

(19)



(11)

EP 2 086 840 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
02.04.2014 Bulletin 2014/14

(51) Int Cl.:
B65B 25/14 ^(2006.01) **B31B 1/20** ^(2006.01)
B65D 85/66 ^(2006.01)

(21) Application number: **07835409.9**

(86) International application number:
PCT/SE2007/050825

(22) Date of filing: **08.11.2007**

(87) International publication number:
WO 2008/069738 (12.06.2008 Gazette 2008/24)

(54) METHOD FOR PACKAGING OF PAPER AND BOARD ROLLS

VERFAHREN ZUR VERPACKUNG VON PAPIER- UND PAPPROLLEN

PROCÉDÉ D'EMBALLAGE DE ROULEAUX DE PAPIER ET DE CARTON

(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 MT NL PL PT RO SE
SI SK TR**

(74) Representative: **Johansson, Lars E. et al**
Hynell Patenttjänst AB
Patron Carls väg 2
683 40 Hagfors/Uddeholm (SE)

(30) Priority: **07.12.2006 SE 0602633**

(56) References cited:
EP-A1- 0 688 719 EP-A1- 0 759 396
WO-A1-94/15839 CA-A1- 2 545 432
FR-A1- 2 603 020 GB-A- 544 993
GB-A- 544 993 US-A- 1 764 081
US-A- 1 807 863 US-A- 3 664 240
US-A- 3 924 375 US-A- 4 137 690
US-A- 4 260 311 US-A- 4 936 459
US-A- 5 265 399 US-B1- 6 234 943

(43) Date of publication of application:
12.08.2009 Bulletin 2009/33

(73) Proprietor: **Mondecon Aktiebolag**
666 31 Bengtsfors (SE)

(72) Inventor: **HAMAR, Ole-Johan**
570 34 Bruzaholm (SE)

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 2 086 840 B1

Description

TECHNICAL FIELD

[0001] The present invention relates to a method for packaging of paper and board rolls, according the preamble of claim 1.

PRIOR ART

[0002] A method according to the preamble of claim 1 is known from GB 544 993. A further method is known from for example US-B1 6,505,459 and US-A 5,265,399. In this known method the projecting portion of the sheath paper web is accordingly folded down against an inner end gable circular blank. Thereby, loose flaps or "ears" are formed in the folded-down paper, which are easily damaged in connection with the handling of the rolls that usually are stored standing on each other. In order to avoid such damage that might lead to damage by moist/complications, e.g. by water leaking into the roll, an outer end gable circular blank is applied outside the folded-down edge and the inner end gable circular blank and is heat sealed against these, with the purpose of ensuring a moisture barrier. Such a solution to the problem is costly, not only in terms of the increased consumption of material but primarily because the packing station becomes more mechanically complex and complicated.

BRIEF ACCOUNT OF THE INVENTION

[0003] The object of the invention is to achieve a packing method that is less costly than the previously known methods, but that nevertheless gives a completely acceptable result.

[0004] This is achieved in the packing method as cited in the introduction, according to the invention, by the end gable circular blank constituting the only end gable circular blank at the end in question of the final packed board or paper roll.

[0005] An is improved impenetrability of the packaging is achieved by a spacing between the slits being adapted such that when the sheath paper web has been wound more than one turn about the envelope surface of the roll, the slits of the outer turn will not be positioned over the slits of the inner turn.

[0006] The packing with the sheath paper web is performed with one edge web at each end gable and at least one intermediate sheath paper web that at its edge portions overlaps or is overlapped by the edge webs. In that way the number of widths in stock, of sheath paper webs, could be decreased.

[0007] The thermoplastic resin preferably covers the entire side of the papery carrier, such that the sheath paper web will consist of a laminate of the carrier and the thermoplastic resin. Thereby, the sheath paper web will become waterproof and the packaging will provide a better protection.

[0008] The end gable circular blank may comprise a paper fibre material and suitably consists of a paper fibre material carrier having one side thereof at least partly covered with a thermoplastic resin that becomes adhesive when heated. The thermoplastic resin preferably covers the entire side of the paper fibre material carrier, such that the end gable circular blank will consist of a laminate of the carrier and the thermoplastic resin. Hereby, the end gable circular blank will be waterproof (forms a moisture barrier) and the packaging will give improved protection.

[0009] It is suitable that the end gable circular blank is applied against the end gable of the roll with the carrier facing the end gable of the roll and the thermoplastic facing away from the end gable of the roll. Hereby, the end gable surface that faces out will provide more friction than if it was covered with paper and such a higher friction is an advantage in connection with the piling up of up-standing rolls.

BRIEF DESCRIPTION OF THE ENCLOSED DRAWINGS

[0010] In the following, the invention will be described in greater detail with reference to the preferred embodiments and the enclosed drawings.

Fig. 1 is a schematic side view over a packed, lying down, paper or board roll having a first preferred embodiment of the packaging according to the invention shown in cross-section.

Fig. 1A is a magnification of the upper right corner of Fig. 1.

Fig. 2 is a planar view showing a sheath paper end that is to be attached at and wound onto the paper or board roll, a series of slits in each side edge portion of the sheath paper end and a device for cutting these slits.

Fig. 3 is an end view of the packed roll in Fig. 1.

Fig. 3A shows a magnification of the marked portion of Fig. 3 and a conceived cross-sectional view of the magnified portion.

Fig. 4 is a view in perspective over a knife roll and a interacting counter roll in the slit cutting device shown in Fig. 2.

Fig. 5 is a view in perspective over the drive arrangement for the knife roll and the interacting counter roll shown in Fig. 4.

Fig. 6 is a side view over a packed, lying down, paper or board roll having a second embodiment of the packaging shown in cross-section.

- Fig. 7 is a schematic planar view over another embodiment of a packing plant, in which the applying of paper is performed in two stations.
- Fig. 8 is a schematic planar view over an embodiment of a packing plant positioned in parallel with a roll conveyor.
- Fig. 9 is a view in perspective over a series of sheath paper rolls of various web width in the packing plant according to Fig. 7 or Fig. 8, for delivery to the actual packing, and
- Fig. 10 is a side view over a part of a packing station according to the invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0011] In Fig. 1 and the magnification of its upper right corner in Fig. 1A, a side view is shown over a packed, lying down paper or board roll 1 for which a first preferred embodiment of the package according to the invention is shown in cross-section. In Fig. 1 the various parts are (elucidatory) shown as lying on a distance from each other while Fig. 1A gives a more true to life image of a package according to the invention. A sheath paper web 2 consisting of a papery carrier 20, one side of which having at least one portion thereof covered by a thermoplastic resin 21 that becomes adhesive when heated, has been wound at least one turn about the envelope surface 10 of the roll 1 with the thermoplastic resin 21 facing the envelope surface 10 and the papery carrier 20 facing away from the envelope surface 10. Fig. 1 however shows only a single turn in order to avoid crowding of the details shown in the figure and to give better lucidity. The shown sheath paper web 2 is wider than the roll 1, such that the web will have side edge portions 22 that project a distance 1 from the end gables 11, 12 of the roll but are folded down during packing against the end gables of the roll to the position shown in Fig. 1 and 1A. Hereby, 1 is at least 50 mm and preferably less than 250 mm, more preferred 60 mm < 1 < 150 mm. Before the folding down of the side edge portions 22, end gable circular blanks 11, 12 of a size d fitting the diameter D of the roll 1 have been applied against the end gables 11, 12 of the roll. According to a preferred embodiment, D relates to d according to the following:

- $D-3 \text{ mm} \leq d \leq D+3 \text{ mm}$, preferably;
- d is somewhat larger than D, such as 1-3 mm, in case there is need for extra edge protection;
- d is somewhat smaller than D, such as 1-3 mm, in case there are considerations to motivate this, e.g. if the paper is brittle.

[0012] The papery carrier 20 is preferably formed from kraft paper but kraft liner, thin board and the like is also

suitable. The thermoplastic resin 21 is preferably formed from polyethylene but other thermoplastic resins that become adhesive when heated are also suitable, e.g. other polyolefins such as polypropylene.

[0013] According to the invention, a packing method is achieved which is less costly than previously known methods but which nevertheless will give a completely acceptable result by at least said side edge portions 22 being covered with said thermoplastic resin 21, by heat sealing the folded-down side edge portions 22 against the end gable circular blanks 3, 4 positioned between the respective end gable 11, 12 of the roll and its associated side edge portion 22, and by the end gable circular blank constituting the only end gable circular blank at the end in question of the final packed board or paper roll 1. The thermoplastic resin 21 on the folded-down side edge portion 22 faces the end gable circular blank 3, 4 and is easily adhered to the circular blank by heat sealing. Hereby, the risk is considerably diminished that there would form loose flaps or "ears" in the folded-down paper 2, which could be damaged in connection with the handling of the rolls and allow water to leak into the roll 1 or cause migration of moist. Thanks to the invention, no external end gable circular blank is applied, which would otherwise have to be heat sealed against the folded-down side edge portion 22 and against an inner end gable circular blank. There is also achieved a cost saving in machine equipment as well as in packaging materials. Since no external circular blanks are required, the need for an end gable press including the associated roll handling and mounting robot for external circular blanks including associated magazines, diminishes, as does the demands for safety equipment, automation and space requirements. By the end gable press and the robot cell not being required, the space requirements are considerably reduced, sometimes up to, and possibly exceeding 20 %, and by the number of machine units being decreased, the investment costs are considerably reduced, sometimes up to, and possibly exceeding, 20 %, as compared with a conventional plant.

[0014] As is shown in Fig. 2, the projecting side edge portion 22 that is to be folded-down against the end gable 11, 12 is preferably provided with a series of lateral slits 23, suitably having a length of about 50-150 mm, which between themselves form a series of tongues 24, 24' that after the folding down will partly overlap each other (see Figs. 1A and 3A) and in connection with the heat sealing will give a covering sealing of the sheath paper web 2 against the end gable circular blank 3, 4. In that way, the risk is completely eliminated that there will form loose flaps or "ears" in the folded-down paper, which could be damaged in connection with the roll handling and allow water to leak into the roll or cause migration of moist, and a strong joint is achieved, which could mean that the length 1 could be shortened as compared to a traditional method, sometimes to be less than 100 mm. The risk that the folding-down would cause an irregular end gable surface on the packed paper roll is also considerably re-

duced. An irregular end gable surface would make it harder to achieve a stable piling up of upstanding packed paper rolls and irregularities could lead to holes being torn up in the packing and could also cause dents in the end gables of the roll.

[0015] An additionally improved impenetrability of the packaging is achieved by a spacing 25 (suitably in the range 30-200 mm) between the slits 23 being adapted such that when the sheath paper web 2 has been wound more than one turn about the envelope surface of the roll 1, the slits 23 of the outer turn will not be positioned over the slits of the inner turn. Preferably, no material is cut off from the sheath paper web 2 in connection with the cutting of the slits 23, but the tongues 24, 24' are of equal width from the base to the top. The shape of the slits 23 may in certain cases be varied among other things depending on the width of the projecting side edge portions 22, the diameter D in question of the roll to be packed and the properties of the sheath paper web 2 (basis weight, structure and quality).

[0016] Additionally improved impenetrability of the package can be achieved by using slits 23 that are somewhat shorter than the length 1 of the folded-down portion of the paper web, slits preferably being used that have a length corresponding to 70-99 %, more preferred 80-90 % of 1, i.e. the portion of the paper web that is to be folded-down. The slits should preferably commence 1-3 mm from the outer edge of the paper web (see Fig. 2); with the purpose of facilitating in connection with replenishment by holding together. The slits should preferably be straight and at 90° angle against the paper web, however, they could be of varying angle and shape, among other things depending on use specific conditions such as the basis weight and type of packaging paper to be used, and the type of protection striven for (moisture barrier, protection against piling-up dents, reloading protection (several loadings/unloading), etc.

[0017] Thanks to the improvements achieved by the new packing method, it can be achieved, as compared with traditional methods:

- Packaging material savings, about 20%
- Lower energy consumption
- Reduced space requirement
- Reduced price, about 20% compared with traditional completely automated machine plants
- Improved protection in exposed portions, end gables and edges of the rolls (transition envelope surface/end gable)

[0018] The background of the development is essentially:

- Environmental aspects
 - demands and desires of reduced energy consumption
 - demands and desired of reduced amount of

packaging materials

- The mills drive for environmentally friendly solutions
- Automatisations - with the new packing method, automatisations of the machine plant can be provided with a reduced extent of robotic equipment.
- Packaging quality

- with the new method, the risk of dents in the end gables of the rolls is reduced, and improved edge protection is achieved.

With improved packaging quality, a reduced amount of reclamations from end customers usually follows, which means cost savings for the mills and increased possibilities of keeping customers.

[0019] In the embodiment shown in Fig. 2, slits 23 are cut in each side edge portion 22 by a cutting device 5A, 5B that is shown in greater detail in Figs. 4 and 5. A cutting device is shown there that comprises a rotary knife roll 52 that has a plurality of knives 54 and that interacts with a rotary counter roll 51, which counter roll forms a nip with the knife roll 52 and has a corresponding number of grooves 53 into which the knife edge can enter when it has cut through the edge portion 22 of the sheath paper web 2. In the embodiment shown in Figs. 4 and 5, the rolls 51, 52 are rotary arranged at a bearing plate 50 that carries the bearing (not shown) for the drive shafts 51C, 52C of the rolls (see Fig. 5). Fig. 5 schematically shows that the rolls 51, 52 are driven by aid of an incoming drive shaft 57 that directly drives one drive shaft 52C and that via a belt device 56 (and a (not shown) reverser transmission) synchronously drives the drive shaft 51C for the other roll 51, such that these will rotate synchronously in opposite directions. Between each groove 53, the counter roll 51 has a planar surface 51A that locally decreases the radius out to said surface 51A, thereby creating a gap between the rolls 51, 52 at an intermediate position, such that an infinitely variable slit spacing 25 can be achieved by varying relative speeds between the web 2 and the rolls 51, 52. Accordingly, the web can move faster or slower than the circumferential speed of the rolls 51, 52 when the surface 51A is exposed against the web 2. (It is also conceivable to use cog wheel drive or other forms of transmission in order to achieve a synchronous counter rotation). In an alternative embodiment, knives 54 and grooves 53 are made to be radially displaceable (e.g. according to the machine chuck principle) such that a variable radius and thereby slit spacing 25 can be achieved, if a non intermittent/pulsating drive of the slitting device 5A, 5B is desired.

[0020] In an alternative embodiment, which is more preferred in many applications, the packing with the sheath paper web 2 can, as is shown in Fig. 6, be performed with an edge web 2', 2'' at each end gable 11, 12 of the roll and at least one intermediate sheath paper web 2'' that at its edge portions overlaps (Fig. 6) or is

overlapped (not shown) by the edge webs 2', 2". In that way the number of widths in stock, of sheath paper webs 2, could be decreased. Fig. 9 shows a store of various widths of sheath paper webs in a packing plant. The overlap structure in respect of the number of webs and their positioning depends among other things on the width relation between the width of the paper or board roll and which web widths that are available for the packing (the centre paper 2" can lie inside as well as outside the side papers). The width of side edge portions 22 that are folded down should be constant. Variations may however exist in certain applications and for practical reasons.

[0021] The thermoplastic resin 21 preferably covers the entire side of the papery carrier 20, such that the sheath paper web 2, 2', 2", 2"' will consist of a laminate of the carrier 20 and the thermoplastic resin 21. Thereby, the sheath paper web will become waterproof and the packaging will provide a better protection.

[0022] If desired, the end gable circular blank 3, 4 can consist solely of a paper fibre material, e.g. corrugated cardboard, but suitably it consists of a carrier 30 of paper fibre material such as kraft paper, kraft liner or board, that has one side that at least partly is covered by a thermoplastic resin 31 that becomes adhesive when heated. Suitably, the same thermoplastic resin is used for the end gable circular blank 3, 4 as for the sheath paper web 2, and the thermoplastic resin 31 preferably covers the entire side of the carrier 30 of paper fibre material, such that the end gable circular blank 3, 4 will consist of a laminate of the carrier 30 and the thermoplastic resin 31. Hereby, the end gable circular blank 3, 4 will be waterproof and the packaging will give improved protection. In certain applications, a heat reflecting layer (see 33 in Fig. 6) can be applied between the carrier 30 and the thermoplastic resin 31, which means a possibility to achieve faster and more efficient melting/sealing, which feature is reserved for the option of an individual patent protection.

[0023] It is suitable that the end gable circular blank 3, 4 is applied against the end gable 11 and 12, respectively, of the roll, with the carrier 30 facing the end gable 11, 12 of the roll and the thermoplastic resin 31 facing away from the end gable 11, 12 of the roll. Hereby, the end gable surface that faces out will provide more friction than if it was covered with paper and such a higher friction is an advantage in connection with the piling up of upstanding rolls.

[0024] The end gable circular blank 3, 4 used in the packing will accordingly replace the inner and outer circular blanks used in conventional packing methods. In the method according to the invention, the middle portion of the end gable circular blank 3, 4 does not have to be heated, which results in the advantage of energy saving and it is also not desirable that it adheres to the end gable 11 or 12, respectively. The end gable circular blanks are adjusted (cut to appropriate diameter d) for the roll diameter D in question, but standard sizes can also be used without the cutting to appropriate diameter. By using the end gable circular blanks 3, 4 with the thermoplastic resin

facing out, a more durable heat sealing is achieved of the folded-down paper against the circular blanks. As is clear from the above, it is however also possible to use end gable circular blanks without resin or having the resin side facing inwards.

[0025] A number of known possible devices 90 exist for the heating in connection with the heat sealing. Preferably, an IR radiator (see Fig. 10) is used, which can be electrically driven or driven by gas burning, but Fig. 8 also indicates that the blowing of hot air, such as by a hot air gun, may be suitable, as is heating by e.g. laser, ultrasound emitter, microwave sources or heated rolls, and of course various combinations of the described methods of heating. Similarly, a number of known possible devices 91 exist for the folding down and pressing of the side edge portions 22 against the end gable circular blanks 3, 4, the folding equipment essentially consisting of a stand, driven arms that are vertically and horizontally movable and folding units mounted on the movable arms.

[0026] The folding device 91 is always adapted to the requirements for a specific plant (e.g. in terms of manning, capacity, price). Preferably, a folding down device 91 with screw blades is used (see Fig. 10), for which the shape of the blades is adapted for specific requirements of the plant. In certain applications, the blades are heated, suitably by integral heating coils and the movement in/out of the blades to and from the circular blanks on the end gables of the rolls can be arranged in different ways. In some cases the blades are in contact with the circular blank during the entire movement. In other cases, the blades move away from the surface when moving out, in order to avoid that paper is torn away. If desired, a subsequent (not shown) pressure device can be used for the folded-down side edge portion, in some cases with integral heat and heated air blow. Such a pressure device can also be designed to give an improved edge protection by covering also a portion of the envelope surface close to the transition between the shell and the end gable. Such a pressure device may e.g. comprise a (not shown) wheel with a circumferential groove that has a right-angled profile, where one side of the groove abuts against the shell side and the other against the end gable side of the roll that is to be packed.

[0027] Figs. 7 and 8 schematically show two different principles for performing a method according to the invention and an associated, exemplifying, arrangement of machine equipment. A conveyor belt 8 is shown which is arranged to feed in non-packed paper rolls 1 and to feed out the final packed paper rolls. Fig. 7 shows a machine arrangement that makes use of a separate feeding path 8' that runs in parallel with the conveyor belt 8, in order to feed the paper roll 1 to the various steps of the packing. In a first step A, an incoming paper roll 1 is moved from the conveyor belt 8 to the second conveyor path 8' that runs in parallel with the conveyor belt 8. This movement can be achieved by aid of a variety of conventional equipments, known per se. Thereafter, the roll 1 is fed to a first packing station 9/B, in which the roll is

initially around its middle portion provided with an intermediate sheath paper web 2'. A type of magazine 7, with a plurality of roll holders 7', 7'', 7''' of varying width, is arranged here to enable selection of an intermediate sheath paper web 2' of fitting width. When the intermediate sheath web 2' has been arranged around the roll 1, the roll is moved to the next packing step 9/C by aid of the conveyor path 8'. Here, the roll 1 is first provided with fitting end gable circular blanks 3, 4, 3', 4', adapted according to the description above. The arranging of the end gable circular blanks 3, 4, 3', 4' takes place by aid of conventional equipment known per se, such as picking robots (not shown). Thereafter, the end gables of the paper roll 1 are wound with edge webs 2', 2''. In connection with the unwinding of the edge webs 2', 2'', before the edge webs reach the paper roll 1, the slits 23 are arranged in the outer edge portions of the edge webs 2', 2'', by aid of said cutting devices 5A, 5B and in connection therewith, the melting layer 21 is heated by aid of infrared heating assemblies 90A, 90A', which is better seen in Fig. 10. It is also shown that the slitting device 5A preferably is arranged before the roll 1, as seen in the moving direction of the edge web 2'', and accordingly the heating devices 90A, 90A' are arranged in a subsequent step, which means that the web 2'' is cold, i.e. the thermoplastic resin 21 is hard, whereby there is no risk of smudging of the slitting device 5A. The slit web 2'' is thereafter rolled up on the roll, such that the edge web 2'' overlaps the middle, already wound up, paper web 2'. The example shows that two parallel heating devices 90A, 90A' are used to melt the thermoplastic resin 21 in the area of the flaps 24 as well as in the area of the portion that overlaps the middle portion 2''. A folding device 91 is positioned at the lower periphery of the roll and hence it will, by its folding means (such as screw blades), successively fold up one flap 24 at the time, which is then pressed against the end gable circular blank 3 in order to fix the same, whereby a heat seal with moisture barrier is achieved. In the next step D, the paper roll is again moved back to the conveyor belt 8 and lead away for further transportation.

[0028] Fig. 8 shows the use of basically the same principles as described for Fig. 7, but with the difference that no separate conveyor path is used but only the conveyor belt 8 is used in connection with the packing method. Hereby, all packing steps according to step B, C above are performed in one and the same position, without step-wise moving of the paper roll 1. Similar to that described above, the intermediate sheath paper web 2' is however applied first and thereafter the end gable circular blanks 3, 4, 3', 4' and finally the edge webs 2', 2'', before the final folding and heat sealing. Fig. 8 indicates that instead of infra-red heating, a heating device 90 is used here in the form of a so called "Leister", which is a known hot air device that is (vertically and horizontally) displaceable and which is thereby easy to control in order for optimal heat delivery. It is also indicated in Fig. 8 that the folding device 91 is more traditionally arranged at the top of the

roll 1 (in order to provide more room for the supporting rollers (not shown)), the "Leister" suitably heating at the top, just prior to the folding device 91.

[0029] Fig. 9 shows a clearer view of a type of roll holding magazine 7 with a plurality of roll holders 7', 7'', 7''' positioned symmetrically along a centre line c, said roll holders carrying paper rolls of different widths in order at one and the same winding station 9 to be able to apply an intermediate sheath paper web 2', the width of which is adapted/optimized in respect of the paper roll 1, such that one and the same packing line conveniently can be used to pack rolls 1 of different roll diameters (access to different types of end gable circular blanks 3, 4, 3', 4') and different roll lengths.

[0030] It is realised that the invention is not limited to that described above but may be varied within the scope of the appended claims. It is realised that in certain embodiments it is adequate for only one of either the edge portion 2', 2'' or the end gable circular blank 3, 4 to be provided with an adhesive, e.g. such that only the end gable circular blank is provided with a thermoplastic resin. In certain embodiments it is also conceivable to use an adhesive other than a thermoplastic resin, such as glue that is coated or sprayed on.

[0031] It is furthermore realised that different types of slitting devices can be used even though an apparatus according to the principles described above is preferred since it is able to make the slits before the winding about the paper roll has taken place. Hereby, slits are applied before the paper is heated up, which is advantageous among other things because the slitting device is not affected by residues of heated material (molten plastics). The slitting device can apply slits of infinitely variable distance 25, in order for the distance (preferably automatically) to be adapted to the diameter D of the roll, such that the roll 1 is packed in such a way that the slits end up between each other in overlapping turns.

[0032] Slits can also be applied in the packing paper in connection with the production thereof (in the roll machine), particularly if large series of rolls with the same dimensions are to be packed, it being realised that the slitting device 5A, 5B flexibly can be positioned in different positions depending on the circumstances. In some applications, the slitting device 5A, 5B is arranged to be laterally displaceable in order to be adjusted for varying positions of the web edge, e.g. when a complete web is used which means that an adaptation to different rolls widths is necessary. Hereby, an extra long knife, e.g. 300 mm, is used in order to be able to cut extra long flaps 24 when needed. It is realised that the slitting device 5A, 5B and its design and function can be made the object of individual patent protection, as it may be used in other applications with similar needs. It is also realised that instead of a heating device 90 a hot melt or any other type of adhesive can be applied in the area of the overlapping portion of the edge paper. It is realised that the term slit should be interpreted broadly, to encompass other methods than a pure cutting-through of the paper,

e.g. also perforation or other treatment that achieve a desired weakening in order to achieve flaps.

Claims

1. A method for packaging of paper and board rolls (1), comprising a sheath paper web (2) consisting of a papery carrier (20) with side edge portions (22) that have least one portion thereof covered by a thermoplastic resin (21) that becomes adhesive when heated, said method comprises the winding of said sheath paper web (2) at least one turn about the envelope surface (10) of the roll (1) with the thermoplastic resin (21) facing the envelope surface (10) and the papery carrier (20) facing away from the envelope surface (10), such that a side edge portion (22) of the sheath paper web (2) projects externally of each end gable (11; 12) of the roll (1), the bringing of end gable circular blanks sized (d) to fit the diameter (D) of the roll (1) to lie against the end gables (11, 12) of the roll (1), and the folding of the projecting side edge portion (22) down against the end gable (11; 12) of the roll, providing the projecting side edge portion (22) to be folded down against the end gable (11; 12) of the roll with a series of lateral slits (23) that between themselves form a series of tongues (24, 24'), and heat sealing the folded-down side edge portions (22) against the end gable circular blank (3; 4) positioned between the end gable (11; 12) of the roll and the side edge portion (22), wherein after the overlapping, said tongues (24, 24') partly overlap each other and that they in connection with the heat sealing give a covering sealing of the sheath paper web (2) against the end gable circular blank (3; 4) **characterised in that** the end gable circular blank (3, 4) constitutes the only end gable circular blank at each end in question of the final packed board or paper roll (1), that the arranging of said slits (23) is made before the paper web contacts the roll (1), and that a spacing (25) between the slits (23) is adapted such that when the sheath paper web (2) has been wound more than one turn around the envelope surface (10) of the roll (1), the slits (23) of the outer turn are not positioned over the slits of the inner turn, and that the packing with the sheath paper web is performed with one edge web (2', 2'') at each end gable (11, 12) and at least one intermediate sheath paper web (2'') that at its edge areas overlaps or is overlapped by the edge webs (2', 2'').
2. A method according to claim 1, **characterized in that** the diameter (d) of said end gable circular blank (3, 4) is adapted to the diameter (D) of said end gable (11, 12) in such a way that $D-3 \text{ mm} < d < D+3 \text{ mm}$.
3. A method according to any one of claims 1-2, **characterised in that** the thermoplastic resin (21) covers

the entire side of the papery carrier (20), such that the sheath paper web (2, 2', 2'', 2''') consists of a laminate of the carrier (20) and the thermoplastic resin (21).

5

4. A method according to any one of claims 1-3, **characterised in that** the end gable circular blank (3; 4) comprises a paper fibre material.

10

5. A method according to any one of claims 1-4, **characterised in that** said slits (23) are arranged before the paper web (2) with the thermoplastic resin (21) reaches the device (90) where the web is heated to become adhesive.

15

6. A method according to claim 4, **characterised in that** the end gable circular blank (3; 4) consists of a carrier (30) of a paper fibre material that has one side thereof at least partly covered with a thermoplastic resin (31) that becomes adhesive when heated.

20

7. A method according to claim 6, **characterised in that** the thermoplastic resin (31) covers the entire side of the carrier (30) of paper fibre material, such that the end gable circular blank (3; 4) consists of a laminate of the carrier (30) and the thermoplastic resin (31).

25

30

8. A method according to claim 6 or 7, **characterised in that** the end gable circular blank (3; 4) is applied against the end gable (11; 12) of the roll with the carrier (30) facing the end gable (11; 12) of the roll and the thermoplastic resin (31) facing away from the end gable (11; 12) of the roll.

35

Patentansprüche

40

1. Verfahren zum Verpacken von Papier- und Papprollen (1), eine umhüllende Papierbahn (2) umfassend, die aus einem papierähnlichen Träger (20) mit seitlichen Randabschnitten (22) besteht, von denen mindestens ein Abschnitt mit thermoplastischem Kunststoff (21) bedeckt ist, der, wenn er erhitzt wird, klebend wird, wobei in dem Verfahren die umhüllende Papierbahn (2) mindestens ein Mal um die Mantelfläche (10) der Rolle (1) herum gewickelt wird, wobei der thermoplastische Kunststoff (21) zu der Mantelfläche (10) gewandt ist und der papierähnliche Träger (20) von der Mantelfläche (10) abgewandt ist, dergestalt dass ein seitlicher Randabschnitt (22) der umhüllenden Papierbahn (2) nach außen von jeder Stirnseite (11, 12) der Rolle (1) übersteht, bewirkt wird, dass kreisförmige Stirnseitenzuschnitte mit Maß (d) dem Durchmesser (D) der Rolle (1) angepasst sind, damit sie an den Stirnseiten (11, 12) der Rolle (1) anliegen, und der überstehende seitli-

45

50

55

che Randabschnitt (22) nach unten gegen die Stirnseite (11; 12) der Rolle gefaltet wird, eine Reihe von seitlichen Einschnitten (23), die untereinander eine Reihe von Zungen (24, 24') ausbilden, an dem überstehenden seitlichen Randabschnitt (22) bereitgestellt wird, der gegen die Stirnseite (11, 12) der Rolle nach unten umgefaltet werden soll, und die nach unten umgefalteten seitlichen Randabschnitte (22) gegen den kreisförmigen Stirnseitenzuschnitt (3; 4), der zwischen der Stirnseite (11; 12) der Rolle und dem seitlichen Randabschnitt (22) angeordnet ist, heißgesiegelt werden, wobei die Zungen (24, 24') nach dem Überlappen einander teilweise überlappen und sie in Verbindung mit dem Heißsiegeln eine abdeckende Siegelung der umhüllenden Papierbahn (2) an dem kreisförmigen Stirnseitenzuschnitt (3; 4) ergeben, **dadurch gekennzeichnet, dass** der kreisförmige Stirnseitenzuschnitt (3, 4) den einzigen kreisförmigen Stirnseitenzuschnitt an jedem betreffenden Ende der fertig verpackten Papp- oder Papierrolle (1) darstellt, dass das Anordnen der Einschnitte (23) vorgenommen wird, bevor die Papierbahn mit der Rolle (1) in Kontakt kommt, und dass ein Abstand (25) zwischen den Einschnitten (23) dergestalt angepasst ist, dass, wenn die umhüllende Papierbahn (2) mehr als ein Mal um die Mantelfläche (10) der Rolle (1) gewickelt worden ist, die Einschnitte (23) der äußeren Wicklung nicht über den Einschnitten der inneren Wicklung angeordnet sind, und dass das Verpacken mit der umhüllenden Papierbahn mit einer einzigen Randbahn (2', 2'') an jeder Stirnseite (11, 12) und an mindestens einer dazwischen liegenden umhüllenden Papierbahn (2'') durchgeführt wird, welche mit ihren Randbereichen die Randbahnen (2', 2'') überlappt oder von ihnen überlappt wird.

2. Verfahren nach Anspruch 1, **dadurch gekennzeichnet, dass** der Durchmesser (d) des kreisförmigen Stirnseitenzuschnitts (3, 4) dergestalt an den Durchmesser (D) der Stirnseite (11, 12) angepasst ist, dass $D-3 \text{ mm} < d < D+3 \text{ mm}$ ist.
3. Verfahren nach irgendeinem der Ansprüche 1 bis 2, **dadurch gekennzeichnet, dass** der thermoplastische Kunststoff (21) die gesamte Seite des papierähnlichen Trägers (20) dergestalt bedeckt, dass die umhüllende Papierbahn (2, 2', 2'', 2''') aus einem Laminat des Trägers (20) und des thermoplastischen Kunststoffes (21) besteht.
4. Verfahren nach irgendeinem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** der kreisförmige Stirnseitenzuschnitt (3; 4) ein Papierfasermaterial umfasst.
5. Verfahren nach irgendeinem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** die Einschnitte

(23) angeordnet werden, bevor die Papierbahn (2) mit dem thermoplastischen Kunststoff (21) die Vorrichtung (90) erreicht, in der die Bahn erhitzt wird, um klebend zu werden.

6. Verfahren nach Anspruch 4, **dadurch gekennzeichnet, dass** der kreisförmige Stirnseitenzuschnitt (3; 4) aus einem Träger (30) aus Papierfasermaterial besteht, dessen eine Seite mindestens teilweise mit einem thermoplastischen Kunststoff (31) bedeckt ist, der beim Erhitzen klebend wird.
7. Verfahren nach Anspruch 6, **dadurch gekennzeichnet, dass** der thermoplastische Kunststoff (31) die gesamte Seite des Trägers (30) aus Papierfasermaterial dergestalt bedeckt, dass der kreisförmige Stirnseitenzuschnitt (3; 4) aus einem Laminat des Trägers (30) und des thermoplastischen Kunststoffes (31) besteht.
8. Verfahren nach Anspruch 6 oder 7, **dadurch gekennzeichnet, dass** der kreisförmige Stirnseitenzuschnitt (3; 4) gegen die Stirnseite (11; 12) der Rolle gelegt wird, wobei der Träger (30) der Stirnseite (11; 12) der Rolle zugewandt ist und der thermoplastische Kunststoff (31) von der Stirnseite (11; 12) der Rolle abgewandt ist.

Revendications

1. Un procédé pour le conditionnement de rouleaux (1) de papier et de carton, comprenant une bande (2) de papier de gainage constituée par un support (20) en une sorte de papier ayant des portions (22) formant des bords latéraux dont moins d'une partie est recouverte par une résine thermoplastique (21) qui devient adhésive lorsqu'elle est chauffée, ledit procédé comprenant l'enroulement de ladite bande (2) de papier de gainage sur au moins un tour autour de la surface d'enveloppe (10) du rouleau (1) avec la résine thermoplastique (21) faisant face à la surface d'enveloppe (10) et le support (20) en une sorte de papier opposé à la surface d'enveloppe (10), de sorte qu'une portion (22) formant bord latéral de la bande (2) de papier de gainage fait saillie vers l'extérieur de chacune des faces d'extrémité (11, 12) du rouleau (1), le fait de placer des flans circulaires de faces d'extrémité, dimensionnés (d) pour correspondre au diamètre (D) du cylindre (1), de manière à ce qu'ils s'étendent contre les faces d'extrémité (11, 12) du rouleau (1), et le fait de plier vers le bas la portion (22) formant bord latéral, faisant saillie, contre la face d'extrémité (11, 12) du rouleau, faisant ainsi que la portion de bord latéral (22), faisant saillie, soit pliée vers le bas contre la face d'extrémité (11, 12) du rouleau avec une série de fentes latérales (23) qui forment entre elles une série de languettes (24, 24'),

et le fait de sceller à chaud les portions (22) formant bords latéraux contre le flan circulaire (3, 4) de face d'extrémité placé entre la face d'extrémité (11, 12) du rouleau et la portion (22) formant bord latéral ; procédé dans lequel, après le chevauchement, lesdites languettes (24, 24') se chevauchent partiellement les unes les autres, et, du fait du scellement à chaud, forment un scellement de recouvrement de la bande (2) de papier de gainage contre le flan circulaire (3, 4) de face d'extrémité, **caractérisé en ce que** le flan circulaire (3, 4) de face d'extrémité constitue le seul flan circulaire de face d'extrémité présent à chaque extrémité en question du rouleau (1) de papier ou de carton final emballé, **en ce que** l'agencement desdites fentes (23) est réalisé avant que la bande de papier ne soit en contact avec le rouleau (1), et **en ce qu'un** espacement (25) entre les fentes (23) est adapté de telle sorte que, lorsque la bande (2) de papier de gainage a été enroulée sur plus d'un tour autour de la surface d'enveloppe (10) du rouleau (1), les fentes (23) de l'enroulement extérieur ne sont pas positionnées par dessus des fentes de l'enroulement intérieur, et **en ce que** l'emballage avec la bande de papier de gainage est réalisé avec une bande de bordure (2', 2'') au niveau de chaque face d'extrémité (11, 12) et avec au moins une bande de papier de gainage (2'') intermédiaire, qui, au niveau de ses zones de bordure, recouvre ou est recouverte par les bandes de bordure (2', 2'').

2. Un procédé selon la revendication 1, **caractérisé en ce que** le diamètre (d) dudit flan circulaire (3, 4) de face d'extrémité est adapté au diamètre (D) de ladite face d'extrémité (11, 12) de telle sorte que $D-3 \text{ mm} < d < D+3 \text{ mm}$.

3. Un procédé selon l'une quelconque des revendications 1 à 2, **caractérisé en ce que** la résine thermoplastique (21) recouvre la totalité du côté du support (20) en une sorte de papier, de telle sorte que la bande de papier de gainage (2, 2', 2'', 2''') est constituée d'un stratifié du support (20) et de la résine thermoplastique (21).

4. Un procédé selon l'une quelconque des revendications 1 à 3, **caractérisé en ce que** le flan circulaire (3, 4) de face d'extrémité comprend un matériau en fibre de papier.

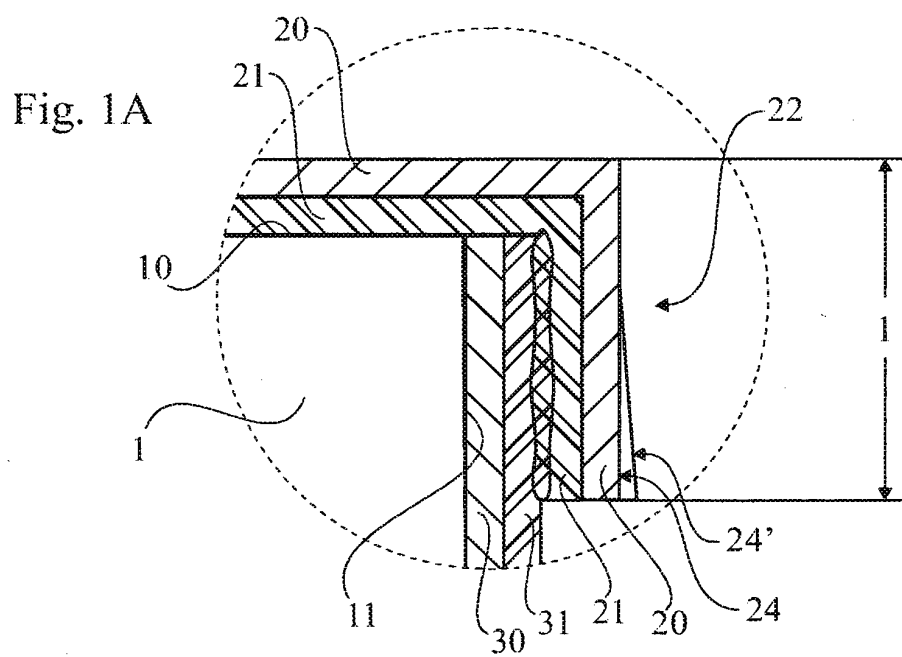
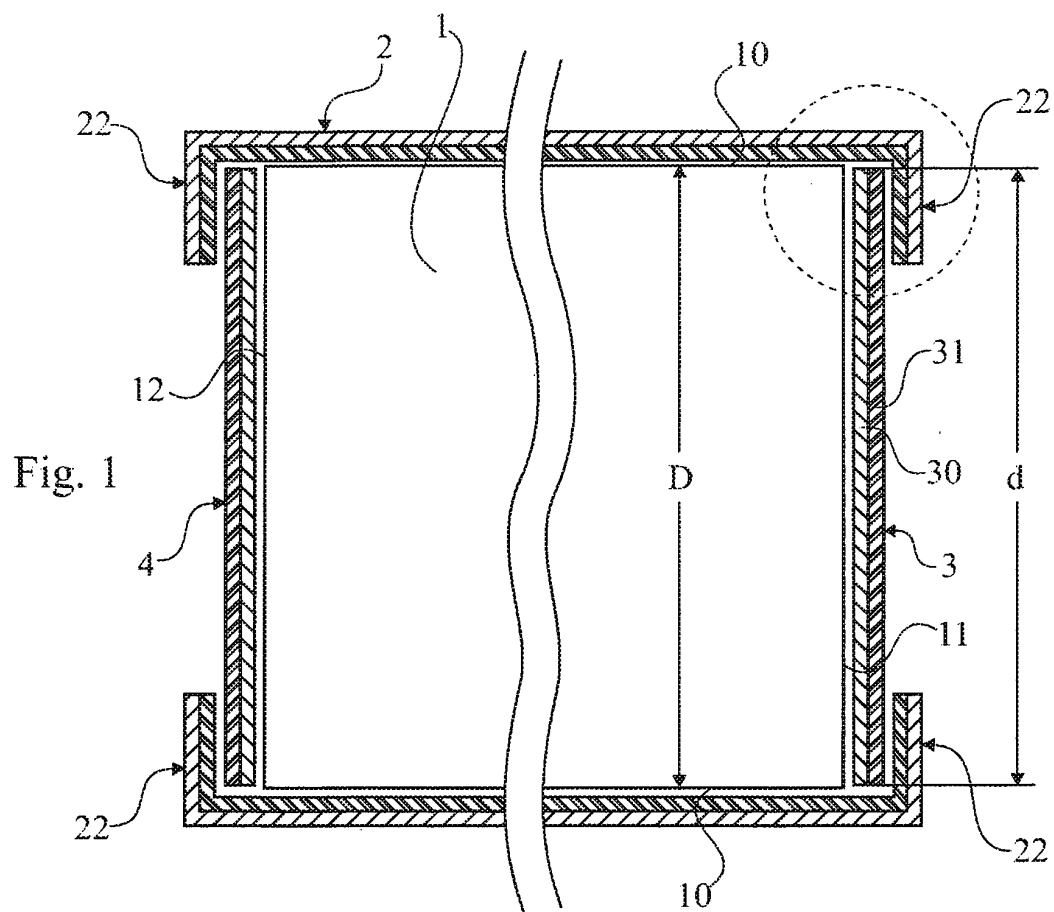
5. Un procédé selon l'une quelconque des revendications 1 à 4, **caractérisé en ce que** lesdites fentes (23) sont agencées avant que la bande de papier (2) avec la résine thermoplastique (21) atteigne le dispositif (90) dans lequel la bande est chauffée pour devenir adhésive.

6. Un procédé selon la revendication 4, **caractérisé en ce que** le flan circulaire (3, 4) de face d'extrémité se

compose d'un support (30) en un matériau de fibres de papier dont un des côtés est au moins partiellement recouvert d'une résine thermoplastique (31) qui devient adhésive lorsqu'elle est chauffée.

7. Un procédé selon la revendication 6, **caractérisé en ce que** la résine thermoplastique (31) recouvre la totalité du côté du support (30) en un matériau de fibres de papier, de telle sorte que le flan circulaire (3, 4) de face d'extrémité se compose d'un stratifié du support (30) et de la résine thermoplastique (31).

8. Un procédé selon la revendication 6 ou 7, **caractérisé en ce que** le flan circulaire (3, 4) de face d'extrémité est appliqué contre la face d'extrémité (11, 12) du rouleau avec le support (30) tourné vers la face d'extrémité (11, 12) du rouleau et la résine thermoplastique (31) tournée à l'opposé de la face d'extrémité (11, 12) du rouleau.



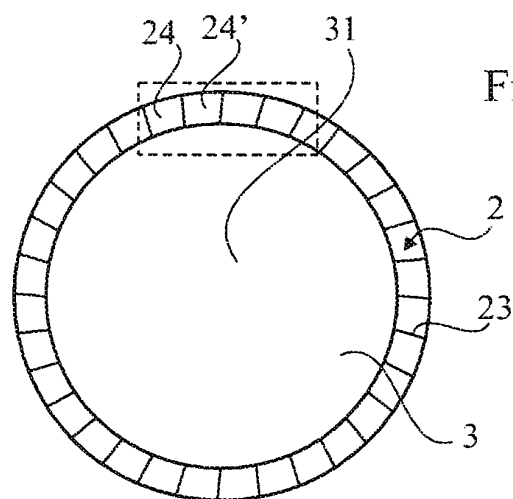
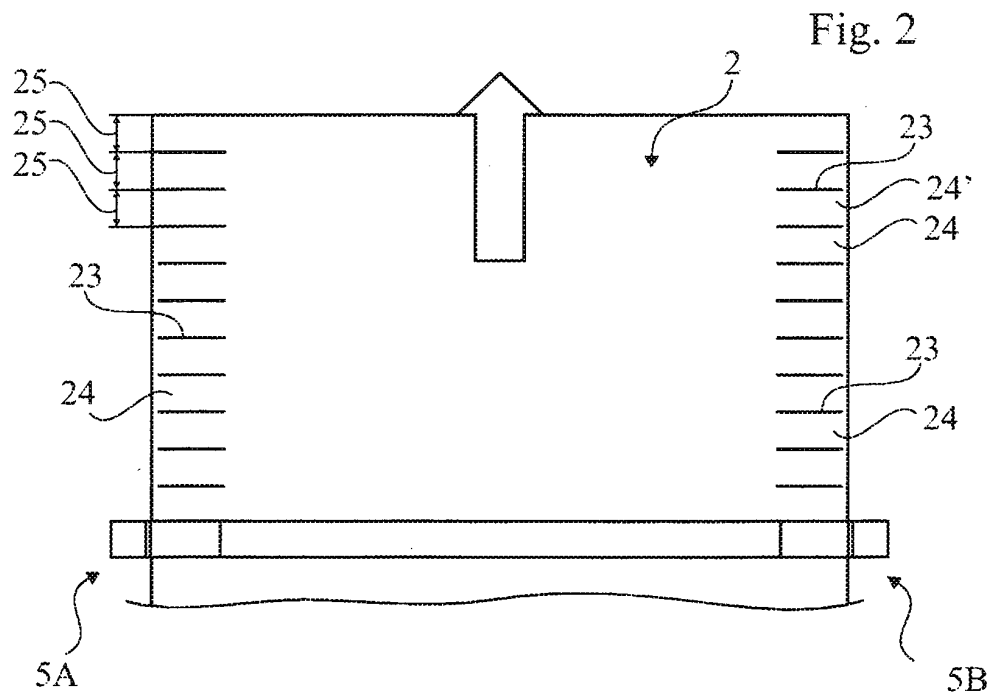


Fig. 3A

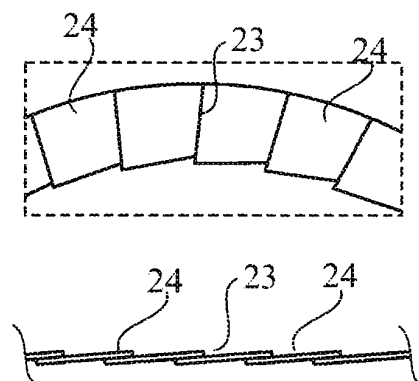
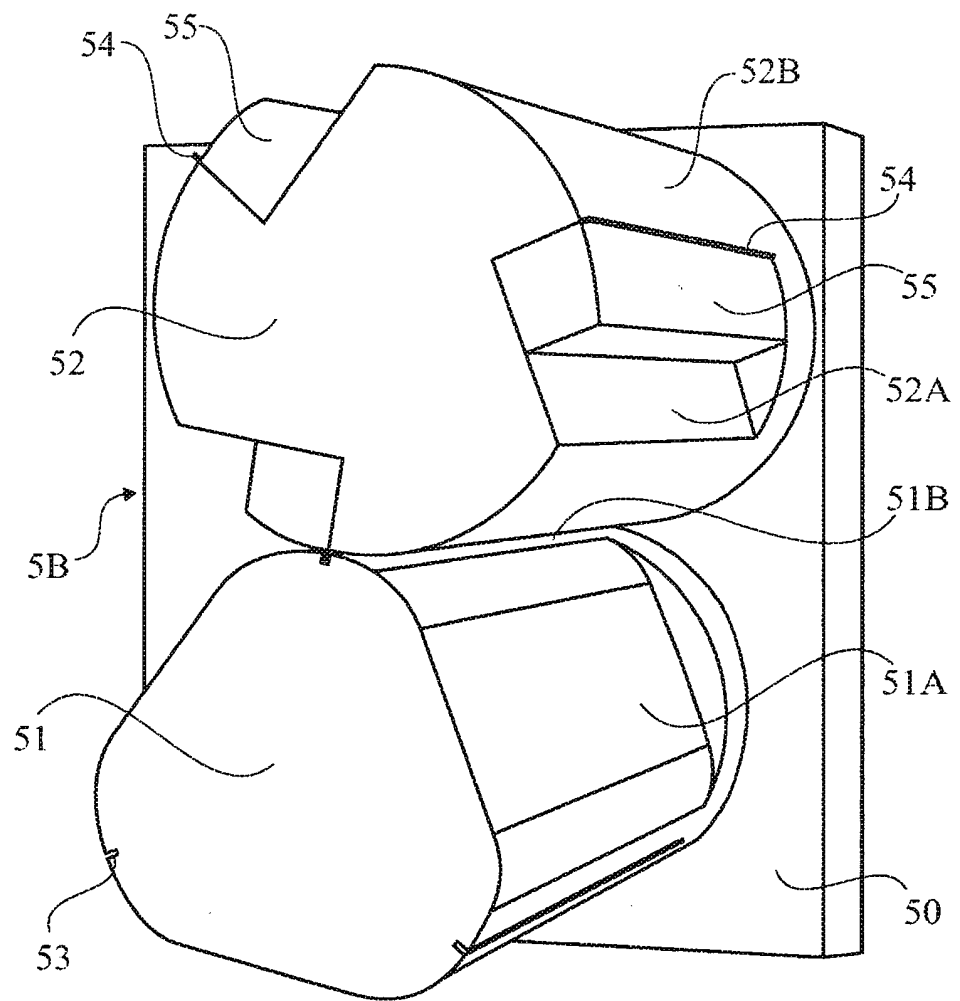


Fig. 4



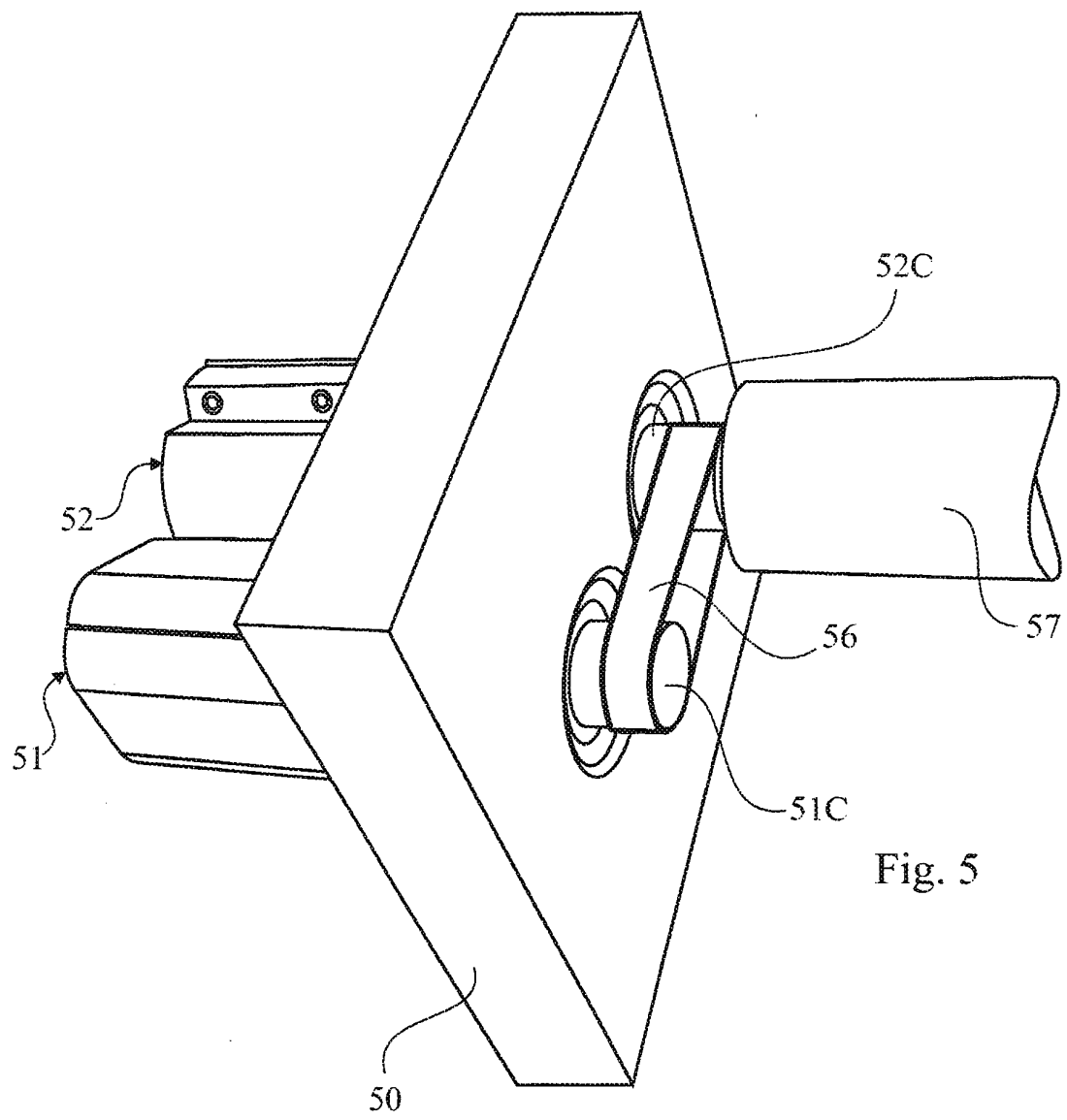


Fig. 5

Fig. 6

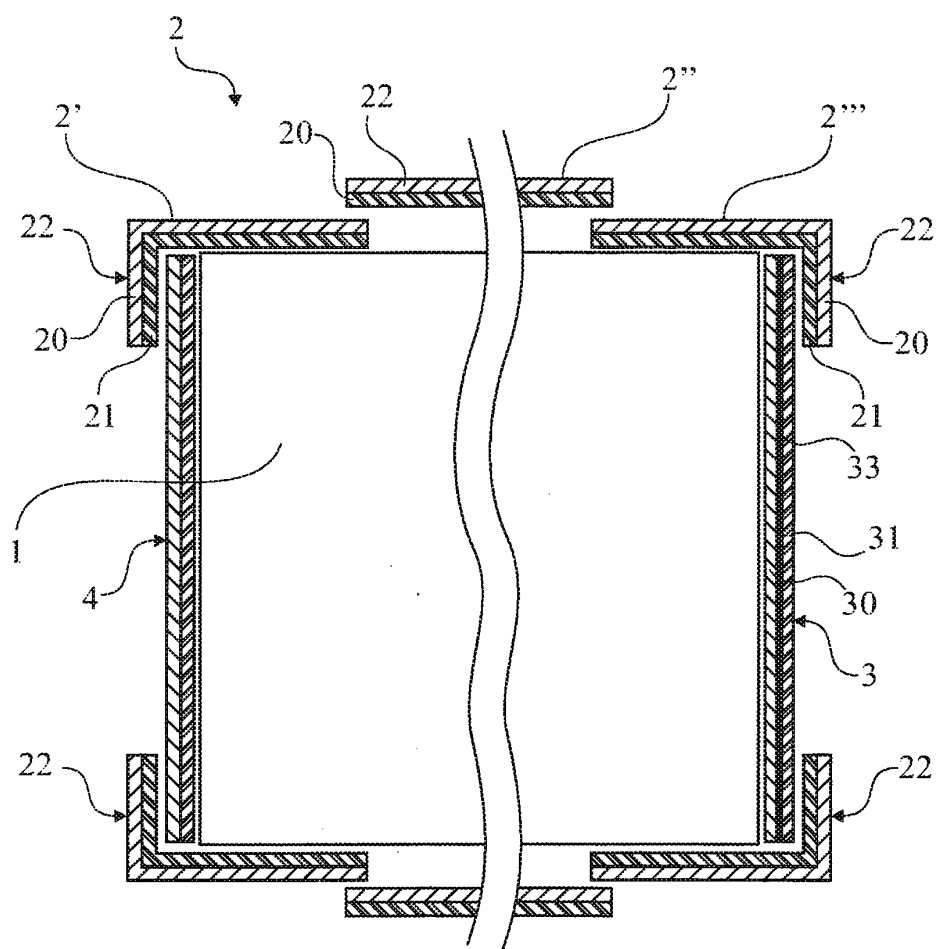


Fig. 7

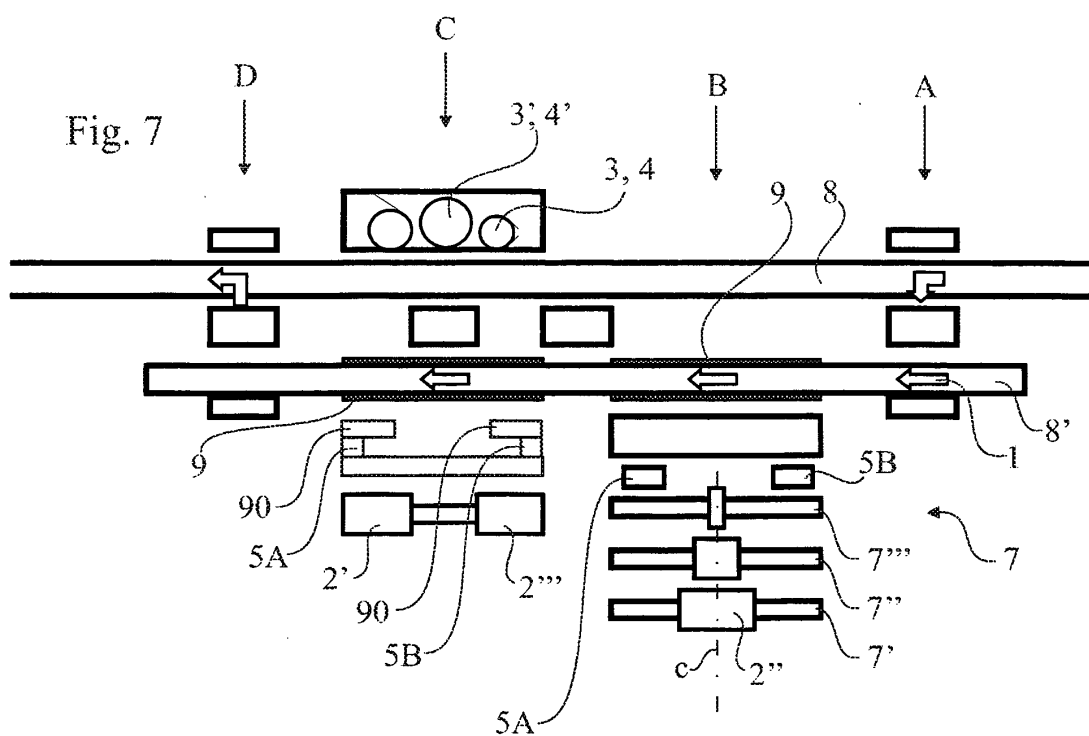
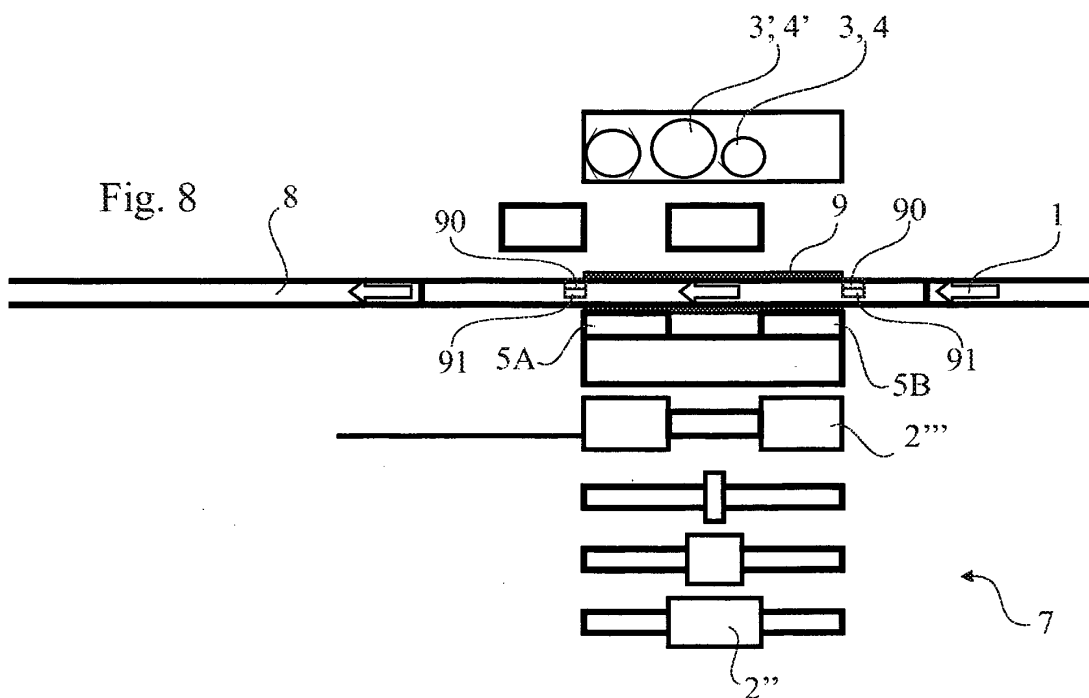


Fig. 8



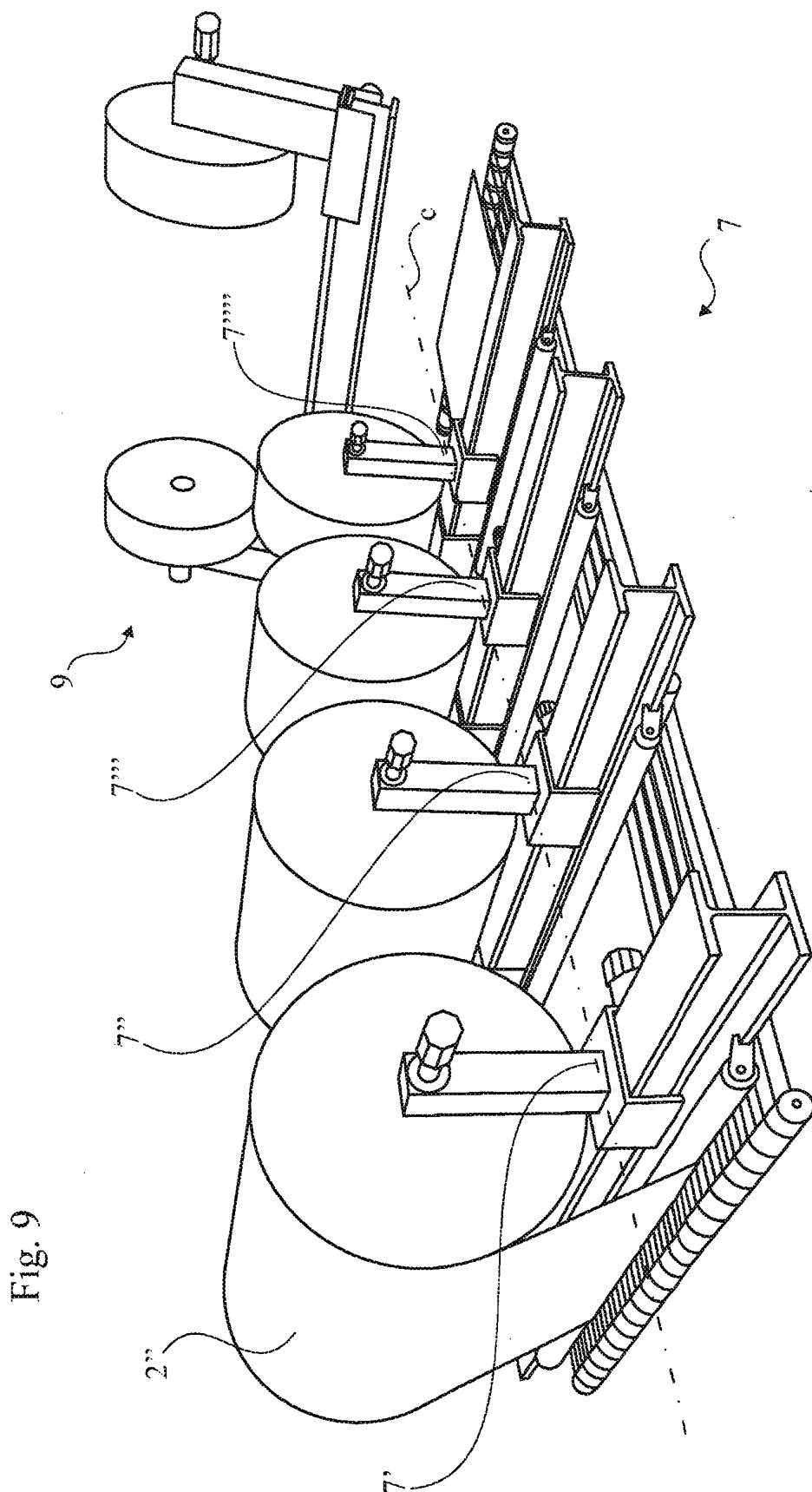
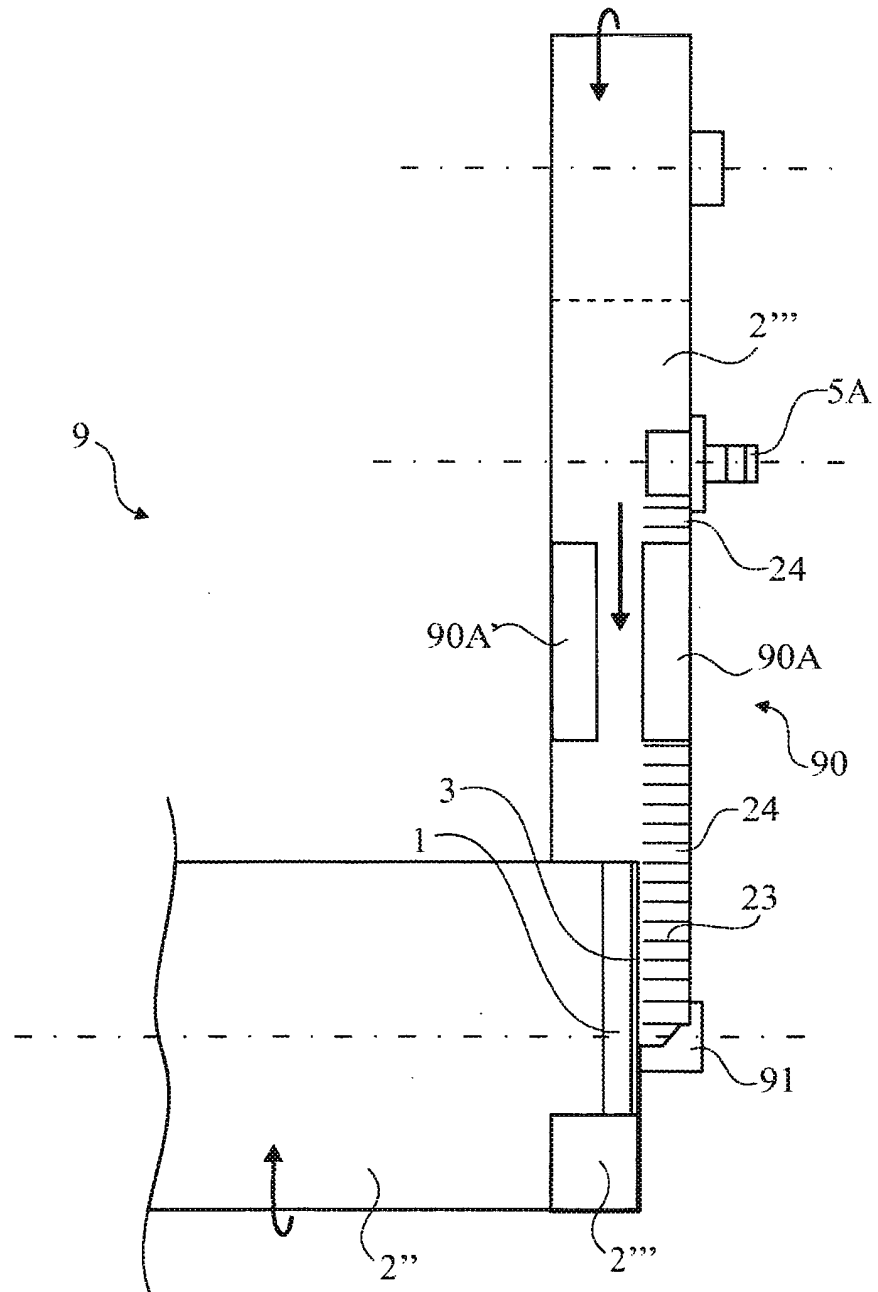


Fig. 10



REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- GB 544993 A [0002]
- US 6505459 B1 [0002]
- US 5265399 A [0002]