



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
20.06.2007 Bulletin 2007/25

(51) Int Cl.:
B65B 61/14 (2006.01) B65B 25/14 (2006.01)

(21) Application number: **05425895.9**

(22) Date of filing: **19.12.2005**

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

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(54) **Machine for applying partially adhesive bands to respective products**

(57) In a machine for applying partially adhesive bands (2) to respective products (3), each band (2) presents a first face (2a) provided with at least one glue zone (38) and a second face (2b) essentially free from glue zones (38), and is advanced in a folding station (15), at which the band (2) is essentially U-folded about a re-

spective product (3), by a first and a second belt conveyors (51, 52) presenting respective conveying branches (53b, 58a) able to engage the first and, respectively, the second face (2a, 2b) of the band (2) itself; the conveying branch (53b) of the first belt conveyor (51) being a toothed conveying branch.

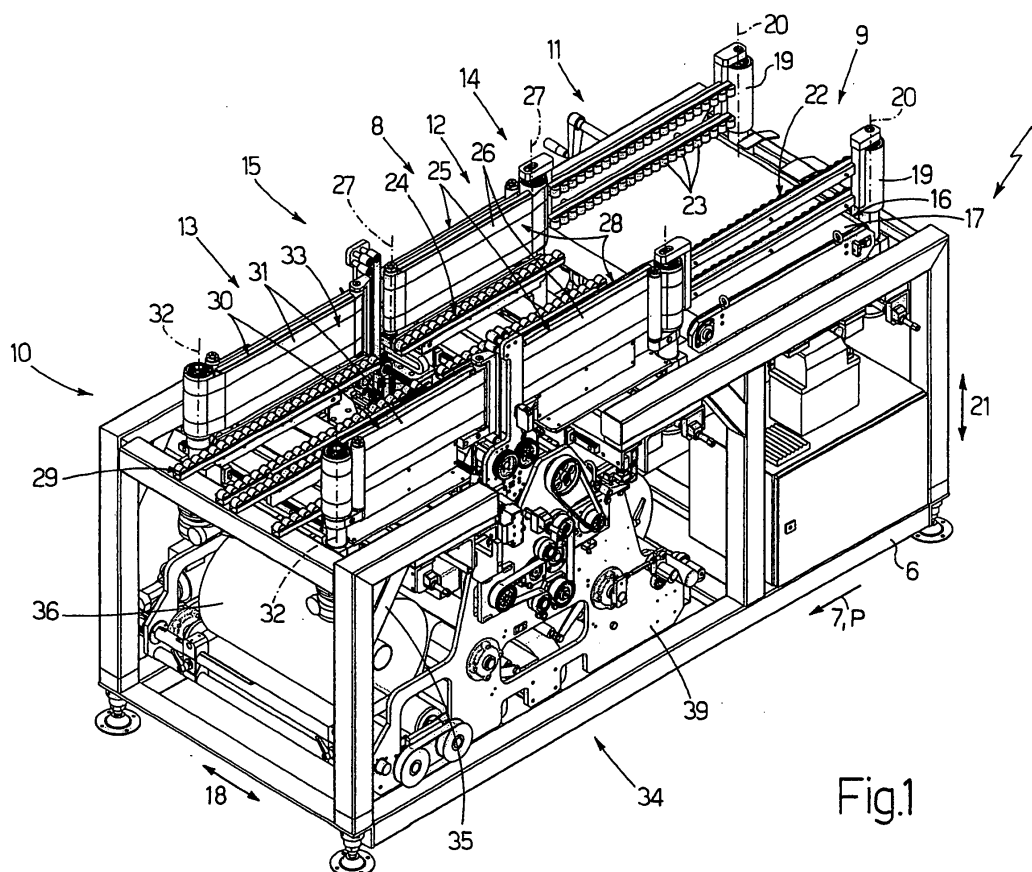


Fig.1

Description

[0001] The present invention relates to a machine for applying partially adhesive bands to respective products.

[0002] In particular, the present invention relates to a machine for applying partially adhesive bands to respective products, each of which consists of an article and a wrapping sheet wrapped about the article itself. The articles taken into consideration in the following discussion are rolls of paper, taken singularly or in groups consisting of a plurality of rolls of paper placed side by side and aligned, to which explicit reference will be made in the present description without for this reason losing in generality.

[0003] In the paper roll industry, is known the packing of paper rolls in respective packages, each of which is obtained by wrapping a plastic material wrapping sheet or the like about one or more rolls of paper. Each package, once ended, is fed to a machine, commonly called "handle applying machine", for applying onto the package a band, i.e. a handle adapted to provide the consumer with a handy grip on the package itself, limited by a first face provided with at least one glue zone and a second face essentially free from glue zones.

[0004] Generally, the machine includes a conveyor device adapted to advance the packages in sequence along a predetermined path and through a folding station, at which each band is essentially U-folded about a respective package.

[0005] Normally, the band is advanced into the folding station by at least one pair of belt conveyors presenting respective, reciprocally facing conveying branches and adapted to engage the first and the second faces of the band itself, respectively.

[0006] Since each belt conveyor comprises at least one smooth belt looped about a respective plurality of pulleys, the known machines of the type described above present some drawbacks mainly deriving from the fact that the glue zone of the first face engages with the respective smooth belt thus damaging the glue zone and hindering the release of the band into the folding station.

[0007] It is the object of the present invention to provide a machine for applying partially adhesive bands to respective products which is free from the drawbacks illustrated above.

[0008] According to the present invention there is provided a machine for applying partially adhesive bands to respective products as claimed in the attached claims.

[0009] The present invention will now be described with reference to the accompanying drawings illustrating a non-limitative embodiment example thereof, in which:

figure 1 is a schematic perspective view, with parts removed for clarity, of a preferred embodiment of the machine of the present invention;

figure 2 is a first schematic side view, with parts removed for clarity, of a detail of the machine in figure 1;

figure 3 is a second schematic side view, with parts

removed for clarity, of the detail in figure 2;

figure 4 is a schematic side view of a detail in figures 2 and 3; and

figure 5 is a side view of a detail in figure 4.

[0010] With reference to figures 1 and 2, it is indicated as a whole by 1 a machine, commonly called a "handle applying machine", for applying partially adhesive bands 2 to respective products 3.

[0011] Each product 3 is defined, in the case in point, by six rolls 4 of paper overlapped and arranged side by side and by a plastic material wrapping sheet 5 wrapped about the rolls 4 themselves. Obviously, according to alternative embodiments not shown, the number of rolls 4 in each product 3 is different from six, and each product 3 is defined by articles different from the rolls 4.

[0012] The machine 1 comprises an elongated base 6 extending in a given direction 7 and a conveying unit 8 for advancing the products 3 in sequence in direction 7 and along an essentially straight path P extending between an input station 9 of the products 3 in the machine 1 and an output station 10 of the products 3 from the machine 1 itself.

[0013] The unit 8 comprises three conveying devices 11, 12, 13 arranged reciprocally in series in direction 7, in which device 12 is connected to device 11 at a first transfer station 14 and to device 13 at a second transfer station 15.

[0014] The device 11 comprises a belt conveyor 16 for receiving the products 3 in sequence from the station 9 and comprising, in turn, a smooth belt 17, which presents a horizontal conveyor branch, and is looped about two pulleys (not shown), one of which is continuously driven, rotationally mounted on the base 6 to turn about respective longitudinal axes (not shown) parallel to each other and to a horizontal direction 18 transversal to direction 7.

[0015] The belt 17 cooperates with two input rollers 19, which are mounted on opposite bands of the path P in direction 18, are arranged upstream of the conveyor 16 in direction 7, and are rotationally mounted on the base 6 to turn, with respect to the base 6 itself, about respective longitudinal axes 20 parallel to a vertical direction 21 orthogonal to directions 7 and 18.

[0016] The products 3 are advanced by the conveyor 16 along an advancement channel 22, which extends parallelly to direction 7, and is laterally limited by idle rollers 23, which are arranged on opposite bands of the path P in direction 18, and are mounted to turn about respective rotation axes (not shown) parallel to the axes 20.

[0017] At station 14, the products 3 are transferred from the conveyor 16 over a conveying plane of a lower idle roller conveyor 24, which cooperates with two lateral loop conveyors 25 to advance the products 3 themselves between stations 14 and 15.

[0018] The two conveyors 25 define device 12 along with conveyor 24, extend in direction 7, are arranged on opposite bands of the path P in direction 18, and each

comprise a respective smooth belt 26, which is looped about a plurality of pulleys (not shown), one of which is continuously driven, rotationally mounted on the base 6 to turn about respective axes 27 parallel to each other and to direction 21.

[0019] The belts 26 present respective vertical conveying branches 28, reciprocally facing, and are reciprocally arranged at a distance substantially equal to the width of a product 3 measured parallelly to the direction 18 so as to define an advancement channel of the products 3 in direction 7.

[0020] With reference to this, it should be pointed out that the input rollers 19 are driven so as to impart to the products 3 an advancement speed substantially equal to the advancement speed imparted to the products 3 by the conveyor 16 and lower than the advancement speed imparted to the products 3 themselves by the conveyors 25. Consequently, the products 3 are initially advanced by the rollers 19 and the conveyor 16 according to a "random" distribution and are then advanced by the conveyors 25 according to a sequence in which the products 3 are reciprocally spaced to each other.

[0021] At station 15, the products 3 are transferred from the conveyors 25 onto a conveying plane of a lower idle roller conveyor 29, which cooperates with two lateral loop conveyors 30 to advance the products 3 themselves between stations 15 and 10.

[0022] The two conveyors 30 define device 13 along with conveyor 29, extend in direction 7, are arranged on opposite bands of the path P in direction 18, and each comprise a respective smooth belt 31, which is looped about a plurality of pulleys (not shown), of which one is continuously driven, rotationally mounted on base 6 to turn about respective axes 32 reciprocally parallel to each other and to direction 21. The belts 31 present respective vertical conveying branches 33, reciprocally facing, and are each coplanar to a respective branch 28.

[0023] Finally, the machine 1 comprises a feeding unit 34 adapted to feed to the station 15 in sequence the bands 2, each of which is made, in the case in point, from a tape 35 of a reel 36, and is limited by two opposite faces 2a, 2b, of which face 2b (figure 2) is completely free from glue zones and face 2a (figure 3) comprises a central portion 37, which is free from glue zones, and presents a shorter length than the width of a product 3 measured parallelly to direction 18, and two lateral portions provided with respective glue zones 38.

[0024] The unit 34 comprises a carriage 39, which is slidingly coupled to the base 6 and can be shifted, either manually or by means of an operating device known and not shown, in direction 18 between an operative position (figure 1), in which the carriage 39 is substantially contained inside the base 6, and a home position (not shown) in which the carriage 39 protrudes outside the base 6 itself to facilitate the maintenance operations of the unit 34 and/or for replacing the coil 36.

[0025] With reference to figure 2, the tape 35 is unwound from the reel 36 by means of at least one pair of

counter-rotating unwinding rollers (not shown), which are rotationally mounted on the carriage 39 to turn, with respect to the carriage 39 itself, about respective longitudinal axes (not shown) parallel to direction 18, and to advance the tape 35 to a cutting station 40 in a determined direction 41 of advancement.

[0026] The station 40 is provided with a cutting device 42 comprising a fixed drum 43, which presents a longitudinal axis 44 parallel to direction 18, and is provided with a sharp edge 45, which protrudes from the drum 43 itself to engage a face 35a of the tape 35 completely free from glue zones. The device 42 also comprises a rotating drum 46, which is rotationally mounted on the carriage 39 to turn, with respect to the carriage 39 itself, about an axis 47 parallel to axis 44, and presents a cutting blade 48, which protrudes from drum 46 to engage a face 35b of the tape 35 presenting glue zones 38 of the bands 2, and cooperates with the edge 45 for, in the case in point, pre-cutting the tape 35 and partially separating, at each operating cycle, a band 2 of the tape 35 itself.

[0027] During its rotation about axis 47, the blade 48 is lubricated by a felt 49 to prevent the glue zones 38 from sticking to the blade 48 itself.

[0028] The unit 34 further comprises a conveying device 50 adapted to advance each band 2 between station 40 and station 15 and comprising, in turn, two counter-rotating belt conveyors 51, 52 adapted to impart to the tape 35 a faster advancement speed than the advancement speed imparted to the tape 35 itself by the aforementioned pair of unwinding rollers (not shown). Following the different advancement speeds imparted to the tape 35 by the unwinding rollers (not shown) and by the device 50, the bands 2, already partially separated from the tape 35 at station 40, are completely separated from the tape 35 itself.

[0029] Regarding this, it should be pointed out that, alternatively to that set forth above, the cutting blade 48 can also be shaped so as to completely separate a band 2 from the tape 35 at each operating cycle.

[0030] As shown in figures 2 and 4, conveyor 51 comprises two reciprocally parallel belts 53 (only one of which is shown in figures 2 and 4), which are aligned one by the other in direction 18, and are facing the face 35b of tape 35 and the faces 2a of bands 2 at the glue zones 38. Each belt 53 presents a toothed drive branch 53a looped about a plurality of reels 54, one of which is driven, rotably mounted about respective axes 55 parallel to direction 18, and a toothed conveyor branch 53b adapted to firstly engage the face 35b of tape 35 and then the faces 2a of bands 2 at the glue zones 38.

[0031] With reference to figure 5, branch 53b presents a plurality of teeth 56 uniformly distributed along the branch 53b itself. Each tooth 56 has a respective contact surface 57 which is smaller than the surface of a glue zone 38, has a width, measured parallelly to direction 18, smaller than the width of a glue zone 38 also measured parallelly to direction 18, and has a height, measured parallelly to direction 41, smaller than the height of a glue

zone 38 also measured parallelly to direction 41.

[0032] As shown in figures 2 and 3, the conveyor 52 comprises two reciprocally parallel smooth belts 58, which are reciprocally aligned in direction 18, are arranged facing the face 35a of tape 35 and the faces 2b of bands 2, extend between stations 40 and 15, and present respective smooth conveying branches 58a which cooperate with the belts 53 to advance the bands 2 in the station 15. The belts 48 are looped about respective pulleys 59 reciprocally coaxially mounted in pairs to turn about respective axes 60 parallel to axes 55.

[0033] The conveyor 52 further comprises two reciprocally parallel smooth belts 61, which are reciprocally aligned in direction 18, are arranged between the belts 58, are wound about a part of the pulleys 59, and extend underneath the conveying unit 8.

[0034] With reference to figure 4, the lower pulleys 59 facing the station 40 are rotationally mounted on two plates 62 hinged to the base 6 to oscillate with respect to the base 6 and under the bias of respective springs 63 arranged between the plates 62 and the base 6 itself, about a common fulcrum axis 64 parallel to the axes 55 and 60 so as to ensure a correct holding of the tape 35 between the conveyors 51 and 52.

[0035] As shown in figure 3, the belts 56, 59 have respective suction openings 63 made through the belts 56 and 59 themselves, and move in contact with the plates 60 which are connected to a pneumatic suction device to ensure a correct holding of the tape 35 and of the band 2 separated each time from the tape 35 by the belts 56, 59 themselves.

[0036] The operation of the machine 1 will now be illustrated assuming the application of a single band 2 to a respective product 3 and from the instant in which the band 2 taken into consideration was separated from the tape 35 by means of the belt conveyors 51, 52 and was advanced in station 15 timed with the respective product 3.

[0037] Following the shift of the product 3 in direction 7 and since the width of the portion 37 of the face 2a of the band 2 is smaller than the width of the product 3 measured parallelly to the direction 18, the product 3 engages at the same time both the central portion 37 and the side portions with the glue zones 38 so as to ensure a correct positioning of the band 2 on the product 3 itself.

[0038] At this point, the assembly consisting of the product 3 and the band 2 is advanced inside a folding mandrel defined by two folding members (not shown), which are fitted at the input of the conveyor device 13, are arranged on opposite bands of the path P in direction 18, are able to fold the lateral portions with the glue zones 38 in contact with the product 3 itself in an essentially U-shaped configuration (figure 2), and are reciprocally mobile, in a setting phase of the machine 1, to vary their distance in direction 18 itself.

[0039] The machine 1 presents, therefore, some advantages mainly constituted by the fact that:

the toothed conveying branch 53b allows to engage only part of each glue zone 38, to avoid damaging the glue zone 38 itself, and to ensure the correct release of the bands 2 from the belts 53 in station 15; the suction plates 62 ensure a correct holding of the tape 35 and the band 2 separated each time from the tape 35 itself by the belts 58, 61; the lubrication of the cutting blade 48 allows to prevent the blade 48 from sticking onto the glue zones 38; and the mentioned folding members (not shown), fixed in use, ensure a correct folding of each band 2 on the respective product 3.

Claims

1. A machine for applying partially adhesive bands (2) to respective products (3), each band (2) having a first face (2a) provided with at least one glue zone (38) and one second face (2b) free from glue zones (38), the machine comprising conveyor means (8) for advancing the products (3) in sequence along a determined path (P); a folding station (15) arranged along said path (P); feeding means (34) for feeding in sequence the bands (2) in the folding station (15) in a position transversal to said path (P), the feeding means (34) comprising a first feeding device (50) comprising in turn at least a first and a second belt conveyors (51, 52) having respective conveyor branches (53b, 58a) reciprocally cooperating to engage said first and second face (2a, 2b) of each band (2) respectively; and folding means arranged in the folding station (15) for essentially U-folding each band (2) about a respective product (3); and being **characterised in that** the conveying branch (53b) of the first belt conveyor (51) is a toothed conveyor branch.
2. A machine according to claim 1, wherein the toothed conveyor branch (53b) is provided with a plurality of teeth (56), each of which presents a contact surface smaller than the surface of a glue zone (38).
3. A machine according to claim 2, wherein the contact surface (57) presents dimensions, measured in two essentially reciprocally orthogonal directions (18, 41), smaller than the corresponding dimensions of a glue zone (38), also measured in said directions (18, 41).
4. A machine according to any of the preceding claims and further comprising a separation station (40) for separating the bands (2) in sequence from a tape (35); the first and second belt conveyors (51, 52) extending between said separation and folding stations (40, 15).

5. A machine according to any of the preceding claims,
in which said second belt conveyor (52) is a suction
belt conveyor.

6. A machine according to any of the preceding claims, 5
in which said second belt conveyor (52) is looped
about a plurality of pulleys (59); at least one of the
pulleys (59) being movable from and to said first belt
conveyor (51) to secure each band (2) between said
conveying branches (53b, 58a). 10

7. A machine according to any of the preceding claims
and further comprising a separation station (40) for
separating the bands (2) in sequence from a tape
(35); the feeding means (34) further comprising a 15
second feeding device for feeding the tape (35) into
said separation station (40).

8. A machine according to claim 7, wherein said first
(50) and second feeding devices are able to advance 20
the tape (35) at reciprocally different advancement
speeds so as to separate each band (2) from the
tape (35) itself.

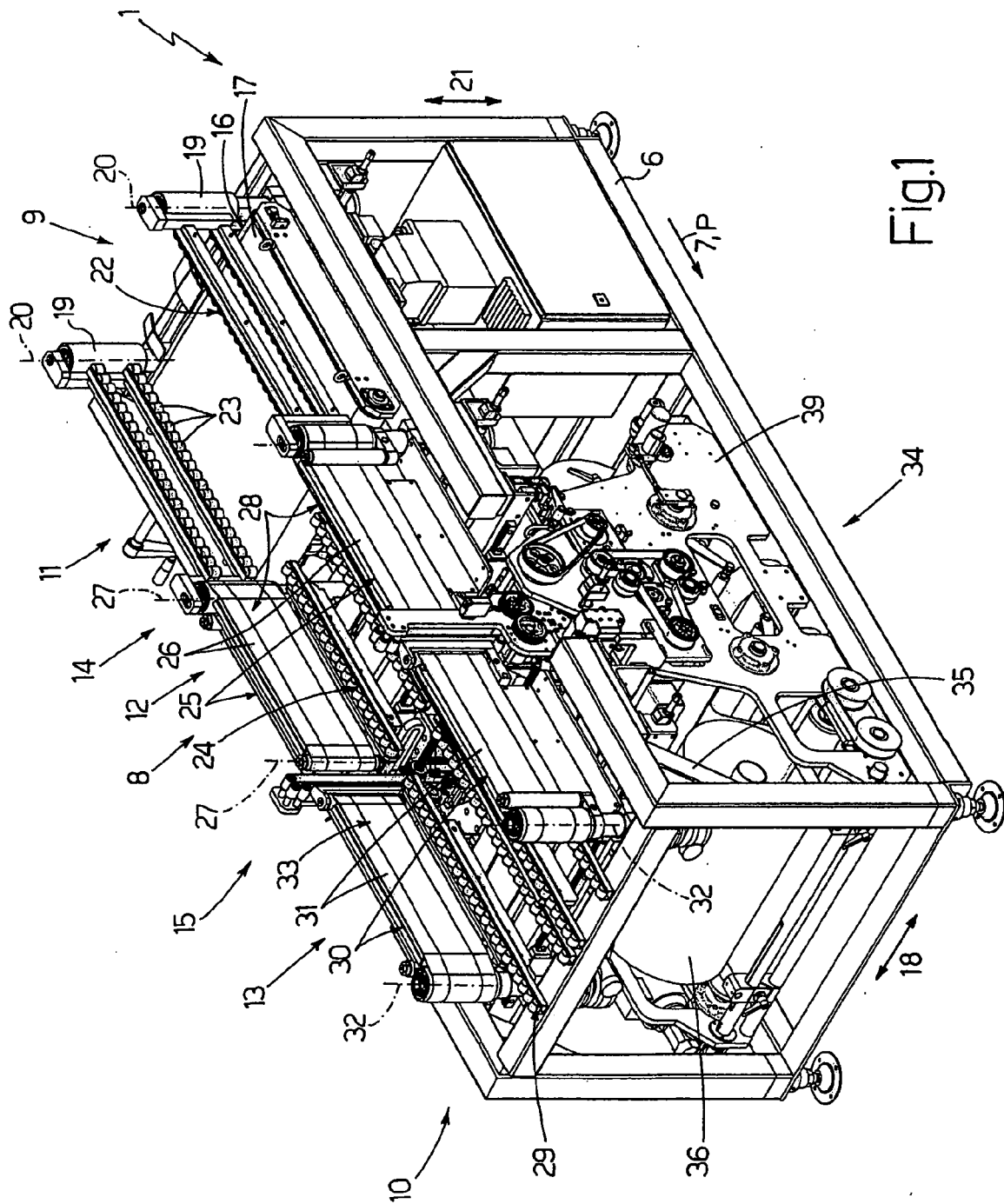
9. A machine according to claim 7 or 8, wherein said 25
feeding means (34) further comprise cutting means
(42) arranged upstream of said first conveyor device
(50) in a direction of advancement (41) of the tape
(35) to partially pre-cut the tape (35) itself. 30

10. A machine according to claim 7, wherein said feeding
means (34) further comprise cutting means (42) ar-
ranged upstream of said first conveyor device (50)
in a direction of advancement (41) of the tape (35)
to separate each band (2) of the tape (35) itself. 35

11. A machine according to claim 9 or 10, wherein said
cutting means (42) comprise a first and a second
cutting members (48, 45) for engaging the tape (35)
at a third face (35b) provided with said glue zones 40
(38) and respectively at a fourth face (35a) complete-
ly free from glue zones (38); lubrication means (49)
being provided to lubricate said first cutting member
(48) so as to prevent its adhesion with said third face
(35b). 45

12. A machine according to any of the preceding claims,
wherein said folding means comprise two folders ar-
ranged on opposite bands of said path (P) in a further
direction (18) transversal to the path (P) itself; the 50
folders being, in use, fixed folders.

13. A machine according to claim 12, wherein said fold-
ers are reciprocally movable to vary their distance in
said further direction (18). 55



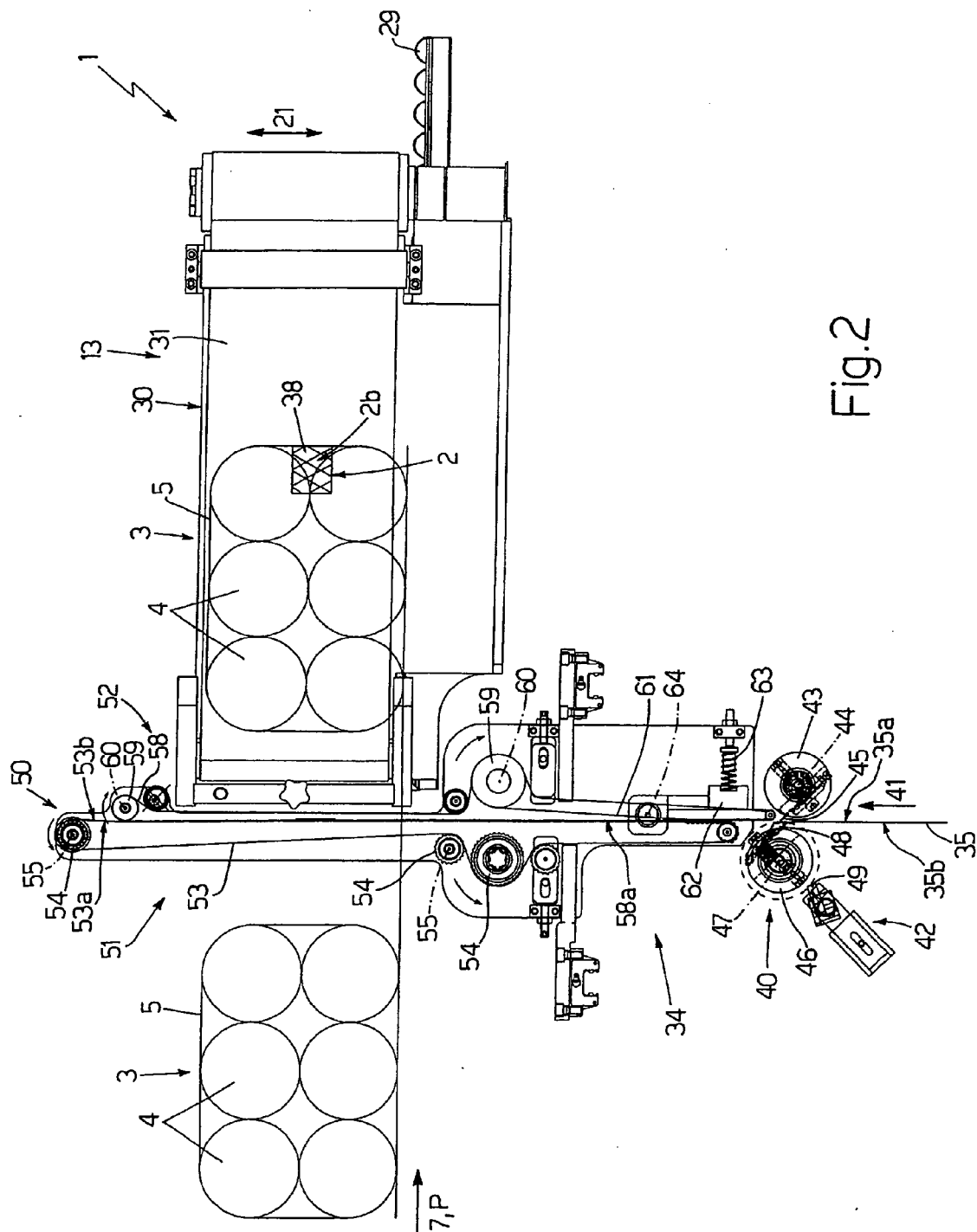
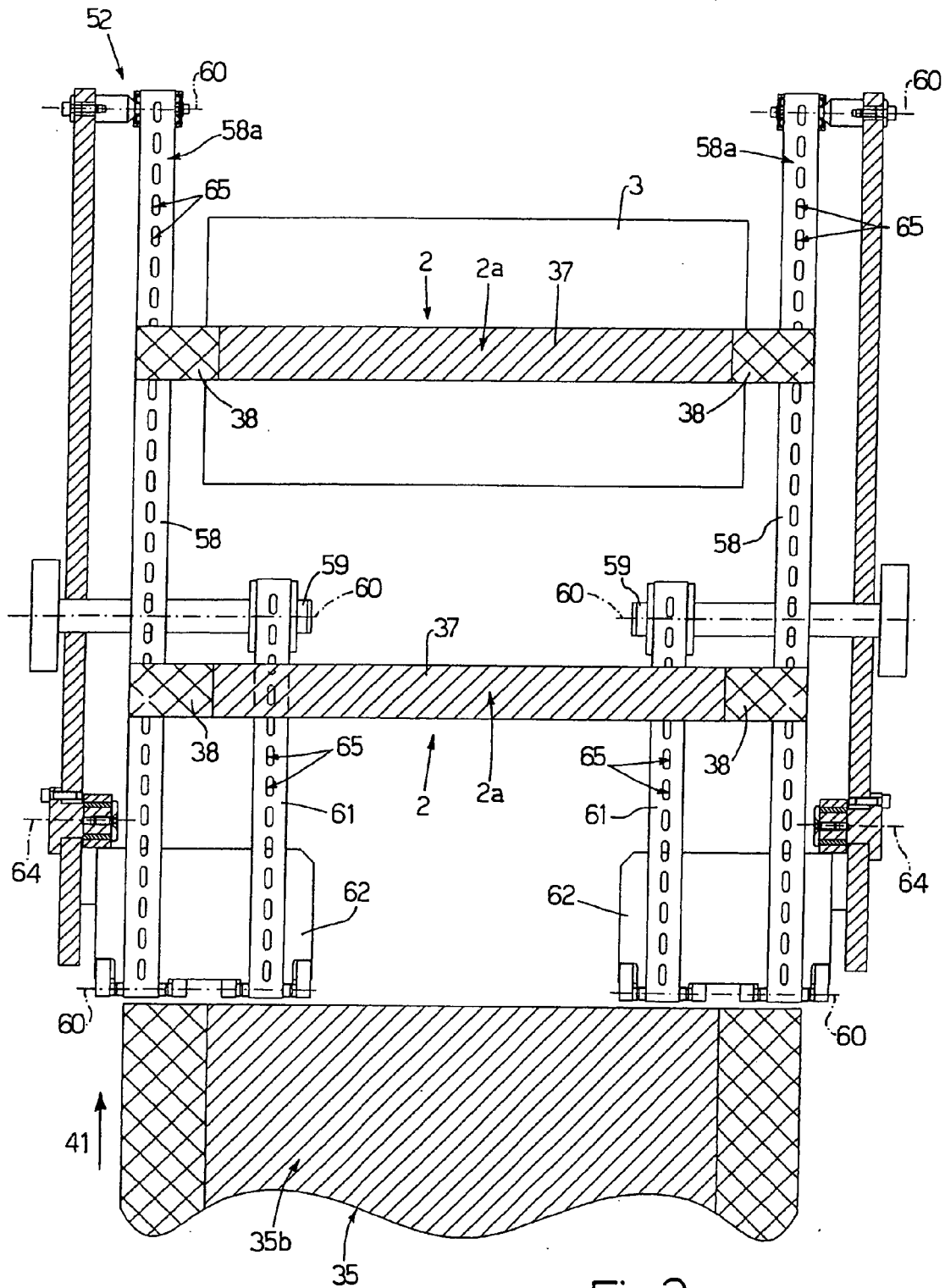


Fig. 2



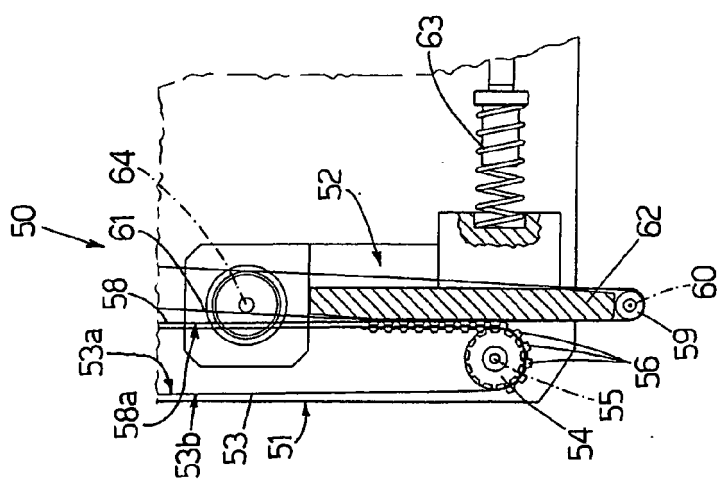


Fig.4

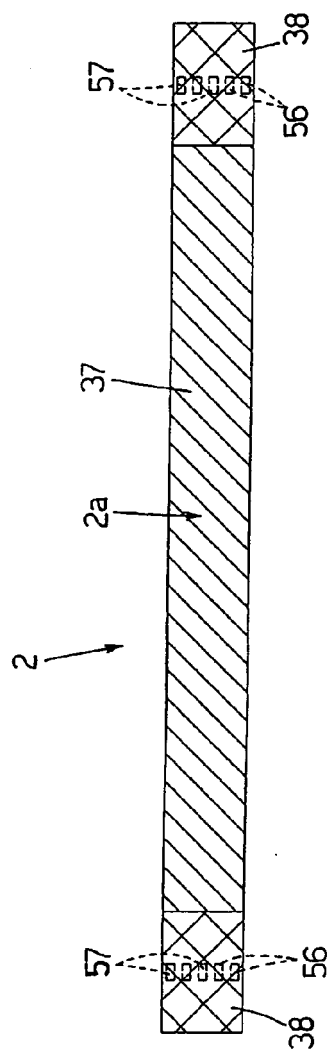


Fig.5



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 05 42 5895

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 1 518 789 A (KPL PACKAGING S.P.A) 30 March 2005 (2005-03-30) * the whole document * -----	1-13	INV. B65B61/14 B65B25/14
			TECHNICAL FIELDS SEARCHED (IPC)
			B65B B65D
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 19 May 2006	Examiner Ungureanu, M
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