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(54) **WRAPPING METHOD AND PACKER MACHINE TO FOLD A WRAPPER AROUND A GROUP OF TOBACCO ARTICLES**

(57) A wrapping method and a packer machine (11) to fold a wrapper (9) around a group (2) of tobacco articles with a parallelepiped shape; along a wrapping path (P1) a pocket (17) is fed, which houses the group (2) of tobacco articles; the wrapper (9) is laid on a first larger lateral wall (5a) of the group (2) of tobacco articles; initially the wrapper (9) is folded around a first transverse corner of the group (2) of tobacco articles defined between the first larger lateral wall (5a) and an upper wall (3), in order to lay the wrapper (9) on the upper wall (3) giving to the wrapper (9) an "L" shape; and subsequently the wrapper (9) is folded around a second transverse corner of the group (2) of tobacco articles defined between a second larger lateral wall (5b) and the upper wall (3), in order to complete the "U" folding of the wrapper (9).

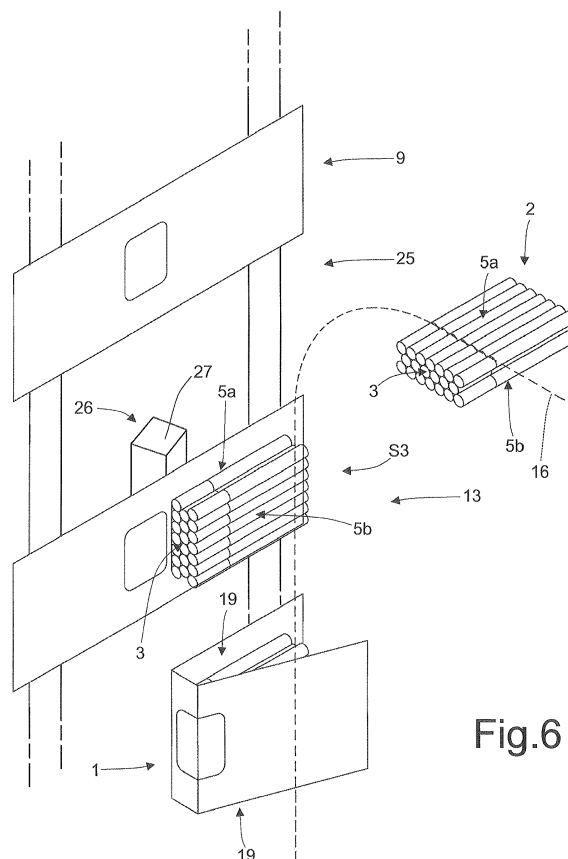


Fig.6

Description

TECHNICAL FIELD

[0001] The present invention relates to a wrapping method and to a packer machine to fold a wrapper around a group of tobacco articles.

[0002] The present invention finds advantageous application in the folding of a heat-sealable wrapper around a parallelepiped group of cigarettes to make a sealed wrap, to which the following description will make explicit reference without implying any loss of generality.

PRIOR ART

[0003] Rigid packets of cigarettes of the type described in Patent US4300676A1 have been proposed for several years on the market, wherein the inner wrap is impermeable and is formed by a wrapper of impermeable and heat-sealable material having a cigarette pull-out opening, which is closed by a reusable closing tab.

[0004] Currently, to produce the inner wrap a central portion of the wrapper is brought in contact with an upper wall of the group of cigarettes, and then the wrapper is folded in a "U" shape around the transverse edges of the upper wall to lay on the larger lateral walls of the group of cigarettes.

[0005] By following the wrapping method described above it may happen that the wrapper is not perfectly centered both longitudinally (i.e. with respect to the upper wall and to the lower wall of the group of cigarettes) and transversely (i.e. with respect to the larger lateral walls of the group of cigarettes). In case of wrong longitudinal centering of the wrapper with respect to the group of cigarettes, the pull-out opening (overlaid by the reusable closing tab) is not in the desired position and above all the tails of the wrapper in the area of the lower wall of the group of cigarettes are asymmetrical (i.e. one being longer and one being shorter than necessary) making it complicated (if not impossible) to obtain good closure (thus a tight seal) of the inner wrap in the area of the lower wall. In case of wrong transverse centering of the wrapper with respect to the group of cigarettes, the lateral flaps of the wrapper are asymmetrical (i.e. one being longer and one being shorter than necessary) making it complicated (if not impossible) to obtain good closure (thus a tight seal) of the inner wrap in the area of the lateral wall.

[0006] It is important to note that the incorrect centering of the wrapper with respect to the group of cigarettes occurs more frequently when the wrapping process is carried out in a fast packer machine with high hourly productivity, and when the group of cigarettes is slim (i.e. when the upper wall of the group of cigarettes is significantly smaller than the standard).

DESCRIPTION OF THE INVENTION

[0007] The object of the present invention is to provide a packing method and a packer machine to fold a wrapper around a group of tobacco articles, which wrapping method and packer machine are free from the drawbacks described above and are, at the same time, easy and inexpensive to produce.

[0008] According to the present invention, a packing method and a packer machine to fold a wrapper around a group of tobacco articles are provided, as claimed in the attached claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The present invention will now be described with reference to the accompanying drawings, which illustrate some examples of non-limiting embodiments, wherein:

- Figure 1 illustrates a front perspective view of a cigarettes wrap made according to the wrapping method of the present invention;
- Figure 2 illustrates a perspective view of a group of cigarettes held in the wrap of Figure 1;
- Figure 3 illustrates a perspective view of a stiffener which can be held in the wrap of Figure 1;
- Figure 4 illustrates a plan view of a wrapper used to make the wrap of figure 1;
- Figure 5 is a schematic and perspective view of a packer machine which produces the wrap of figure 1 and is made according to the present invention;
- Figure 6 is a view in enlarged scale of a detail of the packer machine Figure 5; and
- Figure 7 is a perspective view and in enlarged scale of an alternative of a wrapping conveyor of the packer machine figure 5.

PREFERRED EMBODIMENTS OF THE INVENTION

[0010] In Figure 1 number 1 denotes as a whole a sealed wrap for cigarettes for example of the type described in Patent US4300676A1.

[0011] As illustrated in Figure 2, the wrap 1 for cigarettes holds a parallelepiped-shaped group 2 of cigarettes having an upper wall 3 and a lower wall 4 that are formed by the tips of the cigarettes and are parallel and opposite to one another, two larger lateral walls 5 that are formed by the cylindrical lateral walls of the cigarettes and are parallel and opposite to one another, and two smaller lateral walls 6 which are formed by the cylindrical lateral walls of the cigarettes and are parallel and opposite to one another.

[0012] As illustrated in Figures 1 and 4, the wrap 1 has at the top and in front a cigarette pull-out opening 7 (visible in Figure 34), which is delimited by a pre-weakened tear line, it is closed by a reusable closing tab 8 and involves a portion of a front wall of the wrap 1 and a portion

of an upper wall of the wrap 1. According to a preferred embodiment, the closing tab 8 is fixed to the wrap 1 for cigarettes by means of a repositionable adhesive that does not dry, which is applied to the bottom surface of the closing tab 8 and is arranged all around the pull-out opening 7 to allow the closing tab 8 to be partially separated from the wrap 1 for several times and then be fixed again to the wrap 1.

[0013] The wrap 1 is made by folding a wrapper 9 of rectangular shape (illustrated in Figure 4) around the group 2 of cigarettes (illustrated in Figure 2). Before folding the wrapper 9 around group 2 of cigarettes, the wrapper 9 itself is centrally precut to define the pull-out opening 7; subsequently, to the wrapper 9 the closing tab 8 with rubberized bottom is applied, that is, provided with the repositionable adhesive at the bottom surface thereof which, inside the pull-out opening 7, determines the permanent gluing of the inner portion of the wrapper 9 to the closing tab 8 and outside of the pull-out opening 7 determines a separable gluing of the wrapper 9 to the closing tab 8.

[0014] As illustrated in Figure 3, the wrap 1 may comprise a stiffener 10, which is made of cardboard or rigid paperboard, is "U"-shaped and is arranged inside the wrap 1 contacting the group 2 of cigarettes. The function of the stiffener 10 is to confer greater rigidity and greater shape stability to the wrap 1 so as to prevent the wrap 1 itself from collapsing on itself after removing a part of the cigarettes contained inside the wrap 1 making the pulling-out of the remaining cigarettes complicated and, in particular, making the opening and the subsequent closing of the closing tab 8 extremely complicated. An additional function of the stiffener 10 is to provide a mechanical protection for the cigarettes during the folding of the wrapper 9, a mechanical and thermal protection for the cigarettes when the superimposed portions of the wrapper 9 are heat sealed, and a mechanical protection for the cigarettes during handling of the wrap 1.

[0015] In figure 5, number 11 denotes as a whole a packer machine which is adapted to obtain the wrap 1 described above.

[0016] It is important to note that packer machine 11 may comprise only the components illustrated in figure 5 (in this case each wrap 1 described above is a finished and directly marketable product); alternatively, the packer machine 11 may comprise further components of known type to wrap around each wrap 1 a respective outer casing, which encloses the wrap 1 and may be formed by a cup-shaped outer wrapper folded around the wrap 1 (soft type packet of cigarettes), or it can be formed by a rigid box with hinged-lid obtained by folding a rigid blank around the wrap 1 (rigid type packet of cigarettes).

[0017] The packer machine 11 comprises a forming unit 12 where the groups 2 of cigarettes are obtained in succession, a preliminary folding unit 13 where around each group 2 of cigarettes a corresponding wrapper 9 is folded in a "U" shape, a longitudinal folding unit 14 where

each wrapper 9 is longitudinally folded in the area of the smaller lateral walls 6 of the respective group 2 of cigarettes, and a transverse folding unit 15 where each wrapper 9 is transversely folded in the area of the lower wall 4 of the respective group 2 of cigarettes.

[0018] The packer machine 11 comprises a wrapping conveyor 16, which comprises a plurality of pockets 17 which are adapted to house corresponding groups 2 of cigarettes and are step-fed (that is, with a law of motion which cyclically alternates a movement step and a rest step) along a wrapping path P1 passing through the forming unit 12 and the preliminary folding unit 13. Preferably, the pockets 17 project from the wrapping conveyor 16, i.e. each pocket 17 is fixed to the wrapping conveyor 16 only in the area of a first end and a second end opposite the first end is free from constraints to the wrapping conveyor 16 and relatively far from the same wrapping conveyor 16. In the non-limiting embodiment illustrated in the accompanying figures, the wrapping conveyor 16 comprises a belt, which is wound around end pulleys (one of which is powered) and moves by step along a path closed in a loop; alternatively, the wrapping conveyor 16 comprises a wheel mounted in rotatable manner around a central rotation axis. The forming unit 12 of the groups 2 of cigarettes comprises a hopper 18 provided with three outlets for simultaneously feeding three groups 2 of cigarettes to respective pockets 17 of the wrapping conveyor 16 advancing by step along straight wrapping path P1.

[0019] The preliminary folding unit 13 is arranged along the wrapping conveyor 16 (i.e. along the wrapping path P1) downstream of the forming unit 12. As better illustrated in Figure 6, in the preliminary folding unit 13 each group 2 of cigarettes carried by a pocket 17 is coupled to the corresponding outspread wrapper 9, by laying a lateral part of the wrapper 9 on a first larger lateral wall 5a of the group 2 of cigarettes; subsequently, the wrapper 9 is folded in a "U" shape around the corresponding group 2 of cigarettes so as to form a "U"-shaped wrap 1 having two open lateral ends 19 that display the corresponding smaller lateral walls 6 of the group 2 of cigarettes.

[0020] In the preliminary folding unit 13, initially the wrapper 9 is folded by 90° around a first transverse corner of the group 2 of cigarettes, defined between the first larger lateral wall 5a and the upper wall 3, in order to lay the wrapper 9 on the upper wall 3 thereby giving to the wrapper 9 an "L" shape (at least in the area of the first transverse corner of the group 2 of cigarettes); subsequently, the wrapper 9 is folded by (about) 90° around a second transverse corner of the group 2 of cigarettes, defined between a second larger lateral wall 5b (opposite to the first larger lateral wall 5a) and the upper wall 3, in order to lay the wrapper 9 on the second larger lateral wall 5b (or, alternatively, so as to bring the wrapper 9 closer to the second larger lateral wall 5b) thereby giving to the wrapper 9 a "U" shape. It is important to note that the initial "L" folding of the wrapper 9 and the subsequent "U" folding of the wrapper 9 are performed without inter-

ruption during a single folding operation; i.e. a single folding operation determines the folding of the wrapper 9 both around the first transverse corner of the group 2 of cigarettes, and around the second transverse corner of the group 2 of cigarettes.

[0021] According to alternative and completely equivalent embodiments, in the preliminary folding unit 13 the wrapper 9 is folded around the first transverse corner of the group 2 of cigarettes, defined between the second larger lateral wall 5b and the upper wall 3, in order to lay the wrapper 9 on the second larger lateral wall 5b from the outset or, in order to bring the wrapper 9 closer to the second larger lateral wall 5b (as illustrated in the attached figures); in the latter case, the wrapper 9 is further folded around the second transverse corner of the group 2 of cigarettes, defined between the second larger lateral wall 5b and the upper wall 3, in order to lay the wrapper 9 on the second larger lateral wall 5b when the group 2 of cigarettes leaves the corresponding pocket 17 of the wrapping conveyor 16 together with the wrapper 9.

[0022] The longitudinal folding unit 14 comprises a longitudinal wrapping conveyor 20, which receives in succession the wraps 1 (each consisting of a wrapper 9 folded in a "U" shape around a corresponding group 2 of cigarettes) from the wrapping conveyor 16 in a transfer station S1 and feeds in succession the wraps 1 along a longitudinal folding path P2 that is straight and is arranged perpendicular to the wrapping path P1. Along the wrapping conveyor 16 the groups 2 of cigarettes are fed transversely (i.e. the cigarettes are arranged perpendicular to the wrapping path P1), while along the wrapping conveyor 20 the groups 2 of cigarettes are fed longitudinally (i.e. the cigarettes are arranged parallel to the wrapping path P2). The longitudinal folding unit 14 comprises on each side of the longitudinal folding path P2 a central fixed folder of a known type which fold one lateral open end 16 of the wrap 1 to form a longitudinal fin 21 arranged perpendicular to an underlying smaller lateral wall 6 of the group 2 of cigarettes. The longitudinal folding unit 14 comprises a welding device of known type which on each side of the wrap 1 welds the longitudinal fin 21 to stabilize the longitudinal fin 21 itself. Finally, the longitudinal folding unit 14 comprises a folding device (of known type and normally comprising fixed folding profiles), which is located downstream of the welding device on opposite sides of the longitudinal folding path P2 to fold by 90° each longitudinal fin 21, in order to lay the longitudinal fin 21 on the wrap 1 (i.e. to make the longitudinal fin 25 parallel to an underlying smaller lateral wall 6 of the group 2 of cigarettes).

[0023] In the non-limiting embodiment illustrated in the accompanying figures, the wrapping conveyor 20 is straight and has pushers which feed the wraps 1 through a fixed folding tunnel; alternatively, the wrapping conveyor 16 comprises a wheel mounted in a rotatable manner around a central rotation axis.

[0024] At the end of the longitudinal folding unit 14 (i.e. at the entrance 15 of the transverse folding unit) each

wrap 1 has a lower open end 22, which displays the lower wall 4 of group 2 of cigarettes. The transverse folding unit 15 comprises a transverse wrapping conveyor 23 (known and not illustrated), which receives in succession the wraps 1 (each consisting of a wrapper 9 folded into a tube around a corresponding group 2 of cigarettes) from the longitudinal wrapping conveyor 19 in a transfer station S2 and advances along a transverse folding path P3 which is circular and is located perpendicularly to the longitudinal folding path P2. Along the longitudinal folding path P2 the groups 2 of cigarettes are fed longitudinally (i.e. the cigarettes are arranged parallel to the longitudinal folding path P2), whereas along the transverse folding path P3 the groups 2 of cigarettes are fed transversely (i.e. the cigarettes are arranged perpendicularly to the transverse folding path P3).

[0025] In the non-limiting embodiment illustrated in the accompanying figures, the wrapping conveyor 23 comprises a wheel mounted in a rotatable manner around a central rotation axis; alternatively, the wrapping conveyor 23 is straight.

[0026] The transverse folding unit 15 comprises on one side of the transverse folding path P3 only, folders, which fold, in the area of the lower open end 22 of the wrap 1, each wrapper 9 to form a transverse fin 24 arranged perpendicularly to an underlying lower wall 4 of the group 2 of cigarettes. The transverse folding unit 15 comprises a welding device of known type that welds the transverse fin 24 to stabilize the transverse fin 24 itself. Finally, the transverse folding unit 15 comprises a folding device (of known type and normally comprising fixed folding profiles), which is located downstream of the welding device to fold by 90° the transverse fin 24, in order to lay the transverse fin 24 itself on the wrap 1 (i.e. to make the 24 transverse fin parallel to the underlying lower wall 4 of the group 2 of cigarettes).

[0027] The preliminary folding unit 13 comprises a feeding conveyor 25, which feeds in succession the wrappers 9 along a straight feeding path P4; by way of example, the feeding conveyor 25 comprises two conveyor belts which are closed in a loop, are located on opposite ends of the wrappers 9, and hold the wrappers 9 by sucking. The feeding path P4 has a section parallel and laterally adjacent to the wrapping path P1 in the area of a feeding station S3 in which each wrapper 9 is transferred from the feeding conveyor 25 to a pocket 17 of the wrapping conveyor 16 to be coupled, as previously described, to a corresponding group 2 of cigarettes. To the wrapping conveyor 16 a folding device 26 is coupled, which folds the wrapper 9 in a "U" shape around the group 2 of cigarettes as described previously. Preferably (but not obligatorily), the folding device 26 comprises a single folding element 27, which, on the whole, carries out a rotation of 180° to perform the "U" folding of the wrapper 9 around the group 2 of cigarettes and is moved by an articulated quadrilateral (which imparts a rotational translation to the folding element 27). Regardless, the folding device 26 can be located in the area of the feeding station

S3 or can be located (immediately) downstream of the feeding station S3.

[0028] Preferably, each pocket 17 is provided with sucking elements, which hold by sucking the corresponding wrapper 9, they are activated in the area of the feeding station S3 and are deactivated in the area of the transfer station S1; preferably, said sucking elements are arranged in the pocket 17 in the area of the first larger lateral wall 5a of the group 2 of cigarettes so as to "freeze" the position of the wrapper 9 with respect to the pocket 17 when the wrapper 9 lays for the first time on the pocket 17 itself.

[0029] As illustrated in Figure 7, when the stiffener 10 is provided, each stiffener 10 is fed to the corresponding pocket 17 of the wrapping conveyor 16 upstream of the hoppers 18, i.e. before feeding the pocket 17 to the group 2 of cigarettes.

[0030] In the embodiment illustrated in the accompanying figures, each wrapper 9 is folded around the corresponding group 2 of cigarettes forming the fins 21 and 24; according to alternative and completely equivalent embodiments, each wrapper 9 is folded around the corresponding group 2 of cigarettes forming only the longitudinal fins 21 but not the transverse fin 24, forming only the transverse fin 24 but not the longitudinal fins 21, or without forming any fin.

[0031] The packer machine 11 described above has numerous advantages.

[0032] In the first place, the packer machine 11 described above is able to quickly operate (i.e. with a high hourly productivity) while ensuring a high production quality. In particular, in the packer machine 11, the wrappers 9 are always perfectly centered both longitudinally and transversely with respect to the corresponding groups 2 of cigarettes also operating rapidly (i.e. with a high hourly productivity); accordingly, in the wraps 1 the pull-out opening 7 (overlaid by the reusable closing tab 8) is always exactly in the desired location and especially the welds always ensure the desired seal (therefore the wraps 1 have a high production quality). Said result is obtained thanks to the fact that initially the outspread wrapper 9 (i.e. not folded) lays on a larger lateral wall 5 of the group 2 of cigarettes; in this way, the initial mutual positioning between the wrapper 9 and the group 2 of cigarettes takes place in the area of a larger lateral wall 5 of the group 2 of cigarettes which is particularly wide and therefore allows to achieve a high positioning accuracy even when operating rapidly (i.e. in very short time). In other words, the fundamental technical advantage is to apply the wrapper 9 to the group 2 of cigarettes by referring the wrapper 9 to a large mechanical surface (a larger lateral wall 5 of the group 2 of cigarettes) to the advantage of stability and positioning accuracy of the wrapper 9.

[0033] Furthermore, the packer machine 1 described above is structurally similar to a standard packer machine, i.e. the packer machine 11 described above is obtainable with few and simple changes originating from a

standard packer machine.

[0034] The embodiment illustrated in the accompanying figures refers to the production of a packet of cigarettes, but the present invention is also applicable without substantial changes to the production of any other type of packet of tobacco articles (for example, a packet of cigars, a packet of liquid vaporizing type electronic cigarettes, a packet of new generation cigarettes without tobacco combustion...).

Claims

1. A wrapping method to fold a wrapper (9) around a group (2) of tobacco articles with a parallelepiped shape, which has an upper wall (3) and a lower wall (4) that are parallel and opposite to one another, two larger lateral walls (5) that are parallel and opposite to one another, and two smaller lateral walls (6) that are parallel and opposite to one another; the method comprises the steps of:

feeding, along a wrapping path (P1), a pocket (17) housing the group (2) of tobacco articles; laying the wrapper (9) on a wall (5) of the group (2) of tobacco articles; and folding the wrapper (9) around the group (2) of tobacco articles in a "U" shape, so that the "U"-folded wrapper (9) is placed in the area of the upper wall (3) and of the two larger lateral walls (5) of the group (2) of tobacco articles and has two open lateral ends (19) that display the corresponding smaller lateral walls (6) of the group (2) of tobacco articles;

the wrapping method is **characterized in that:**

the wrapper (9) is initially laid on a first larger lateral wall (5a) of the group (2) of tobacco articles;

the wrapper (9) is folded around a first transverse corner of the group (2) of tobacco articles defined between the first larger lateral wall (5a) and the upper wall (3), in order to lay the wrapper (9) on the upper wall (3) giving to the wrapper (9) an "L" shape at least in the area of the first transverse corner of the group (2) of tobacco articles; and subsequently the wrapper (9) is folded around a second transverse corner of the group (2) of tobacco articles defined between a second larger lateral wall (5b) and the upper wall (3), in order to complete the "U" folding of the wrapper (9).

2. A wrapping method according to claim 1, wherein the wrapper (9) is folded around the second transverse corner of the group (2) of tobacco articles defined between the second larger lateral wall (5b) and

the upper wall (3), in order to lay the wrapper (9) on the second larger lateral wall (5b) from the outset.

3. A wrapping method according to claim 1, wherein:

the wrapper (9) is folded around the second transverse corner of the group (2) of tobacco articles defined between the second larger lateral wall (5b) and the upper wall (3), in order to bring the wrapper (9) closer to the second larger lateral wall (5b); and

the wrapper (9) is further folded around the second transverse corner of the group (2) of tobacco articles defined between the second larger lateral wall (5b) and the upper wall (3), in order to lay the wrapper (9) on the second larger lateral wall (5b) when the group (2) of tobacco articles leaves the pocket (17) together with the wrapper (9).

4. A wrapping method according to claim 1, 2 or 3, wherein the pocket (17) is provided with sucking elements, which hold the wrapper (9) by sucking it and are located in the pocket (17) in the area of the first larger lateral wall (5a) of the group (2) of tobacco articles.

5. A wrapping method according to any of the claims from 1 to 4, wherein the wrapper (9) is folded around the group (2) of tobacco articles in a "U" shape by means of a folding device (26) comprising a single folding element (27), which, on the whole, carries out a rotation of 180° to perform the "U" folding of the wrapper (9) around the group (2) of tobacco articles.

6. A wrapping method according to any of the claims from 1 to 5, wherein the wrapper (9) is folded around the group (2) of tobacco articles in a "U" shape by means of a folding device (26) comprising a single folding element (27), which is moved by an articulated quadrilateral that causes a roto-translation of the folding element (27).

7. A wrapping method according to claim 5 or 6, wherein the folding device (26) is located in the area of a feeding station (S3) where the wrapper (9) is coupled to the group (2) of tobacco articles.

8. A wrapping method according to claim 5 or 6, wherein the folding device (26) is located downstream of a feeding station (S3) where the wrapper (9) is coupled to the group (2) of tobacco articles.

9. A wrapping method according to any of the claims from 1 to 8, wherein the wrapper (9) centrally has a pull-out opening (7), which is closed by a reusable closing tab (8) and is located in the area of the upper

wall (3) and of the second larger lateral wall (5b) of the group (2) of tobacco articles.

10. A packer machine (11) to fold a wrapper (9) around a group (2) of tobacco articles with a parallelepiped shape, which has an upper wall (3) and a lower wall (4) that are parallel and opposite to one another, two larger lateral walls (5) that are parallel and opposite to one another, and two smaller lateral walls (6) that are parallel and opposite to one another; the packer machine (11) comprises the steps of:

a wrapping conveyor (16) to feed, along a wrapping path (P1), a pocket (17) housing the group (2) of tobacco articles;

a feeding conveyor (25) to lay the wrapper (9) on a wall (5) of the group (2) of tobacco articles; and

a folding device (26) to fold the wrapper (9) around the group (2) of tobacco articles in a "U" shape, so that the "U"-folded wrapper (9) is placed in the area of the upper wall (3) and of the two larger lateral walls (5) of the group (2) of tobacco articles and has two open lateral ends (19) that display the corresponding smaller lateral walls (6) of the group (2) of tobacco articles; the packer machine (11) is **characterized in that:**

the wrapper (9) is initially laid on a first larger lateral wall (5a) of the group (2) of tobacco articles;

the wrapper (9) is folded around a first transverse corner of the group (2) of tobacco articles defined between the first larger lateral wall (5a) and the upper wall (3), in order to lay the wrapper (9) on the upper wall (3) giving to the wrapper (9) an "L" shape at least in the area of the first transverse corner of the group (2) of tobacco articles; and subsequently the wrapper (9) is folded around a second transverse corner of the group (2) of tobacco articles defined between a second larger lateral wall (5b) and the upper wall (3), in order to complete the "U" folding of the wrapper (9).

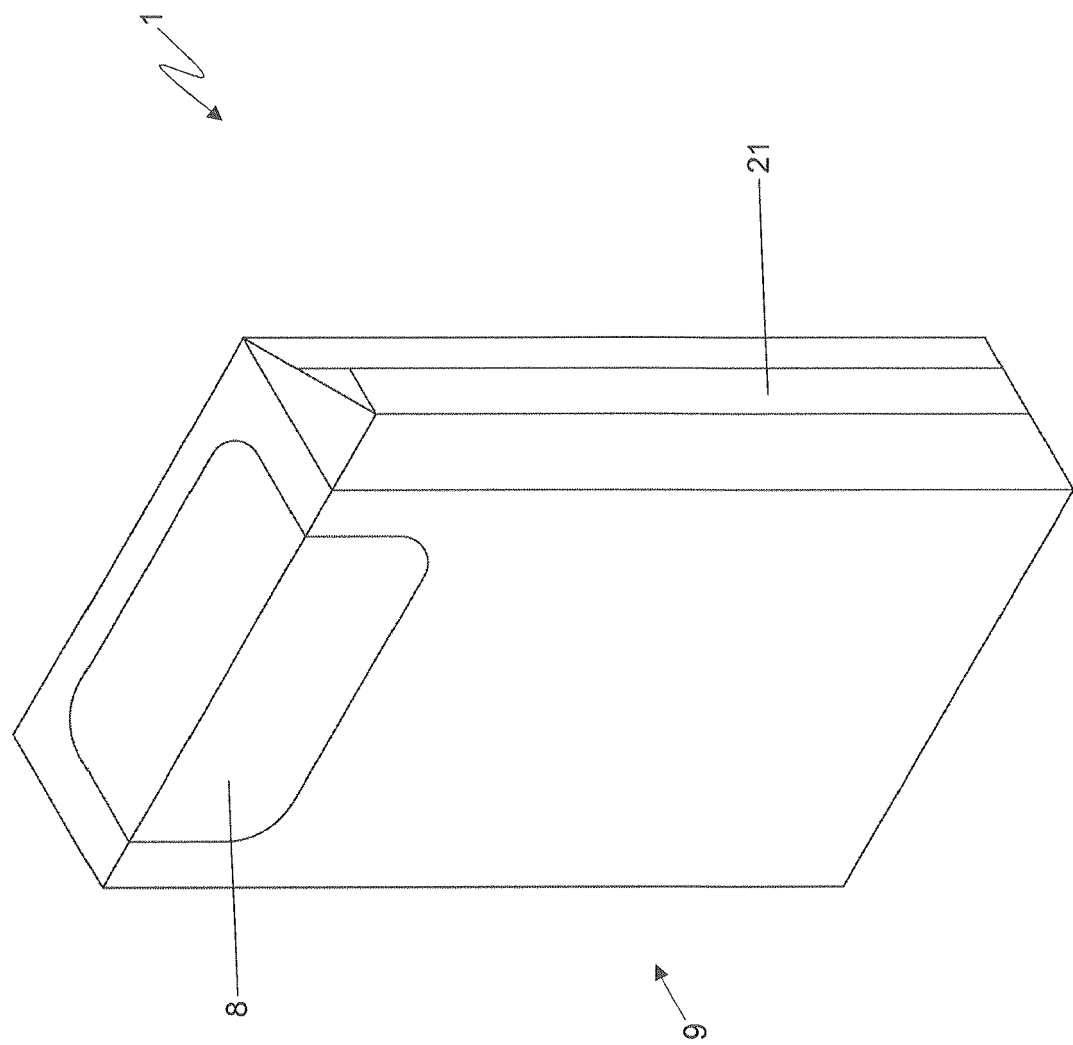
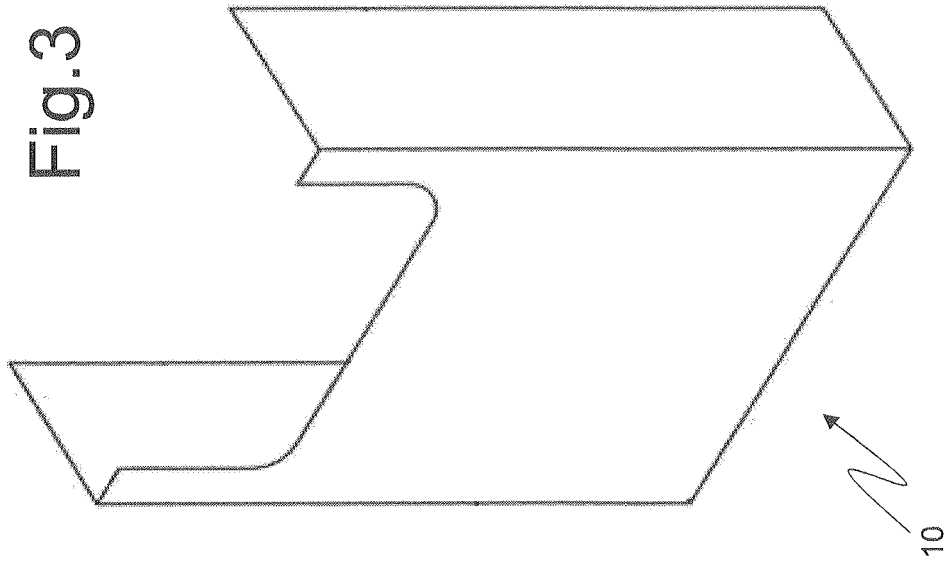
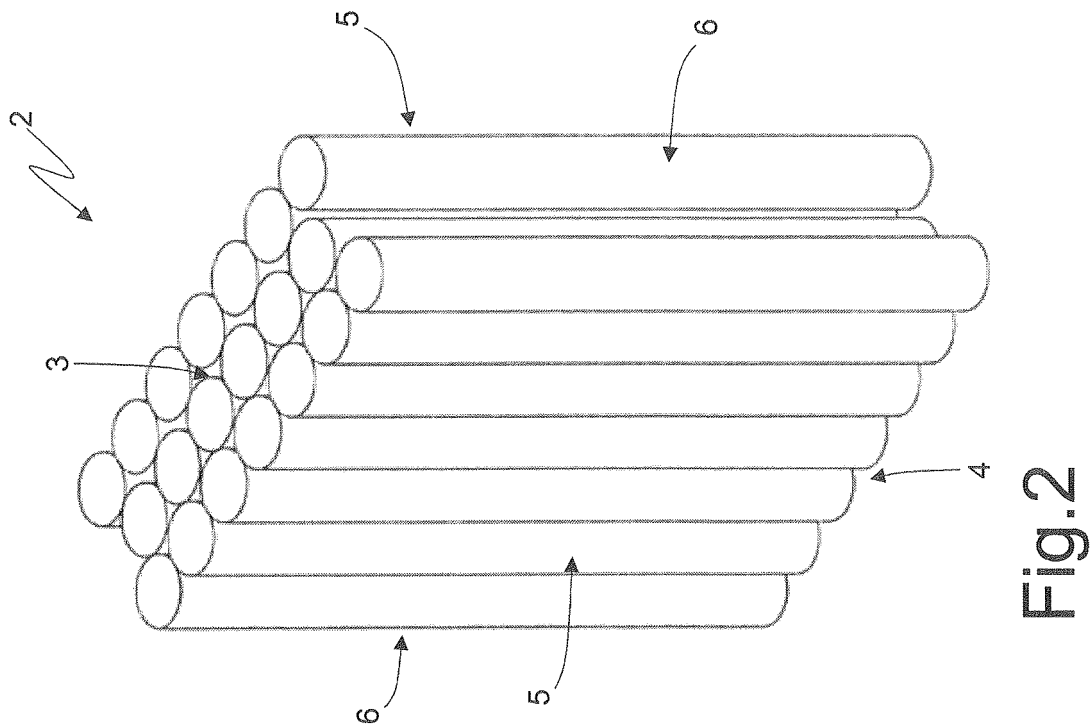
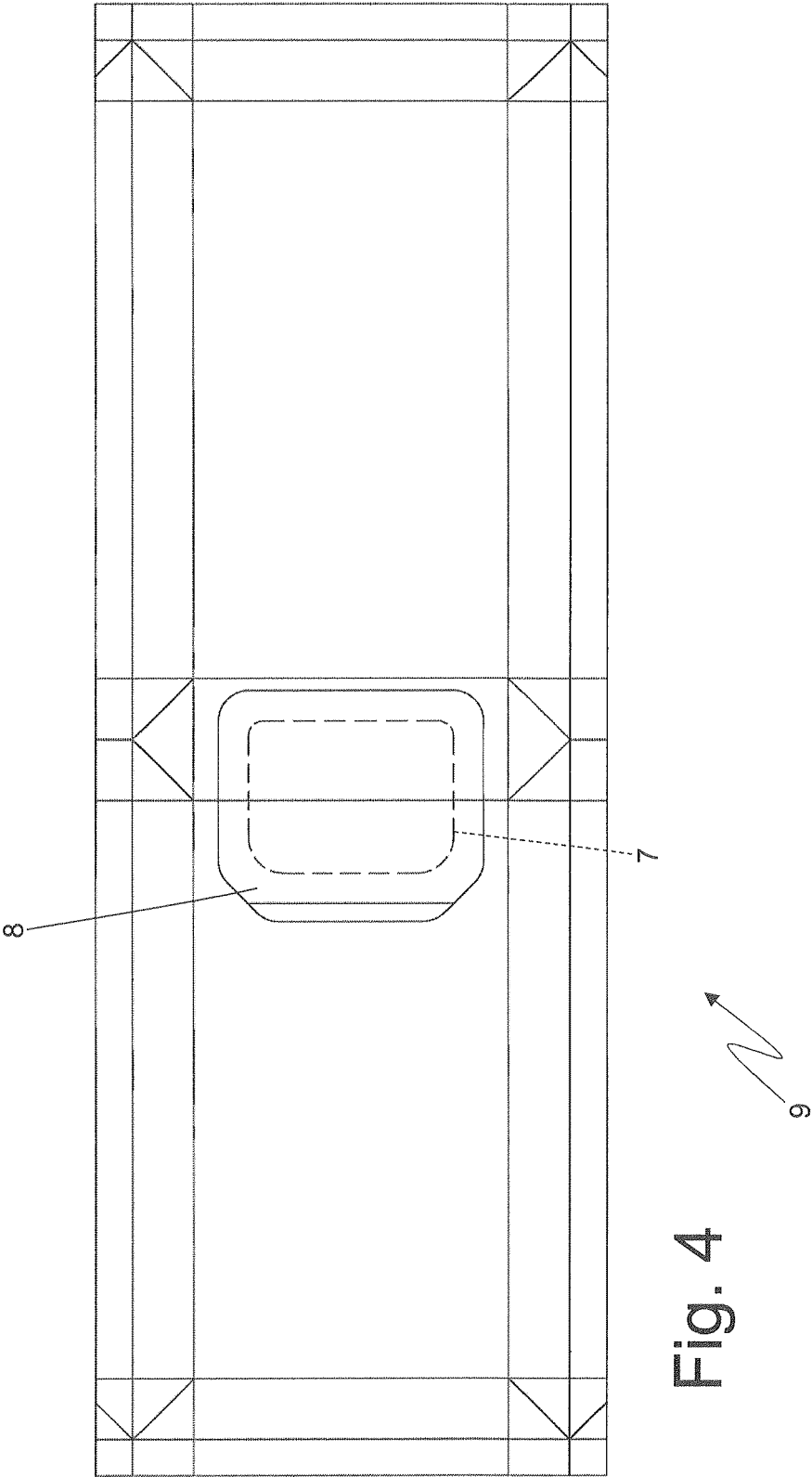


Fig. 1





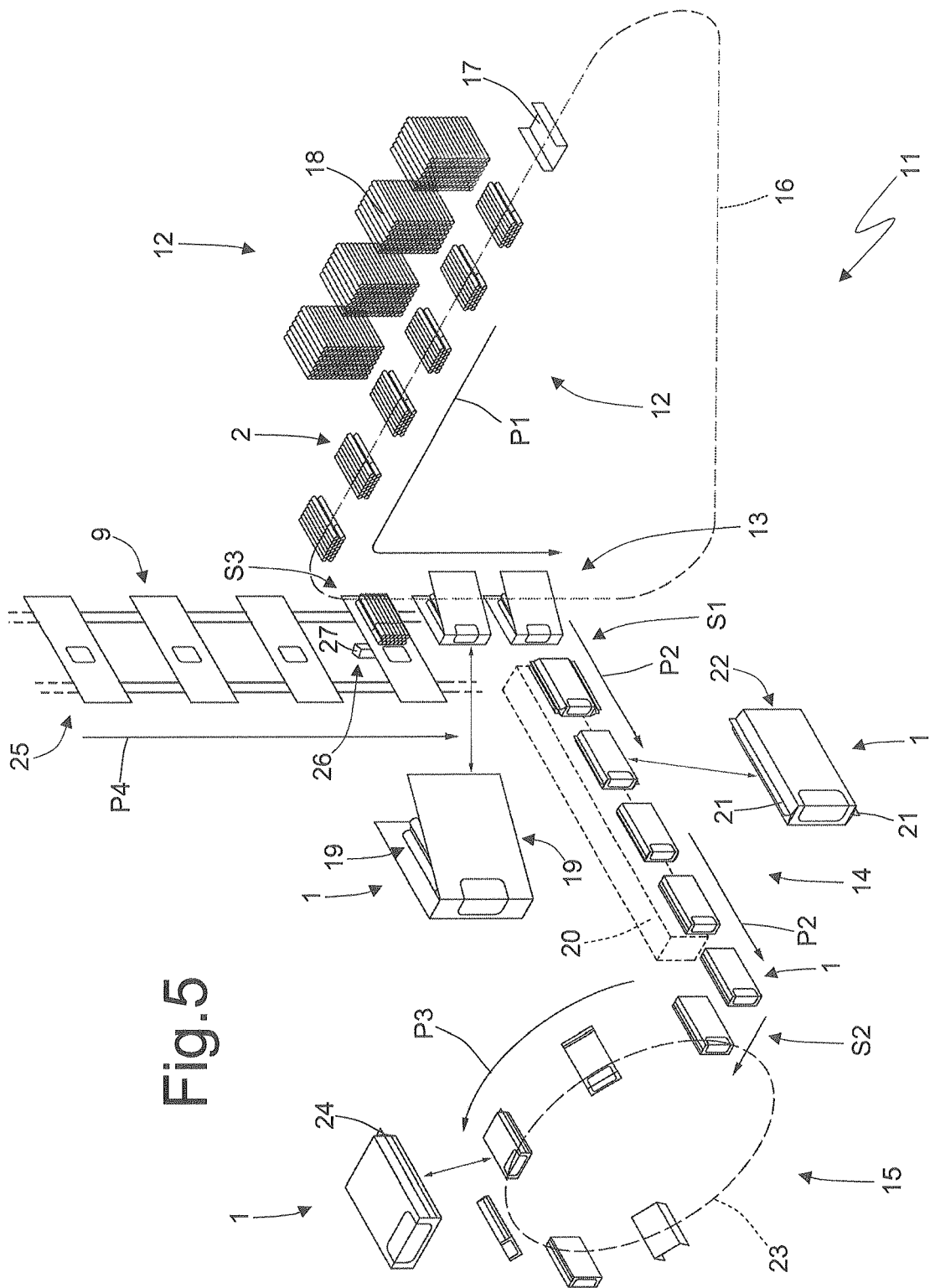


Fig. 5

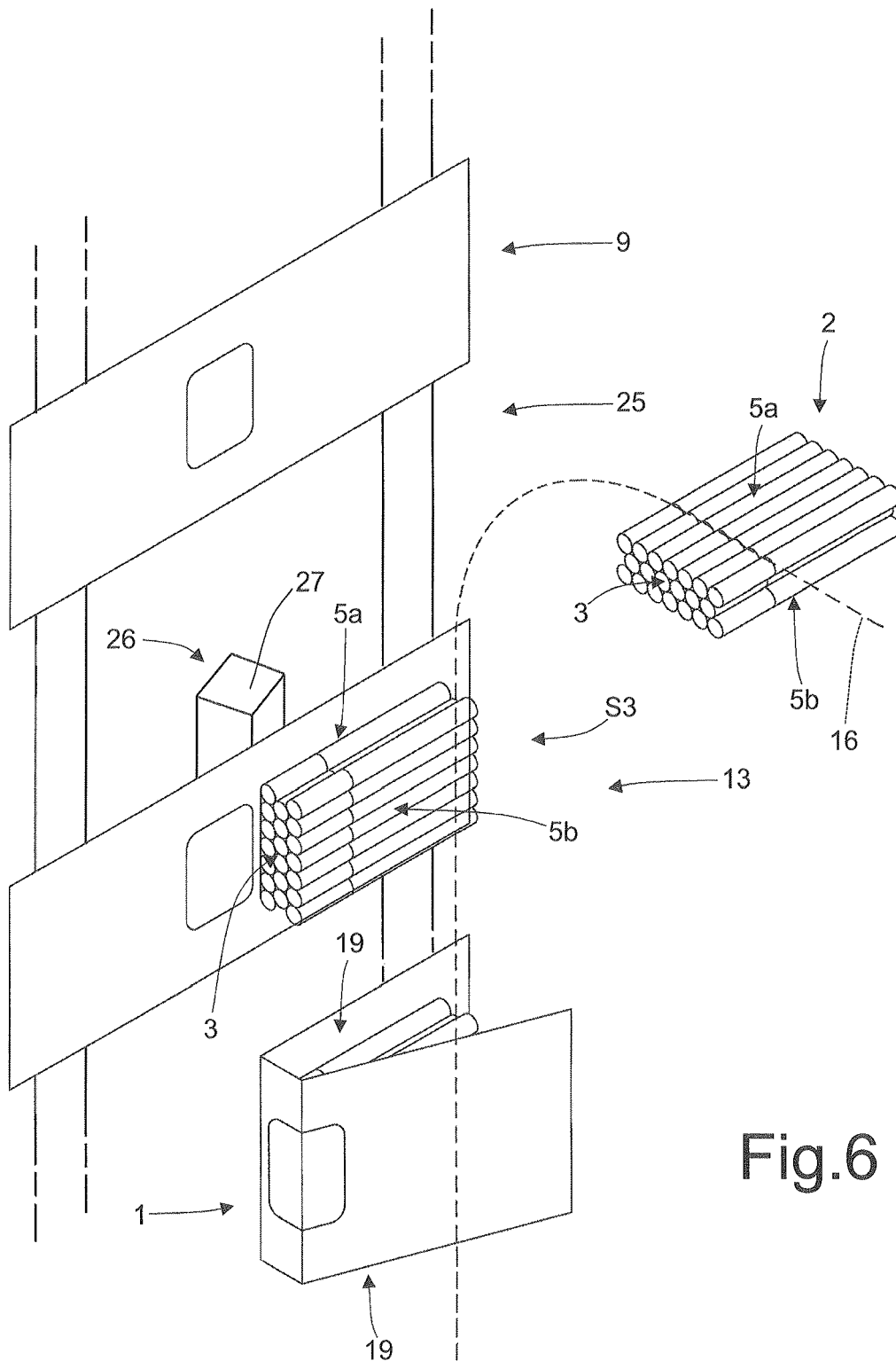
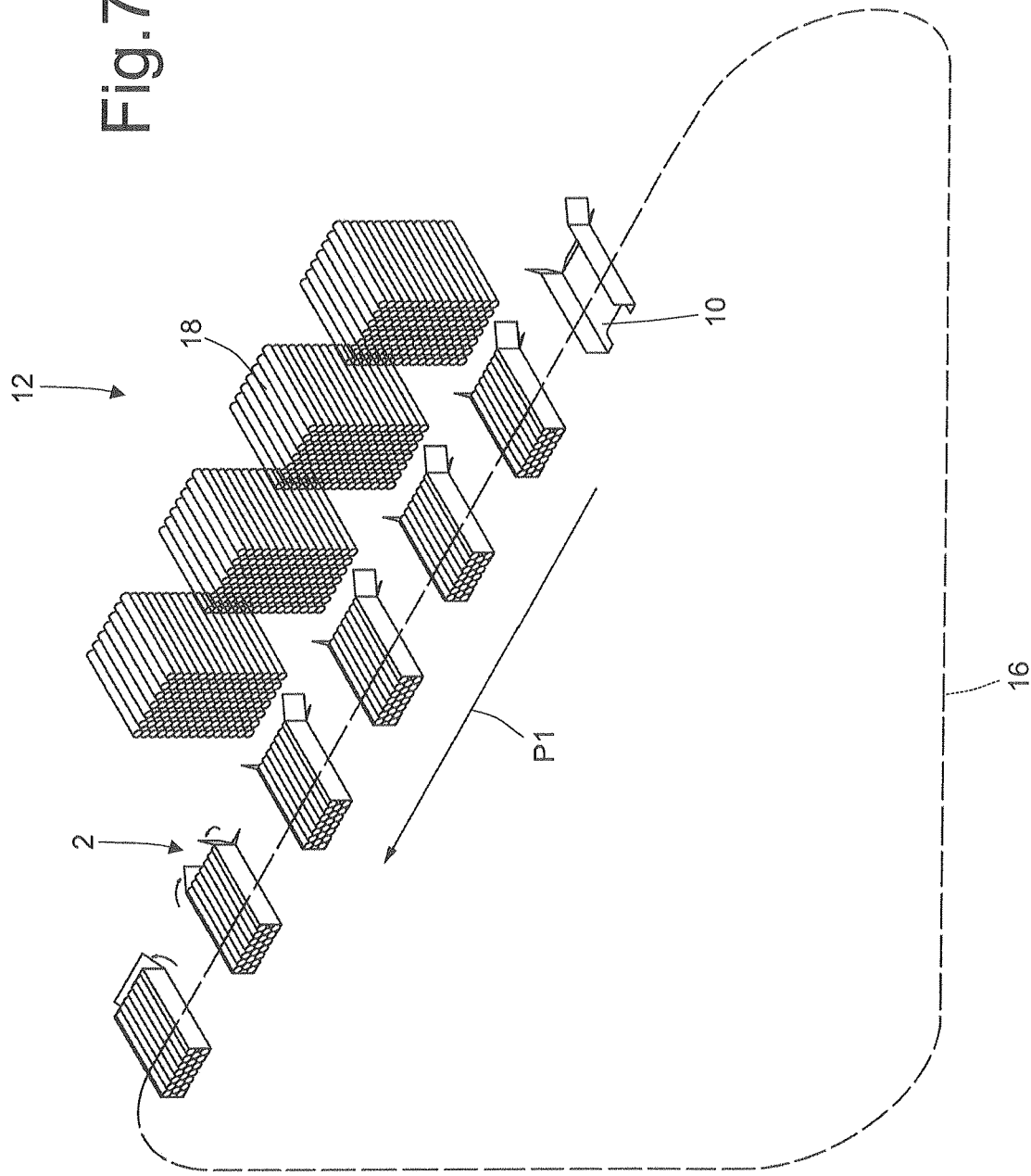


Fig.6

Fig.7





EUROPEAN SEARCH REPORT

Application Number
EP 16 16 0866

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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 2 008 935 A1 (GD SPA [IT]) 31 December 2008 (2008-12-31) * figures 1, 3, 4 * * paragraphs [0010], [0011], [0014], [0019], [0025], [0028] * -----	1-10	INV. B65B19/22 B65B41/06 B65B49/10 B65B49/12 B65B19/02
A	EP 1 862 387 A2 (GD SPA [IT]) 5 December 2007 (2007-12-05) * figures 1, 4 * * paragraphs [0008], [0009] * -----	1-10	
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			TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 30 June 2016	Examiner Schmitt, Michel
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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 16 16 0866

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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