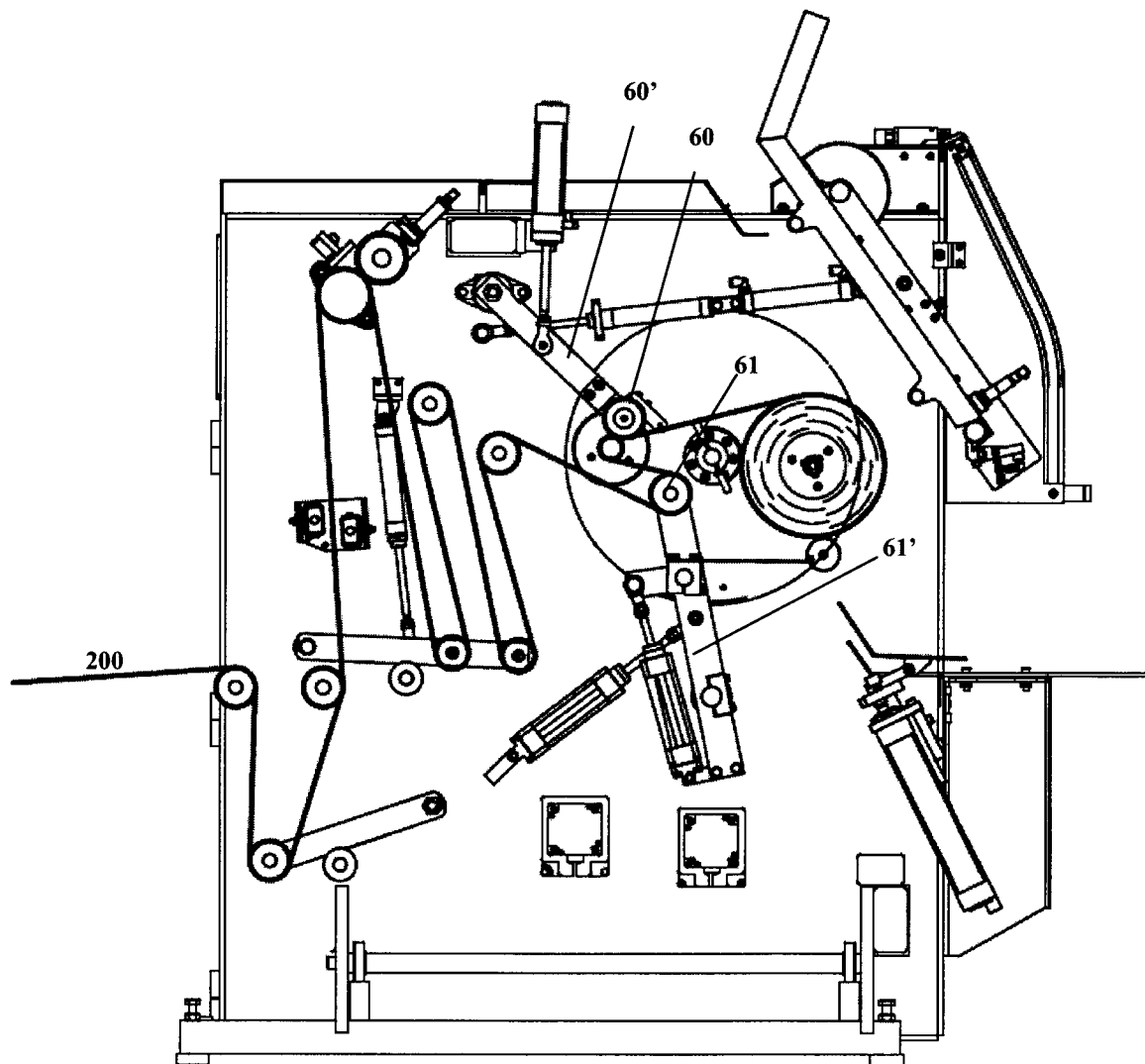
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FIG. 8



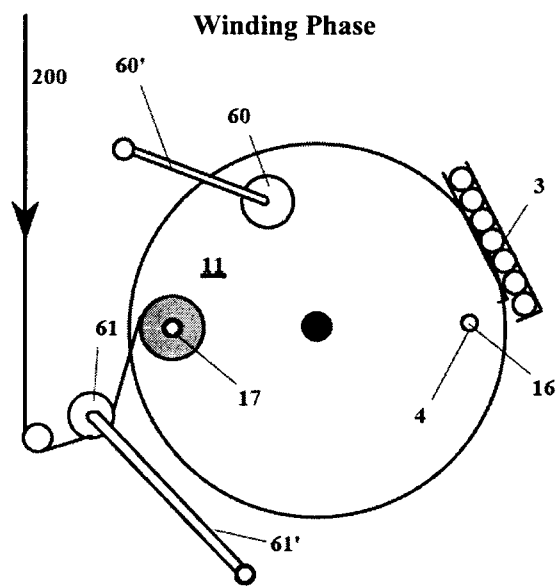
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FIG. 9



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Fig. 10



90° Rotated Lateral View

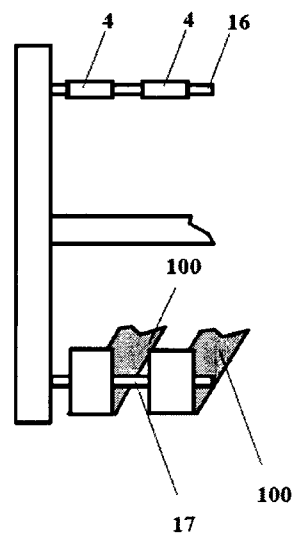
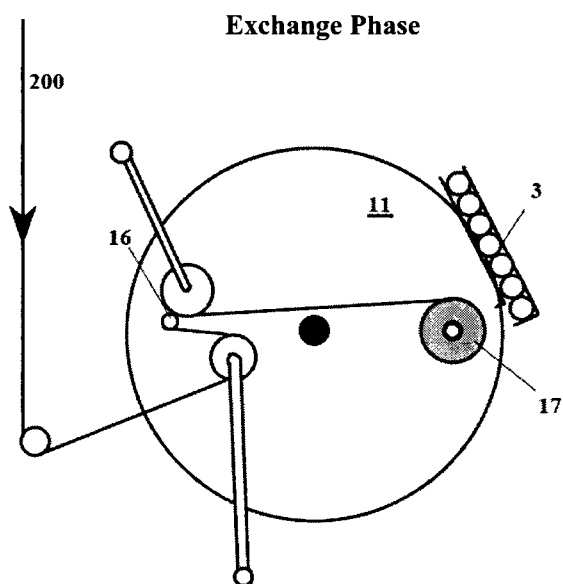


Fig. 11



90° Rotated Lateral View

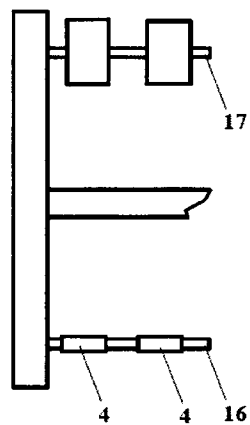
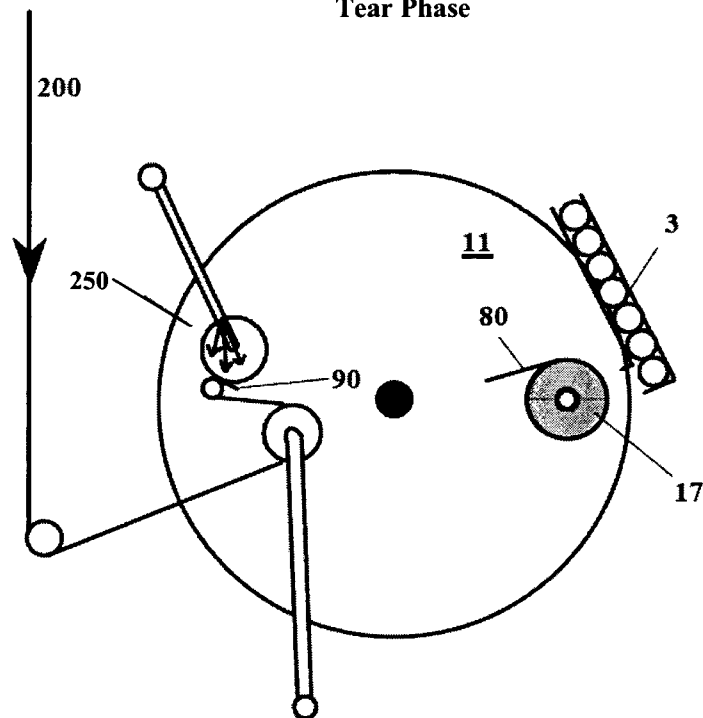


Fig. 12

Tear Phase



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Fig. 13

Unloading phase

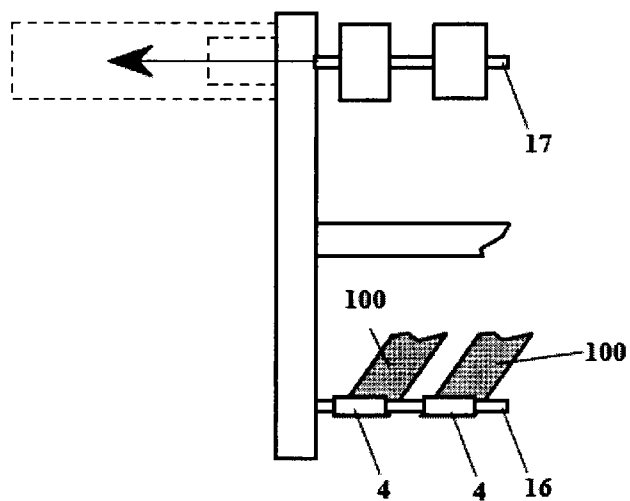
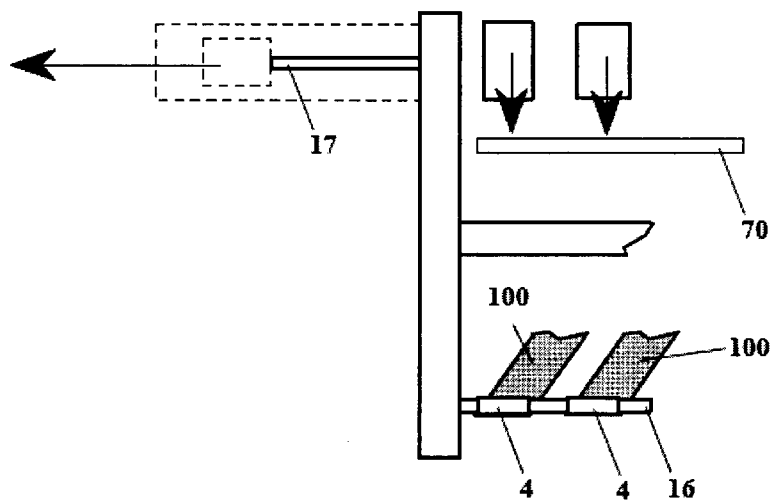


Fig. 14

Rolls Unloading phase



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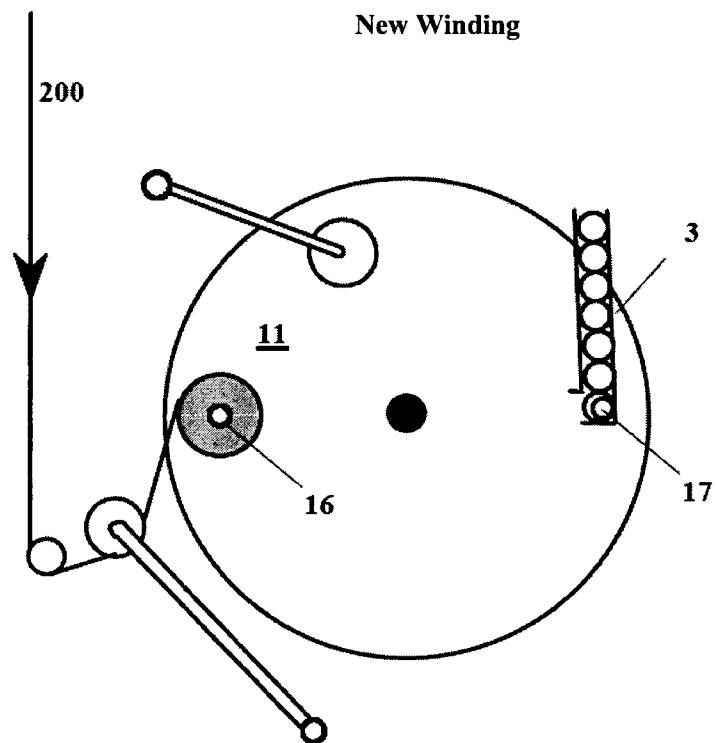
Fig. 15

Fig. 16

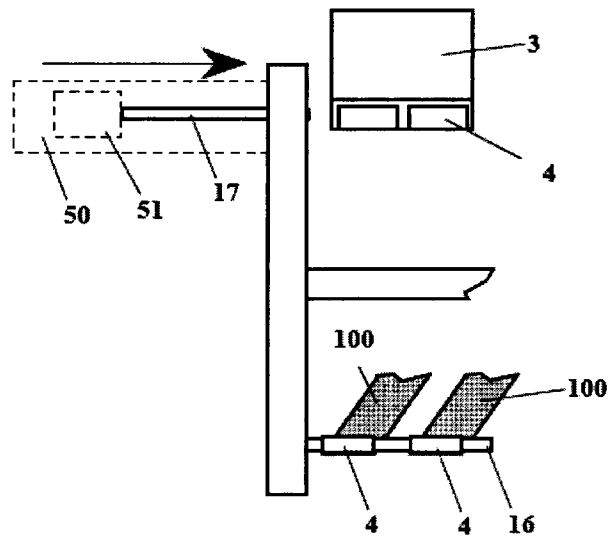


Fig. 17

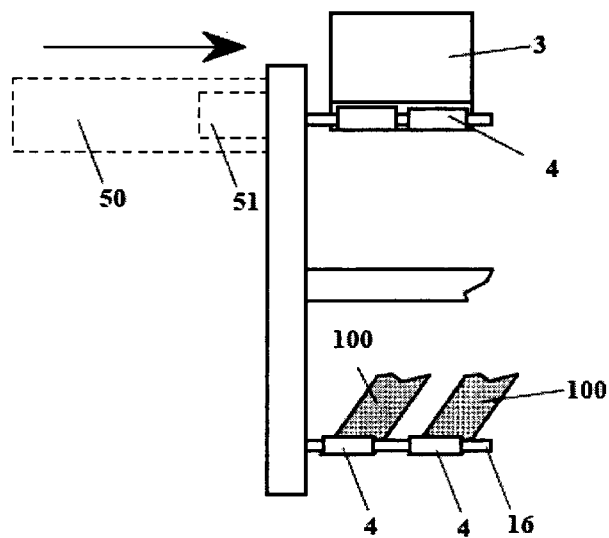
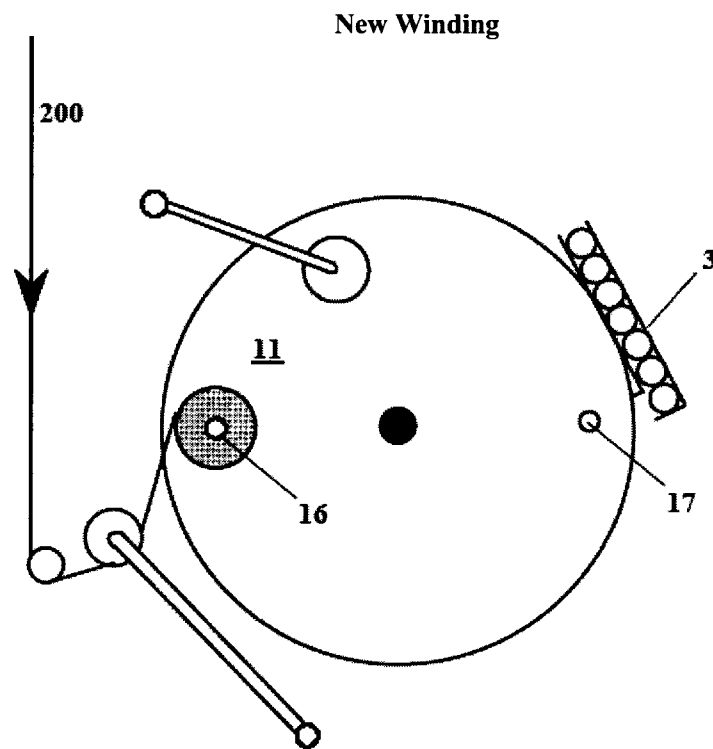


Fig. 18



INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2011/053843

A. CLASSIFICATION OF SUBJECT MATTER

INV. B65H19/22 B65H18/10 B65H19/26
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B65H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3 782 650 A (DONNELL E) 1 January 1974 (1974-01-01) the whole document	1,12
A	US 2010/206978 A1 (VAN DEN BRINK RICHARD RUDOLF THEODOOR [NL]) 19 August 2010 (2010-08-19) paragraph [0032] - paragraph [0035]	1,12
A	US 3 733 035 A (SCHOTT C) 15 May 1973 (1973-05-15) column 3, line 31 - column 8, line 20; figures 1,2,7,9,10,13	1,12
A	US 3 558 400 A (HORVATH STEVEN J ET AL) 26 January 1971 (1971-01-26) column 5, line 11 - column 6, line 48; figures 1,11	1,12
	-/--	



Further documents are listed in the continuation of Box C.



See patent family annex.

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Date of the actual completion of the international search

27 January 2012

Date of mailing of the international search report

06/02/2012

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INTERNATIONAL SEARCH REPORT

International application No

PCT/IB2011/053843

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	EP 0 837 020 A2 (FMC CORP [US] HUDSON SHARP MACHINE COMPANY [US]) 22 April 1998 (1998-04-22) the whole document -----	1,12

INTERNATIONAL SEARCH REPORT

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International application No

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