



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
01.10.2003 Bulletin 2003/40

(51) Int Cl.7: **B65B 25/14**

(21) Application number: **02022753.4**

(22) Date of filing: **11.10.2002**

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

(72) Inventor: **Gorrieri, Giordano**
40065 Pianoro (Bologna) (IT)

(74) Representative: **Marchitelli, Mauro**
c/o Buzzi, Notaro & Antonielli d'Oulx Srl
Via Maria Vittoria 18
10123 Torino (IT)

(30) Priority: **08.02.2002 IT TO20020112**

(71) Applicant: **Casmatic S.p.A.**
40033 Casalecchio di Reno, Bologna (IT)

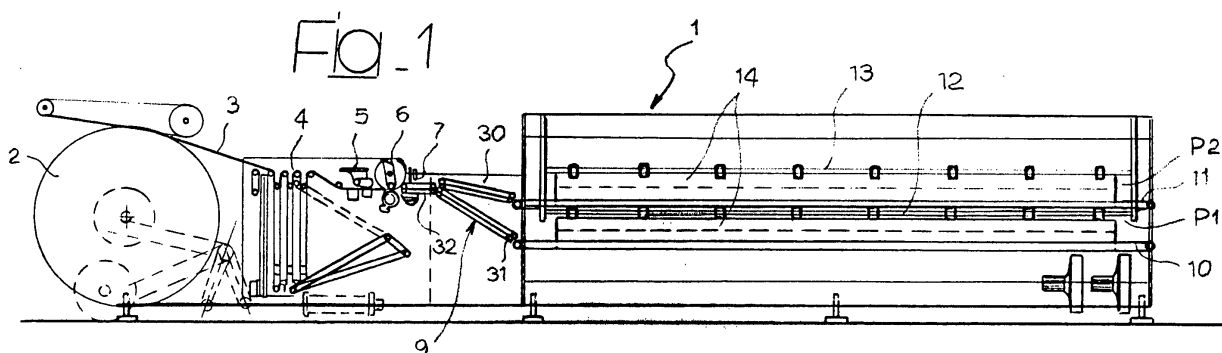
(54) **Apparatus for winding a band on a respective roll of paper material**

(57) A banding machine (1) comprises

processing circuits (P1, P2).

- two distinct processing circuits (P1, P2), where rolls of paper material (14) are wound in a respective band;
- means (2-7) for forming a plurality of lengths of paper, each of which is to form a band; and
- means (9-13) for transferring the lengths to the two

The presence of the two processing circuits (P1, P2), and possibly of distributor means (9) to obtain the lengths (3A) from a single supply reel (2), enables processing of a number of rolls (14) that is larger than what is rendered possible using apparatus according to the prior art.



Description

[0001] The present invention relates to an apparatus for winding a band on a respective roll of paper material, the rolls obtained by the apparatus being designed to be subsequently divided into a number of parts.

[0002] Rolls of toilet paper are normally produced using machines, known as re-reeling machines, which are fed with rolls of large dimensions, commonly designated by the term "logs". These usually have a width varying from 1,800 mm to 3,600 mm and have a diameter equal to that of the rolls of toilet paper that are to be obtained.

[0003] Set downstream of the re-reeling machine is a shearer, which sees to "slicing up" each log into various pieces, which normally have a length of between 95 mm and 115 mm, so as to obtain a number of final rolls of toilet paper that is equal to the width of the log divided by the length of the individual rolls. The final rolls thus obtained are subsequently packaged in groups, in sheets of plastic material or of paper.

[0004] In certain cases the final rolls are also wound individually in a band of printed paper bearing wordings or other indications. The said type of packaging is, for example, envisaged in the case of rolls produced for hotels, clinics and similar communities.

[0005] In the case where packaging with a band is required, combined with the re-reeling machine provided internally for obtaining rolls of toilet paper is a further machine, called banding machine, of the type referred to in the preamble of the attached Claim 1.

[0006] The banding machine sees to winding the entire log with a band of paper, which is normally printed, before the log itself reaches the shearer of the re-reeling machine, previously providing the log with a printed band. The subsequent shearing of the log itself thus enables n final rolls that have already been banded to be obtained for each operating cycle of the banding machine.

[0007] Re-reeling machines of more recent production are characterized by a high operating speed and enable processing of up to more than 40 logs per minute. On the other hand, however, currently available banding machines according to the present state of the art are able to process only approximately fifteen logs per minute.

[0008] The above limitation entails the need to reduce the maximum possible speed for operation of the re-reeling machine or, alternatively, to combine with the latter an external banding machine, designed to work in parallel with the one already integrated internally in the re-reeling machine itself. This approach implies, however, the provision of special plants for derivation or transfer of the logs between the re-reeling machine and the external banding machine, with a consequent considerable occupation of space.

[0009] The purpose of the present invention is to overcome the aforesaid drawback and, in particular, to provide a banding machine for the use described above that

will enable processing of a greater number of logs as compared to what is rendered possible by the current state of the art.

[0010] The above and other purposes still are achieved, according to the present invention, by an apparatus for winding a band on a respective roll of paper material that has the characteristics specified in the attached claims, which are understood as forming an integral part of the present description.

[0011] Further purposes, characteristics and advantages of the present invention will emerge clearly from the ensuing detailed description and from the annexed drawings, which are provided purely by way of explanatory and non-limiting example, and in which:

- Figure 1 is a schematic side view, in partial cross section, of a banding machine built according to the teachings of the present invention;
- Figure 2 is a schematic plan view, in partial cross section, of a banding machine built according to the teachings of the present invention;
- Figure 3 is a schematic cross-sectional view of the banding machine of Figure 1;
- Figure 4 is a side view of a possible embodiment of a distributor assembly for distributing paper for the banding machine of Figures 1 to 3;
- Figures 5 to 8 are schematic side views of the distributor assembly of Figure 4 in as many different operating conditions.

[0012] In Figure 1, the reference number 1 designates as a whole a banding machine according to the invention, that is, an apparatus envisaged for winding a band of paper on a respective log, namely, a roll of paper of large dimensions designed to be subsequently divided into a plurality of rolls of smaller length, which here are assumed to be rolls of toilet paper.

[0013] The banding machine 1 comprises a metal framework, at one end of which there is supported, according to modalities in themselves known, a reel 2 for feeding of a sheet of printed paper, designated by 3, to the banding machine itself.

[0014] The reference numbers 4 and 5 designate, respectively, a winding assembly and a set of calibrated rollers, of conception and operation in themselves known, operative for unwinding the sheet 3 from the reel 2.

[0015] The reference number 6 designates a blade, envisaged for cutting the sheet 3 into pieces of a given length, each designed to produce a band of paper for winding a respective log. One of said lengths is designated by 3A in Figure 2.

[0016] The reference number 7 designates a spraying assembly, which comprises two spray guns envisaged for dispensing respective strips of glue along the two longitudinal edges of the sheet 3, or rather of a length 3A. Said strips of glue are designated by 8 in Figure 2.

[0017] The reference number 9 designates, as a

whole, a distributor assembly, which will be described in greater detail hereinafter. For the time being, it is sufficient to point out that the assembly 9 is operative for directing alternately a length 3A being formed towards a respective closed-loop conveyor belt, set inside the banding machine 1. For this purpose, according to the main feature of the present invention, the banding machine 1 envisages a bottom conveyor belt and a top conveyor belt, designated by 10 and 11, respectively.

[0018] The reference numbers 12 and 13 designate closed-loop belts on rollers, each set above a respective conveyor belt 10, 11, the functions of which will be clarified hereinafter. The belts 12 and 13 are such that they can move in a direction substantially perpendicular to the direction of movement of the conveyor belts 10 and 11.

[0019] Note that, in Figure 2, the banding machine 1 is represented partially in cross section in order to enable visualization of the top belt 11, on which a length of sheet 3A is set. In said Figure, moreover, some of the components previously cited are not represented for reasons of greater clarity.

[0020] In Figure 2, the letter D designates, as a whole, a deflecting arrangement, represented schematically, the function of which is to direct alternately incoming logs entering the banding machine 1 towards the conveyor belt 10 or the conveyor belt 11, one of said logs being designated by 14.

[0021] In Figure 3, the deflecting arrangement D is illustrated in greater detail. Note that, in said figure, the conveyor belts 10 and 11 are represented only schematically, for reasons of greater clarity.

[0022] In Figure 3, the reference number 15 designates a catenary, actuated with known means on respective end pinions 15A and 15B. The catenary 15 has a set of paddles or diaphragms, designated by 15C, designed for picking up individually the logs 14 for feeding the banding machine 1. Said logs 14 are directed to the catenary 15 with means in themselves known, the implementation of which is irrespective of the purposes of the present invention.

[0023] The reference number 16 designates a mobile partition wall (represented schematically), actuated by means of a respective cylinder, designated by 17. The cylinder 17 may be actuated for angular displacement of the partition wall 16 between a raised position and a lowered position. When the partition wall 16 is in the raised position (represented by a dashed line in Figure 3) the log 14 unloaded from the top of the catenary 15 is caused to drop onto a first chute or channel, designated by 18. When the partition wall 16 is, instead, in the respective lowered position, illustrated by a solid line in Figure 3, the log 14 is unloaded from the catenary 15 onto a second chute or channel, designated by 19. Said channels 18 and 19 are designed for directing the log 14 towards the bottom conveyor belt 10 and towards the top conveyor belt 11, respectively.

[0024] At the end of each channel 18, 19 there is pro-

vided a respective lever-type loading mechanism 20, 21, actuated by means of an actuator 20A, 21A. The mechanisms 20, 21, which can be built in any known way, are operative for drawing individually a log 14 from the respective channel 18 or 19 to the bottom conveyor belt 10 or to the top conveyor belt 11.

[0025] As may be noted in Figure 3, between each belt 10, 11 and the respective belt 12, 13, there is defined a rolling path, P1 and P2, in which the logs 14 are directed by means of the mechanisms 20 and 21. For this purpose, the belts 12 and 13 are operative for favouring the rolling of the logs 14 on the conveyor belts 10 and 11, respectively, in a transverse direction with respect to the latter.

[0026] At the end of each of the paths P1 and P2, the banding machine 1 envisages a respective unloading arrangement, which can be built using any known technique, for example by means of an actuator 22A, 23A and an actuating mechanism of a diaphragm that can move angularly 22B, 23B.

[0027] Irrespective of its practical implementation, each arrangement 22A-22B, 23A-23B is operative for directing the logs 14 at exit from the two aforesaid rolling paths up to entry to the storage unit of a respective reeling machine (not represented in the figures) or onto one and the same conveyor belt 24 ? the implementation of which is in itself known ?, which sees to transferring the rejected logs.

[0028] Figure 4 illustrates, in greater detail, the deflector assembly envisaged in the preferred embodiment of the invention, previously designated as a whole by 9 in Figures 1 and 2.

[0029] The assembly 9 comprises a first, a second and a third belt conveyor of the air-suction type, designated respectively by 30, 31 and 32.

[0030] Each belt conveyor 30, 31, 32 comprises respective closed-loop perforated belts 30A, 31A, 32A, which can move on pulleys 30B, 31B, 32B for sliding at least in part on the top opening of a hollow plane support, designated by 30C, 31C, 32C. Each surface 30C, 31C, 32C is connected, by means of respective pipe unions 30D, 31D, 32D to an air-suction circuit (not represented in the figure).

[0031] The general embodiment of air-suction conveyors is in itself known and does not call for a detailed description herein. Here, it will suffice to point out that, following upon activation of the above-mentioned air-suction circuit, in the holes of the portion of belt that passes over the top opening of the respective guard, there is created a suction of air, which is plane so as to maintain the sheet of paper present on the perforated belt in a fixed position.

[0032] The two conveyors 30 and 31 are in fixed positions, with their final end or output end in a position corresponding to the initial end or input end of a respective conveyor belt 10, 11. From Figure 4 it may be noted how, in a position corresponding to the initial end of the conveyors 30 and 31, there will be provided respective

top rollers, designated by 30E and 31E, aimed at facilitating licking therein of a length 3A of paper.

[0033] The conveyor 32 has, instead, at its two longitudinal ends, a similar lick-in roller 32E and an outlet roller 32F.

[0034] The two suction conveyors 30 and 31 are set one above the other and in an inclined position, the belt conveyor 31 being longer than the belt conveyor 30. Unlike the air-suction conveyors 30 and 31, the belt conveyor 32 is able to perform angular movement so as to be able to assume a first operating position and a second operating position.

[0035] In the first position, shown as a solid line in Figure 4 (as well as in Figures 5 and 8), the final end of the belt conveyor 32, bearing the outlet roller 32F, is substantially aligned with the initial end of the belt conveyor 30, bearing the lick-in roller 30E. In its second position, shown by a dashed line in Figure 4 (as well as in Figures 6 and 7), the final end of the belt conveyor 32 is, instead, substantially aligned with the initial end of the belt conveyor 31, which carries the lick-in roller 31E.

[0036] For this purpose, the belt conveyor 32 is hinged to the structure of the banding machine 1, via means in themselves known, so as to be able to move angularly about a horizontal axis (substantially coincident with that of the left-hand pulley 32B of the belt conveyor 32), following upon actuation of a cylinder, designated by 33 in Figure 4. Finally, in said figure the reference number 34 designates a cogged belt, provided for imparting rotation on the left-hand pulleys 30B, 31B and 32B of the three air-suction conveyors 30, 31 and 32, said belt being actuated by means of a servo motor 35 and a return-idler pulley 36.

[0037] Operation of the banding machine 1 according to the present invention is described in what follows.

[0038] The logs 14 for feeding the banding machine 1 are drawn onto the paddles 15A of the catenary 15 of Figure 3, to be carried upwards. When a paddle 15A reaches the top of the catenary 15, the respective log 14 falls by gravity on the opposite side of the lifting paddle.

[0039] At this point, the logs 14 are sorted alternately, by means of the mobile partition 16, onto the chute 18 and onto the chute 19. The respective mechanisms 20 and 21 then see to drawing the individual logs 14 from the chute 18 to the path P1 and from the chute 19 to the path P2.

[0040] In the presence of logs entering the banding machine 1, the reel 2 is unwound continuously, by means of the winding assembly 4 and the calibrated rollers 5. As the sheet 3 is advancing, the blade 6 sees to carrying out cutting thereof when the winding of the reel 2 has reached the set value of length of the banding pieces 3A.

[0041] Whilst the sheet is being unwound in the aforesaid way, the spray guns of the spray assembly 7 see to spraying on the glue, so that along the edges of the

length 3A being formed there will be arranged the two strips designated by 8 in Figure 2.

[0042] The leading end of the length 3A being formed then reaches the distributor assembly 9. It is assumed, for this purpose, that the belt conveyor 32 will be in its raised position, as shown in Figure 5.

[0043] The leading end of the length 3A is licked in, by means of the lick-in roller 32F, onto the belt conveyor 32. The perforated belt 32A of the latter (see also Figure 4) then sees to applying suction on the length 3A, to draw it towards the outlet roller 32F.

[0044] The leading end of the length 3A can in this way reach the belt conveyor 30, on which it is taken in by means of the respective lick-in roller 30E, then to be suctioned onto the perforated belt 30A of the belt conveyor 30 itself. The leading end of the length 3A proceeds in this way up to the conveyor belt 11. Said condition is illustrated, as has been said, in Figure 5. The length 3A is then caused to advance from the conveyor belt 11 up to the position shown in Figure 2.

[0045] Whilst the conveyor 30 and the conveyor belt 11 are fed from the length 3A, the conveyor 32 is lowered (by means of the cylinder 33 of Figure 4), so that its final end, which carries the outlet roller 32F, will align itself with the initial end of the conveyor 31, which carries the respective lick-in roller 31E. The continuity of the length 3A causes the latter to continue in any case to advance on the conveyor 30, forming a substantially S-shaped bend, between the rollers 32F and 30E, as illustrated in Figure 6.

[0046] When cutting for separation of the length 3A (performed upstream by the blade 6) reaches a position corresponding to the roller 32F of the conveyor 32, the trailing end of the length 3A itself is in any case made to proceed along the conveyor 30, and hence along the conveyor belt 11. The leading end of the new length being formed, designated by 3A' in Figure 7, reaches, instead, the conveyor 32, in a way similar to what has been described previously, then proceeding to be taken onto belt conveyor 31, given the presence of the lick-in roller 31E of the latter.

[0047] As in the previous case, the leading end of the length 3A' is then suctioned onto the perforated belt 31A of the conveyor 31, and then reaches the conveyor belt 10. This condition is illustrated, as has been said, in Figure 7.

[0048] Whilst the length 3A' is fed onto the conveyor 31 and onto the conveyor belt 10, the conveyor 32 is once again moved angularly, upwards, once more by means of the cylinder 33 of Figure 4.

[0049] The final end of the conveyor 32 is thus caused to align itself once again with the initial end of the conveyor 30. Also in this case, the continuity of the length 3A' causes the latter to continue, in any case, to advance along the conveyor 31, forming a bend that is substantially specular with respect to the one previously mentioned, between the rollers 32F and 31E, as illustrated in Figure 8.

[0050] When cutting for separation of the length 3A' reaches a position corresponding to the lick-in roller 32F of the conveyor 32, the trailing end of the length 3A' will be made to proceed along the conveyor 31, and then along the conveyor belt 10. The leading end of the new length being formed will proceed instead on the conveyor 32, and will then be taken onto the conveyor 30, as described previously.

[0051] The aforesaid alternation of feeding of lengths 3A and 3A' to the conveyor belts 10 and 11 proceeds until the banding machine 1 is supplied with logs 14. Given that the displacement of the conveyor 32 takes place during the cycle of winding of a piece 3A, 3A' having a length, on average, of between 1,800 mm and 3,600 mm, its angular movement can be obtained in a relatively slow way. This advantageously enables winding-off of the sheet 3 from the reel 2 with a continuous motion to be obtained.

[0052] By means of the aforesaid action of the distributor assembly 9, the lengths 3A, 3A' of banding for the logs 14 are directed alternately to the conveyor belts 10 and 11, and then to the paths P1 and P2 of Figure 4.

[0053] When a log 14 is taken onto the path P1, the roller belt 12 causes rolling of the log itself on the conveyor belt 10, in a transverse direction with respect to the latter. On the conveyor belt 10 there is at this moment already present a length 3A' of printed paper, along the edges of which are present the strips of glue 8 of Figure 2. Consequently, following upon action of the belt 12, the log 14 is caused to roll on the length 3A, the latter unwinding and gluing to the former.

[0054] The same occurs, of course, when a log 14 is taken onto the respective path P2, the roller belt 13 causing rolling of the log itself on the conveyor belt 11, on which there is already present a length 3A provided with strips of glue 8.

[0055] At exit from of the paths P1 and P2, the logs 14, which are by now provided with the corresponding lengths of banding, are then directed, by means of the arrangements 22A-22B and 23A-23B, to the re-reeling machine.

[0056] In the course of the unloading operation performed by the arrangements 22A-22B and 23A-23B, the conveyor belts 10 and 11 will see to conveying new lengths 3A, 3A', which will then be wound on the incoming log entering the paths P1 and P2, coming from the channels 18, 19 and from the mechanisms 20, 21.

[0057] Of course, actuation of the various actuators previously described will be controlled in appropriate ways and at appropriate intervals by a suitable control system (not represented), which may readily be appreciated by a person skilled in the branch.

[0058] From the foregoing description there emerge clearly the characteristics and advantages of the present invention. Amongst these there is to be emphasized how the provision, in the framework of the banding machine 1, of the two distinct processing paths P1 and P2 will enable processing, in a given unit of time, of a

number of logs that is decidedly larger than what was rendered possible by apparatus according to the prior art, thus enabling exploitation to the maximum of the production potential of current re-reeling machines. The operating speed of the banding machine according to the invention is further increased by virtue of the provision of the distributor assembly 9, which enables feeding of the lengths of banding paper necessary for the two aforesaid paths P1 and P2 by means of a single reel 2, which can moreover be maintained in continuous motion. The provision of the deflecting arrangement D moreover enables feeding of both of the processing paths P1 and P2 from one and the same pick-up point of the logs 14, with evident advantages in logistic terms.

[0059] It is clear that, for the person skilled in of the branch, numerous variations are possible to the apparatus and to the method described herein purely by way of example, without thereby departing from the sphere of novelty inherent in the innovative idea, just as is it clear that, in the practical implementation of the invention, the shapes, dimensions, materials and components used may differ from the ones previously designated by way of example, and may be replaced by elements that are technically equivalent.

[0060] The invention has hitherto been described with reference to logs envisaged for the production of rolls of toilet paper, but it is clear that the invention is also applicable for the banding of logs necessary for obtaining other types of rolls of paper, such as for example rolls of kitchen wipes and the like.

Claims

1. An apparatus for winding a band on a respective roll of paper material (14), the rolls (14) processed by the apparatus being designed to be subsequently divided into a number of parts, the apparatus (1) comprising:
 - feed means (2, 4, 5, 6), operative for forming a plurality of first lengths (3A, 3A') of paper or the like, each length (3A, 3A') being such as to form a respective band;
 - first conveying means (10), operative for transferring and positioning in succession the first lengths (3A, 3A') in a position corresponding to a first path of transit (P1) of first rolls (14); and
 - first delivery means (18), for feeding the first path (P1) with the first rolls (14);

where, in a position corresponding to the first path (P1), a roll (14) is caused to roll on the surface of a respective first length (3A, 3A') that carries a glue (8), so that the length itself will wrap round and will stick onto the roll, the direction of rolling of the roll (14) being substantially perpendicular to the direction of transfer of the length (3A, 3A') to the first

path of transit (P1);

characterized in that the apparatus (1) further comprises:

- a second path of transit (P2) of second rolls (14), similar to the first path (P1);
- second conveying means (11), for the transfer and positioning in succession of second lengths (3A, 3A') in a position corresponding to the second path of transit (P2); and
- second delivery means (19), for feeding the second path (P1) with the second rolls (14).

2. The apparatus according to Claim 1, **characterized in that** said feed means (2, 4, 5, 6) are operative for forming both the first and the second lengths (3A, 3A') starting from one and the same starting sheet (3), said feed means comprising in particular:
 - a reel (2) on which is wound the starting sheet (3);
 - means (4, 5) for continuously unwinding the starting sheet (3) from the reel (2);
 - cutting means (6), for dividing the starting sheet (3), continuously unwound from the reel (2), into said first and second lengths (3A, 3A').
3. The apparatus according to Claim 2, **characterized in that** it comprises first distributor means (9), operative for directing alternately the first and the second lengths (3A, 3A') to the first and to the second paths of transit (P1, P2).
4. The apparatus according to Claim 1, **characterized in that** it comprises loading means (15), operative for picking up the first and the second rolls (14) from one and the same feed point, and second distributor means (D), operative for directing alternately the first and the second rolls (14), picked up from said loading means (15), to the first and to the second delivery means (18, 19).
5. The apparatus according to Claim 2, **characterized in that** it comprises dispensing means (7), operative for laying the glue both on the first and on the second lengths (3A, 3A').
6. The apparatus according to Claim 1, **characterized in that** the first and the second conveying means comprise a respective closed-loop conveyor belt (10, 11).
7. The apparatus according to Claim 6, **characterized in that** above the conveyor belt (10, 11) there are operatively set means of movement (12, 13), which can move so as to bring about rolling of the rolls (14), there being formed a respective path of transit

(P1, P2) between the conveyor belt (10, 11) and the means of movement (12, 13).

8. The apparatus according to Claim 7, **characterized in that** the means of movement (12, 13) can move in a direction substantially perpendicular to the direction of movement of the respective conveyor belt (10, 11).
9. The apparatus according to Claim 3, **characterized in that** the first deflector means (9) comprise at least one conveying device (32) for the first and the second lengths (3A, 3A'), which can be moved angularly between a first operating position and a second operating position.
10. The apparatus according to Claim 6 and Claim 9, **characterized in that** the first deflector means (9) further comprise a second and a third conveying device (30, 31), each of which in a fixed position and having the final end in a position corresponding to the initial end of a respective conveyor belt (11, 10), where:
 - in the said first operating position, the final end of the first conveying device (32) is substantially aligned with the initial end of the second conveying device (30); and
 - in the said second operating position, the final end of the first conveying device (32) is substantially aligned with the initial end of the third conveying device (31).
11. The apparatus according to Claim 10, **characterized in that** the conveying devices (30, 31, 32) each comprise a respective closed-loop belt having a plurality of holes (30A, 31A, 32A) and means (30C, 31C, 32C, 30D, 31D, 32D) for causing a suction of air through said holes.
12. The apparatus according to Claim 1, **characterized in that** the first delivery means comprise a first chute (18) and the second delivery means comprise a second chute (19).
13. The apparatus according to Claim 12, **characterized in that** the second distributor means (D) comprise a deflector (16) that can move angularly between two positions, in a first position the rolls (14) being drawn towards the first chute (18) and in the second position the rolls (14) being drawn towards the second chute (19).
14. The apparatus according to Claim 13, **characterized in that** associated to each chute (18, 19) is a respective pick-up device (20, 21), each pick-up device (20, 21) being operative for drawing individually a roll (14) from the respective chute (18, 19) to the

respective path of transit (P1, P2).

15. The apparatus according to Claim 4 and Claim 13,
characterized in that the loading means comprise
a catenary hoist (15) from which the rolls (14) are 5
unloaded, one by one, onto the deflector (16).
16. The apparatus according to Claim 1, **characterized**
in that, at the end of each path of transit (P1, P2),
there is provided a respective unloading arrange- 10
ment (22A-22B, 23A-23B), the two unloading ar-
rangements (22A-22B, 23A-23B) being operative
for directing the first and the second rolls (14) onto
one and the same device (24) for moving-away of 15
the rolls (14), provided with the respective band,
from the apparatus (1).

20

25

30

35

40

45

50

55

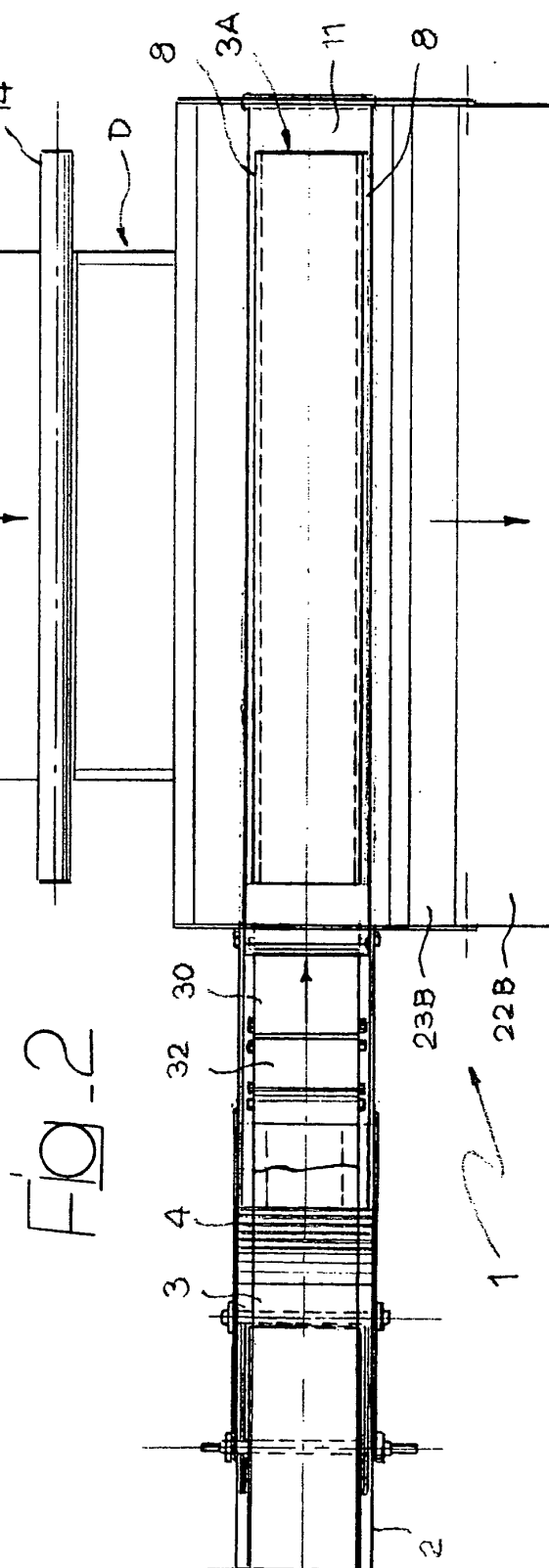
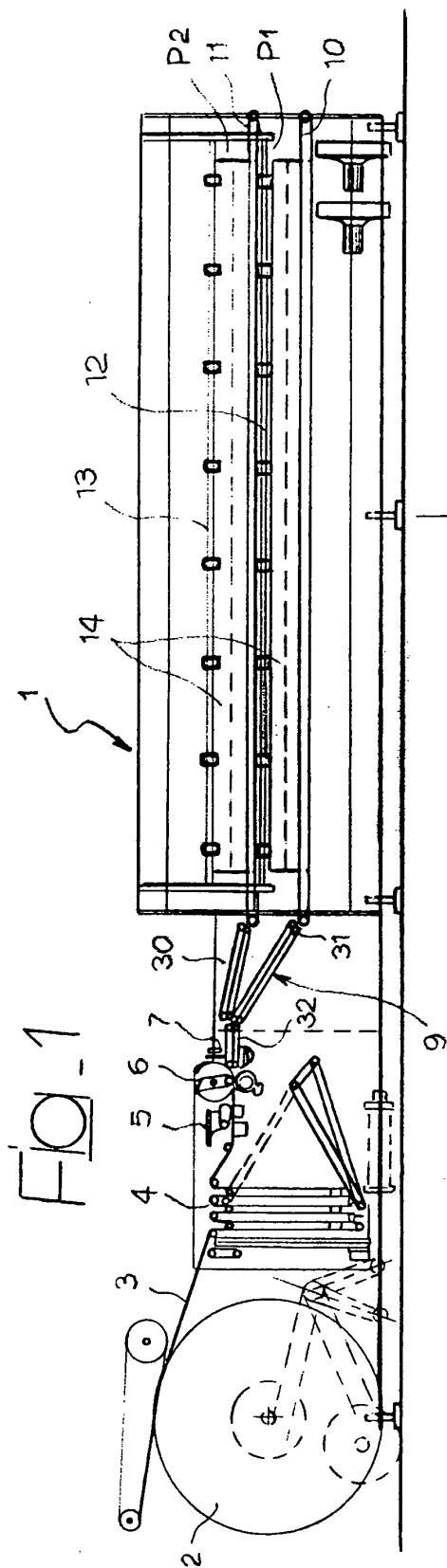
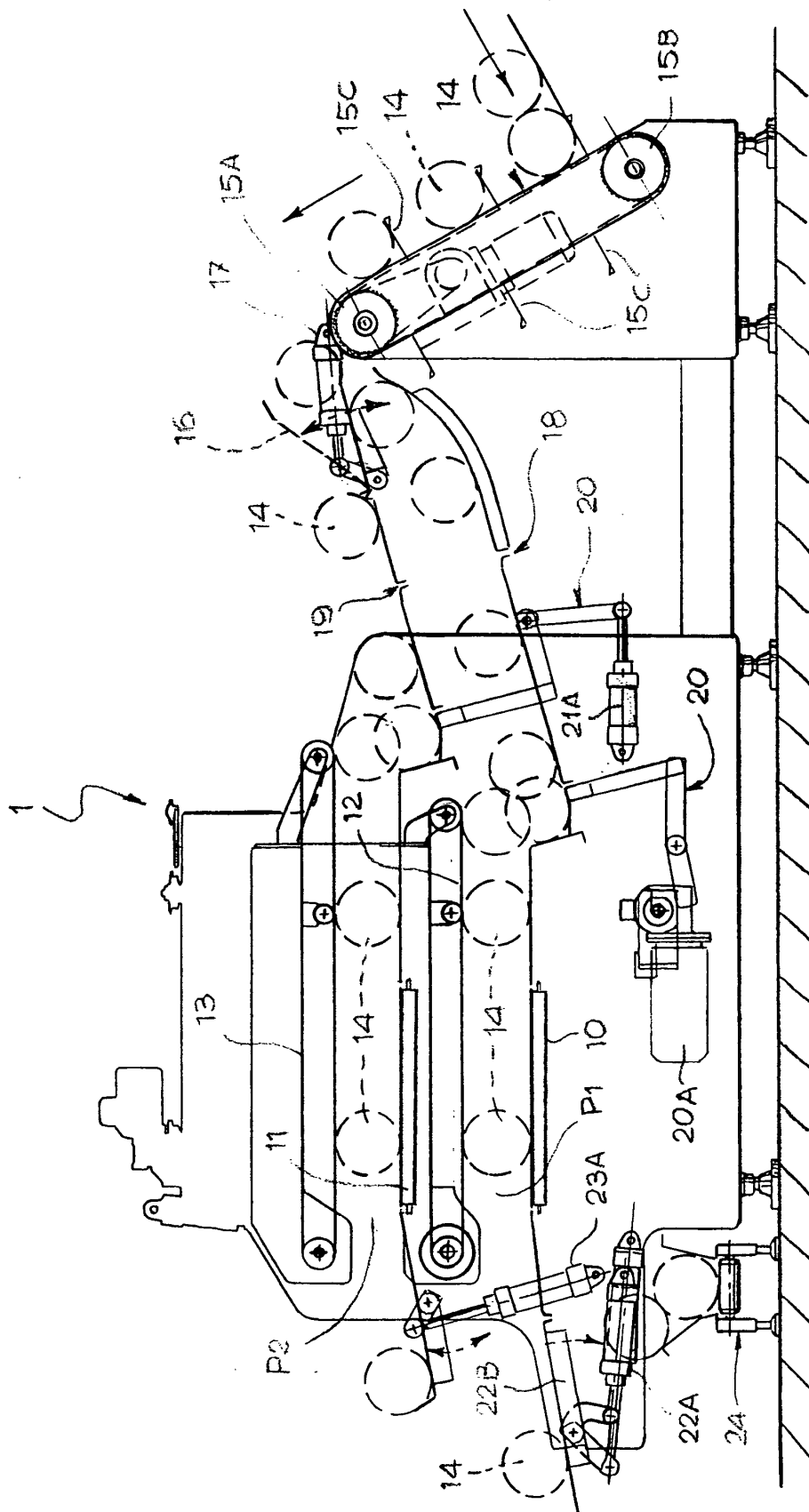


Fig. 3



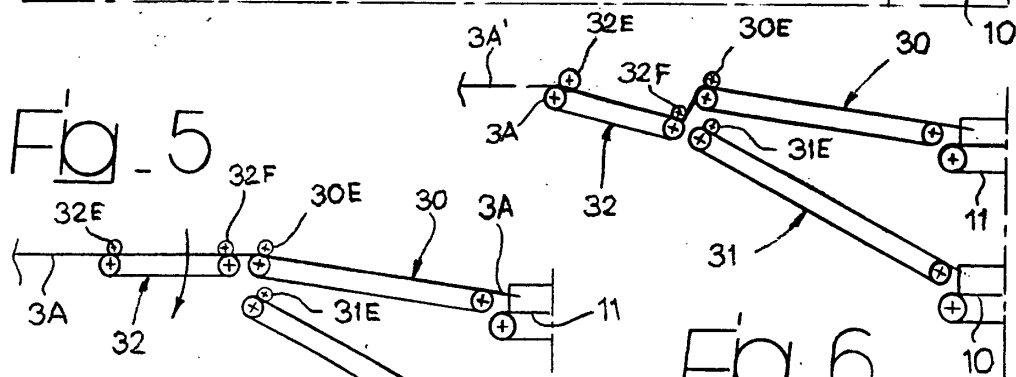
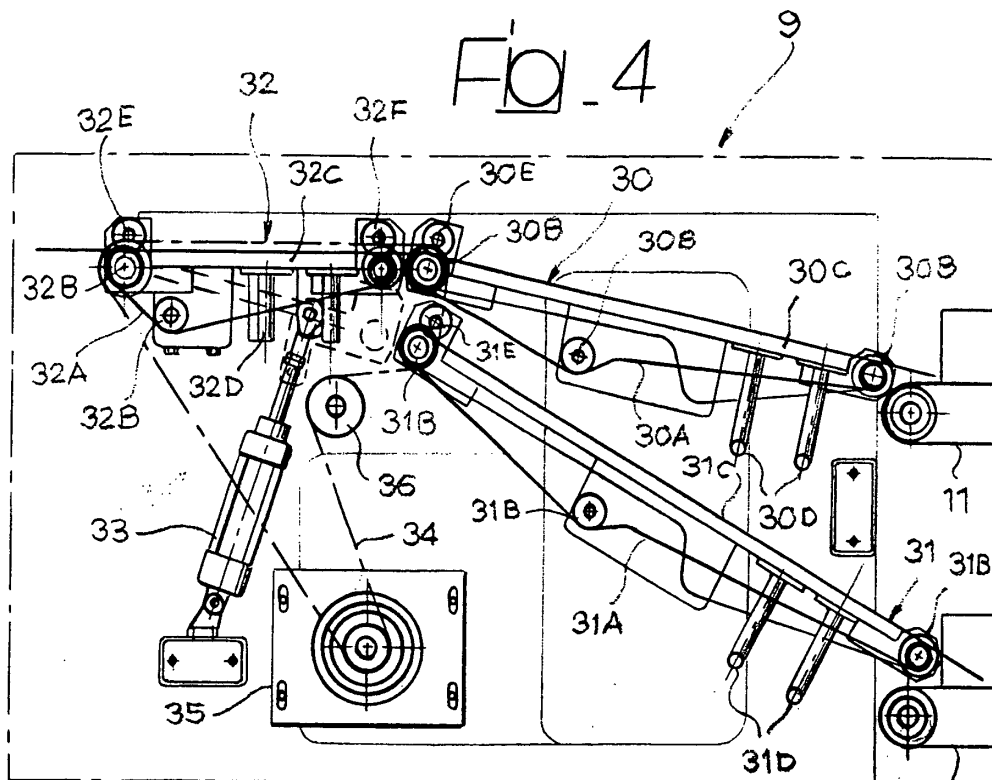
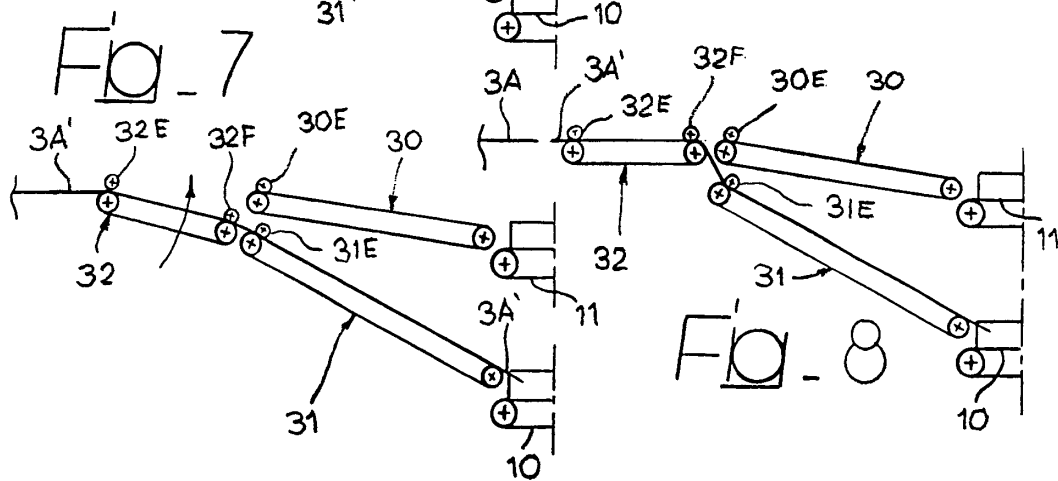


Fig. 6





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 02 02 2753

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	US 3 296 772 A (SIDNEY BARKER JOHN) 10 January 1967 (1967-01-10) * column 2, line 69 - column 3, line 21; figures *	1	B65B25/14		
A	US 5 927 047 A (BARTELS WILLY) 27 July 1999 (1999-07-27) * the whole document *	1			
A	EP 0 481 567 A (OF FRI S R L OFFICINE FRIGERIO) 22 April 1992 (1992-04-22) * the whole document *	1			
A	US 2 746 224 A (WOLLETT ERNEST S) 22 May 1956 (1956-05-22) * column 5, line 63 - column 6, line 40; figures *	1			
A	US 2 893 189 A (WESLEY LANCASTER ARTHUR) 7 July 1959 (1959-07-07) * the whole document *	1			
A	US 2 893 319 A (ZIEBELL THEODORE R) 7 July 1959 (1959-07-07) * the whole document *	1	<table border="1"> <thead> <tr> <th>TECHNICAL FIELDS SEARCHED (Int.Cl.7)</th> </tr> </thead> <tbody> <tr> <td>B65H B65B</td> </tr> </tbody> </table>	TECHNICAL FIELDS SEARCHED (Int.Cl.7)	B65H B65B
TECHNICAL FIELDS SEARCHED (Int.Cl.7)					
B65H B65B					
The present search report has been drawn up for all claims					
Place of search THE HAGUE		Date of completion of the search 17 July 2003	Examiner Haaken, W		
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 B2 (P04C01)

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

EP 02 02 2753

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.

17-07-2003

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 3296772	A	10-01-1967	GB 978671 A	23-12-1964
US 5927047	A	27-07-1999	SE 506084 C2	10-11-1997
			DE 69607326 D1	27-04-2000
			DE 69607326 T2	27-07-2000
			DK 810947 T3	10-07-2000
			EP 0810947 A1	10-12-1997
			ES 2143753 T3	16-05-2000
			JP 11500691 T	19-01-1999
			SE 9500643 A	22-08-1996
			WO 9626112 A1	29-08-1996
EP 0481567	A	22-04-1992	IT 1246210 B	16-11-1994
			AT 112222 T	15-10-1994
			DE 69104320 D1	03-11-1994
			DE 69104320 T2	18-05-1995
			EP 0481567 A1	22-04-1992
			ES 2062672 T3	16-12-1994
US 2746224	A	22-05-1956	NONE	
US 2893189	A	07-07-1959	NONE	
US 2893319	A	07-07-1959	NONE	

EPO FORM P0459

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