



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
24.08.2022 Bulletin 2022/34

(21) Application number: **22158344.6**

(22) Date of filing: **23.02.2022**

(51) International Patent Classification (IPC):
B65B 19/22 (2006.01) **B65B 51/02** (2006.01)
B65B 61/00 (2006.01) **B65B 35/20** (2006.01)
B65B 61/24 (2006.01)

(52) Cooperative Patent Classification (CPC):
B65B 19/223; B65B 35/205; B65B 51/023;
B65B 61/002; B65B 61/24

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(30) Priority: **23.02.2021 IT 202100004127**

(71) Applicant: **G.D Società per Azioni**
40133 Bologna (IT)

(72) Inventors:
• **MALDOTTI, Sergio**
40133 Bologna (BO) (IT)

• **GUBBELLINI, Roberto**
40133 Bologna (BO) (IT)
• **CARBONI, Luca**
40133 Bologna (BO) (IT)
• **RIGHI, Maurizio**
40133 Bologna (BO) (IT)
• **FERRARI, Michele**
40133 Bologna (BO) (IT)
• **GAMBERINI, Giuliano**
40133 Bologna (BO) (IT)

(74) Representative: **Studio Torta S.p.A.**
Via Viotti, 9
10121 Torino (IT)

(54) **PACKER MACHINE AND WRAPPING METHOD TO PRODUCE A PACK OF SMOKING ARTICLES**

(57) A packer machine (24) to produce a cigarette pack (1) and having:
a wrapping drum (25), which is mounted so as to rotate, with an intermittent motion, around a rotation axis (26) and moves a pocket (27) along a circular wrapping path (P1) extending between an input station (S1), where a wrap (3) and a blank (17) are inserted into the pocket (27), and an output station (S2); a first folding device, which is arranged along the first wrapping path (P1) and folds the blank (17) around the wrap (3); a gluing conveyor (29), which receives the wrap (3) wrapped in the blank (17) from the pocket (27) of the wrapping drum (25) in the output station (S2) and moves the wrap (3) wrapped in the blank (17) up to a transfer station (S3) along a straight gluing path (P2), which is parallel to the rotation axis (26) of the wrapping drum (25); at least one gluing device (31), which is arranged along the gluing path (P2) and applies glue (23) on first wings (9', 13') or on second wings (9", 13") of the blank (17); and a second folding device (34), which is arranged downstream of the gluing device (31) and folds the first wings (9', 13') by 90° against the second wings (9", 13"), thus completing the production of the cigarette pack (1).

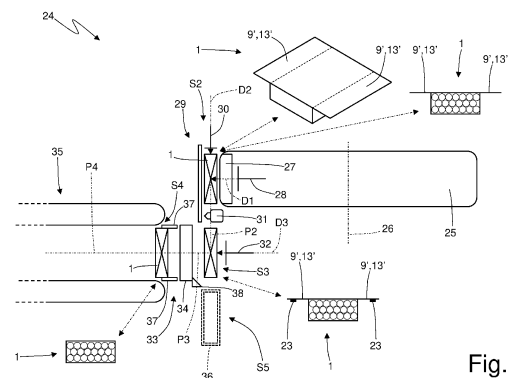


Fig. 10

Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This Patent Application claims priority from Italian Patent Application No. 102021000004127 filed on February 23, 2021.

TECHNICAL FIELD

[0002] The present invention relates to a packer machine and to a wrapping method for producing a pack of smoking articles.

[0003] The present invention is advantageously applied to the production of a rigid cigarette pack with a hinged lid, to which the following disclosure will explicitly refer without thereby losing generality.

PRIOR ART

[0004] Rigid cigarette packs with a hinged lid currently are the most widespread cigarette packs on the market since they are simple to produce, easy and practical to use, and offer good protection to the cigarettes contained therein.

[0005] Patent application No. EP3680185A1 describes a packer machine for producing a rigid cigarette pack with a hinged lid; the packer machine comprises a final wrapping drum which is mounted so as to rotate around a horizontal rotation axis and comprises a plurality of peripheral wrapping pockets which are moved stepwise along a circular wrapping path rotating in an intermittent manner around the rotation axis. During the rotation of the wrapping drum around the rotation axis, each wrapping pocket one after the other goes through: an input station, in which the wrapping pocket receives a wrap (composed of a group of cigarettes wrapped in a wrapping sheet made of metallic paper) surrounded by a U-folded collar and by a corresponding blank fed by a feeding unit, a series of folding stations in which the blank is folded around the wrap and around the collar so as to form a rigid outer container, and finally an output station in which the cigarette pack is transferred to a drying conveyor belt completing the folding of the blank during the exit from the wrapping pocket by folding outer wings that constitute part of the side walls against corresponding inner wings that constitute the remaining part of the side walls. The drying conveyor moves the packs through a drying zone which constitutes an output of the packer machine and feeds the cigarette packs towards a following cellophane-wrapping machine that applies around each cigarette pack an overwrap made of transparent plastic material.

[0006] Along the wrapping drum and between the folding stations, a gluing station is also arranged in which spraying gluing devices apply a series of glue points (essentially hot glue points but also some vinyl-based cold glue points) on some parts of the blank so as to stabilize

via gluing the shape of the cigarette pack.

[0007] However, in the gluing station it is necessary to use a high number of gluing nozzles in order to be able to apply all the necessary glue (particularly on the outer or inner wings), since along the wrapping drum, the blank is arranged transversally with respect to the forward movement direction and thus is arranged in an unfavorable manner for the application of the glue (which instead has a longitudinal orientation).

[0008] Furthermore, the gluing station is relatively far from the output station (in which the outer wings are folded against the inner wings) and consequently in case of stop of the packer machine all the cigarette packs standing between the gluing station and the output station have to be rejected because at the moment of the following restarting the hot glue that had been deposited in the gluing station is by then dry and thus unable to stick (also in the case of a very brief stop, since the hot glue dries in very few seconds).

[0009] In order to at least partially solve these drawbacks, it has been suggested to bring the gluing station closer to the output station (in which the outer wings are folded against the inner wings); however, this solution is extremely costly and difficult since in the proximity of the output station the space is not sufficient for all the necessary spraying gluing devices and therefore, in order to pursue it, it is necessary to completely redesign (i.e. upset) a relevant part of the packer machine.

[0010] Patent No. EP2935015B1 describes a packer machine for producing an inner container of a cigarette pack with a sliding opening by folding an inner blank around a group of cigarettes wrapped in a wrapping sheet made of metallic paper.

[0011] Patent application No. EP3546377A1 describes a packer machine for producing a cigarette pack provided with an outer container and with a hinged lid by folding a blank around a group of cigarettes wrapped in a wrapping sheet made of metallic paper.

DESCRIPTION OF THE INVENTION

[0012] The object of the present invention is to provide a packer machine and a wrapping method for producing a pack of smoking articles, said packer machine and wrapping method being devoid of the above-described drawbacks (thus allowing applying the glue in a simple manner and in close proximity to the folding zone of the outer wings) and being at the same time easy and cost-effective to embody.

[0013] In accordance with the present invention, a packer machine and a wrapping method for producing a pack of smoking articles are provided, according to what claimed in the appended claims.

[0014] The claims describe embodiments of the present invention forming integral part of the present description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] The present invention will now be described with reference to the accompanying drawings, which illustrate a non-limiting example embodiment thereof, wherein:

- Figure 1 is a front perspective view and in a closed configuration of a rigid cigarette pack;
- Figure 2 is a rear perspective view of the cigarette pack of Figure 1 in a closed configuration;
- Figure 3 is a front perspective view of a wrap of the pack of Figure 1;
- Figure 4 is a perspective view of a group of cigarettes contained in the wrap of Figure 3;
- Figure 5 is a plan view of a wrapping sheet used for making the wrap of Figure 3;
- Figure 6 is a plan view of a collar of the cigarette pack of Figure 1;
- Figure 7 is a plan view of a blank used for making an outer container provided with a hinged lid of the cigarette pack of Figure 1;
- Figure 8 is a perspective view and with parts removed for clarity of a packer machine that produces the cigarette pack of Figure 1 and is manufactured in accordance with the present invention;
- Figure 9 is a perspective and schematic view of part of the packer machine of Figure 8;
- Figure 10 is a plan and schematic view of part of the packer machine of Figure 8;
- Figure 11 is a perspective view and with parts removed for clarity of part of the packer machine of Figure 8;
- Figure 12 is a schematic view of a pusher of the packer machine of Figure 8;
- Figure 13 is a front and schematic view of a feeding unit of blanks of the packer machine of Figure 8; and
- Figure 14 is a perspective view of some elements of the feeding unit of Figure 13.

PREFERRED EMBODIMENTS OF THE INVENTION

[0016] In Figures 1 and 2, reference numeral 1 indicates, as a whole, a rigid cigarette pack with a hinged lid. The cigarette pack 1 comprises a cup-shaped outer container 2 made of cardboard or rigid paperboard and a wrap 3 (illustrated in Figure 3) housed inside the container 2.

[0017] The outer container 2 has an open upper end and is provided with a lid 4, which is cup-shaped and is hinged to the outer container 2 along a hinge 5 (illustrated in Figure 2) so as to rotate, with respect to said outer container 2, between an open position (not illustrated) and a closed position (illustrated in Figures 1 and 2) of the open upper end. The outer container 2 has a substantially rectangular parallelepiped shape oriented according to a prevalent vertical development direction, is cup-shaped, and has the upper end open, a lower wall

6 opposite the open upper end, a front wall 7 and a rear wall 8 (in which the hinge 5 is made) parallel to and opposite one another, and two side walls 9 parallel to and opposite one another. Between the front 7, rear 8 and side 9 walls of the outer container 2, four longitudinal edges are defined, whereas between the walls 7, 8 and 9 and the lower wall 6 of the outer container 2, four transverse edges are defined.

[0018] The lid 4 has a substantially rectangular parallelepiped shape, is cup-shaped, and has an open lower end (facing the open upper end of the outer container 2 when the lid 4 is in the closed position), an upper wall 10 (which is parallel to and opposite the lower wall 6 of the outer container 2 when the lid 4 is in the closed position), a front wall 11 (which is parallel to and aligned with the front wall 7 of the outer container 2 when the lid 4 is in the closed position), a rear wall 12 (which is parallel to and aligned with the rear wall 8 of the outer container 2 when the lid 4 is in the closed position and is hinged to the rear wall 8 of the outer container 2 along the hinge 5), and two side walls 13 parallel to and opposite one another (which are parallel to and aligned with, in particular coplanar and adjacent, the side walls 9 of the outer container 2 when the lid 4 is in the closed position). Between the front 11, rear 12 and side 13 walls of the lid 4, four longitudinal edges are defined, whereas between the walls 11, 12 and 13 and the upper wall 10 of the lid 4, four transverse edges are defined. The longitudinal edges and the transverse edges of the lid 4 are parallel to and aligned with the corresponding longitudinal and transverse edges of the outer container 2 when the lid 4 is in the closed position.

[0019] The wrap 3 encloses a group 14 of cigarettes (illustrated in Figure 4) having a parallelepiped shape and is formed by folding a wrapping sheet 15 (illustrated in Figure 5) around the group 14 of cigarettes; in the embodiment illustrated in Figure 3, the wrap 3 has at the top and at the front a removable portion which is separate from the rest of the wrap 3 by a pre-weakened tear line, whereas according to a different embodiment not illustrated the wrap 3 is sealed and is provided with an opening for extracting the cigarettes covered by a re-closable closing label.

[0020] According to what illustrated in Figure 6, the cigarette pack 1 further comprises a rigid collar 16, which is connected (by means of gluing) in a U-folded manner to the inside of the outer container 2 so as to partially protrude on the outside of the open upper end of the outer container 2 and engage a corresponding inner surface of the lid 4 when said lid 4 is arranged in the closed position.

[0021] According to what illustrated in Figure 7, the outer container 2 and the lid 4 are made by folding a blank 17 of conventional type in which each side wall 9 of the outer container 2 is made by placing on top of one another and gluing two wings 9' and 9" (i.e. an outer wing 9' to an inner wing 9"), and each side wall 13 of the lid 4 is made by placing on top of one another and gluing two

wings 13' and 13" (i.e. an outer wing 13' to an inner wing 13"). Furthermore, the front wall 11 of the lid 4 is formed by placing on top of one another and gluing a panel 11' and a flap 11".

[0022] In particular, the blank 17 has two pre-weakened longitudinal folding lines (which define the longitudinal edges of the outer container 2 and of the lid 4) and a plurality of pre-weakened transverse folding lines (which define the transverse edges of the outer container 2 and of the lid 4) which delimit, between the two longitudinal folding lines, a panel 7' that constitutes the front wall 7 of the outer container 2, a panel 6' that constitutes the lower wall 6 of the outer container 2, a panel 8' that constitutes the rear wall 8 of the outer container 2, a panel 12' that constitutes the rear wall 12 of the lid 4, a panel 10' that constitutes the upper wall 10 of the lid 4, a panel 11' that constitutes the front wall 11 of the lid 4, and the reinforcement flap 11" that is folded by 180° and glued against an inner surface of the panel 11' (i.e. against an inner surface of the front wall 11 of the lid 4). The blank 17 comprises a pair of outer wings 9', which are arranged on opposite sides of the panel 7', are connected to the panel 7' along the two longitudinal folding lines, and constitute an outer part of the side walls 9 of the outer container 2. The blank 17 comprises a pair of inner wings 9", which are arranged on opposite sides of the panel 8', are connected to the panel 8' along the two longitudinal folding lines, constitute an inner part of the side walls 9 of the outer container 2, and are glued and placed on top of the corresponding outer wings 9'. Each inner wing 9" comprises a tongue that is folded by 90° with respect to the inner wing 9" to be subsequently rested on and glued to the panel 6'.

[0023] The blank 17 comprises a pair of outer wings 13', which are arranged on opposite sides of the panel 11', are connected to the panel 11' along the two longitudinal folding lines, and constitute an outer part of the side walls 13 of the lid 4. The blank 17 comprises a pair of inner wings 13", which are arranged on opposite sides of the panel 12', are connected to the panel 12' along the two longitudinal folding lines, constitute an inner part of the side walls 13 of the lid 4, and are glued to and placed on top of the corresponding outer wings 13'. Each inner wing 13" comprises a tongue that is folded by 90° with respect to the inner wing 13" to be subsequently rested on and glued to the panel 10'.

[0024] According to what illustrated in Figure 7, a plurality of glue points 18-23 are applied to the blank 17 in a spraying manner (as it will be described in the following): hot glue points 18 (i.e. quick-setting glue) and a cold glue point 19 (slow-setting and normally vinyl-based) on the flap 11" so as to glue the flap 11" to the panel 11', cold glue points 20 on the panel 8' so as to glue the panel 8' to the wrap 3, cold glue points 20 on the inner wings 9" so as to glue the inner wings 9" to side walls of the collar 16, cold glue points 21 on the panel 7' so as to glue the panel 7' to a front wall of the collar 16, cold glue points 21 on the outer wings 9' and 13' so as to glue the outer

wings 9' and 13' to the inner wings 9" and 13", and hot glue points 23 on the outer wings 9' and 13' so as to glue the outer wings 9' and 13' to the inner wings 9" and 13". The (few) cold glue points 22 on the outer wings 9' and 13' are redundant with respect to the (more numerous) hot glue points 23 and have the function of ensuring a solid connection between the outer wings 9' and 13' and the inner wings 9" and 13" even if the cigarette pack 1 is heated at relatively high temperatures (for example if it were left in the summer on the dashboard of an automobile parked in the sun).

[0025] In Figure 8, reference numeral 24 indicates, as a whole, a packer machine (only partially illustrated) which is designed to produce the above-described cigarette pack 1 and operates with an intermittent motion (i.e. a motion which provides for a cyclical alternation of motion steps and still steps).

[0026] According to what illustrated in Figures 9 and 10, the packer machine 24 comprises a wrapping drum 25 (i.e. a wrapping conveyor) which is mounted so as to rotate (with an intermittent motion, i.e. "stepwise") around a horizontal rotation axis 26. The wrapping drum 25 supports twelve pockets 27 (one of which is schematically illustrated in Figure 10), each of which is designed to host therein a wrap 3 coupled to a collar 16 and to a blank 17 (according to a different embodiment, the wrapping drum 25 supports eight pockets 27).

[0027] The rotation of the wrapping drum 25 around the rotation axis 26 cyclically moves each pocket 27 along a circular wrapping path P1 and through: an input station S1 in which a wrap 3 (containing the group of cigarettes 14), a collar 16 and a blank 17 are radially (i.e. perpendicular to the rotation axis 26) inserted inside the pocket 27 (getting into the pocket 27, the blank 17 folds in a U-shaped manner around the wrap 3 and the collar 16), and an output station S2 in which the almost complete cigarette pack 1 is radially (i.e. perpendicular to the rotation axis 26) extracted from the pocket 27. Between the input station S1 and the output station S2 and around the wrapping drum 25, a series of folding devices are arranged which fold the blank 17 around the wrap 3 and the collar 16 up to obtaining the configuration illustrated in Figure 10 in which, in order to complete the cigarette pack 1, the outer wings 9' and 13' still need to be folded by 90° against the inner wings 9" and 13" previously folded (in particular when the blank 17 gets into a pocket 27 together with a wrap 3 and a collar 16). According to a preferred embodiment, the folding devices arranged around the wrapping drum 25 only comprise fixed folding elements that are devoid of parts in movement.

[0028] In the input station S1, a wrap 3 together with a corresponding collar 16 and with a corresponding blank 17 are "pinched" (i.e. gripped) between a pusher and a counter-pusher and are thus shifted from a pocket of a previous wrapping drum (not illustrated) to a pocket 27 of the wrapping drum 25 by means of a synchronized and concordant movement of the pusher and of the counter-pusher.

[0029] According to what illustrated in Figure 10, in the output station S2, a pusher 28 partially extracts (as it will be better explained in the following) an almost complete (i.e. with the outer wings 9' and 13' still to be folded) cigarette pack 1 from a pocket 27 of the wrapping drum 25 by means of a movement along a transfer direction D1 which is horizontal and perpendicular to the wrapping path P1 and to the rotation axis 26 (i.e. arranged radially with respect to the rotation axis 26). In the output station S2 a linear gluing conveyor 29 is arranged which is designed to extract an almost complete (i.e. with the outer wings 9' and 13' still to be folded) cigarette pack 1 from a pocket 27 of the wrapping drum 25 moving the almost complete cigarette pack 1 along a straight gluing path P2, which is perpendicular to the circular wrapping path P1. The gluing conveyor 29 comprises, among the other things, a pusher 30 which is movable with a reciprocating motion (i.e. with a cyclical alternation of forward travels and return travels) along the straight gluing path P2 by means of a movement along a transfer direction D2 that is horizontal and perpendicular to the transfer direction D1. In other words, the almost complete cigarette packs 1 are extracted from the pockets 27 of the wrapping drum 25 by the pusher 30 of the gluing conveyor 29 that goes through a pocket 27 from side to side, said pocket 27 standing still in the output station S2.

[0030] Along the straight gluing path P2, two gluing devices 31 are arranged (only one of which is illustrated in Figure 10) which apply the hot glue points 23 on the wings 9' and 13' still to be folded of each blank 17. The straight gluing path P2 develops from the output station S2, in which each almost complete cigarette pack 1 comes out of the wrapping drum 25 and gets into the linear gluing conveyor 29, at a transfer station S3, in which each almost complete and glued (i.e. provided with the glue 23) cigarette pack 1 comes out of the linear gluing conveyor 29. Along the gluing path P2, suitable guides and contrasts are arranged that keep the almost complete cigarette pack 1 well assembled and squared. According to a possible embodiment, the two gluing devices 31 only apply the hot glue points 23 on the wings 9' and 13' still to be folded of each blank 17; according to a different embodiment, the two gluing devices 31 apply both the hot glue points 23, and the cold glue points 22 on the wings 9' and 13' still to be folded of each blank 17 (obviously in this case each gluing device 31 has to comprise a spray gun for applying the hot glue points 23 and another spray gun for applying cold glue points 22).

[0031] In the transfer station S3, a pusher 32 transfers, by means of a movement along a transfer direction D3 which is horizontal, perpendicular to the gluing path P2 and parallel to the transfer direction D1, each almost complete cigarette pack 1 from the linear gluing conveyor 29 to a following linear wrapping conveyor 33 which is designed to move the almost complete cigarette pack 1 along a straight wrapping path P3, which is perpendicular to the gluing path P2. In other words, the linear wrapping conveyor 33 receives the almost complete cigarette pack

1 from the gluing conveyor 29 and is designed to move the almost complete cigarette pack 1 along the straight wrapping path P3. According to a preferred embodiment, the pusher 32 is part of the wrapping conveyor 33 and moves the almost complete cigarette packs 1 along the straight wrapping path P3. Along the straight wrapping path P3, a folding device 34 is arranged which folds the outer wings 9' and 13' by 90° against the inner wings 9" and 13" previously folded (in particular when the blank 17 gets into a pocket 27 together with a wrap 3 and with a collar 16) completing the forming of the cigarette pack 1. According to a preferred embodiment illustrated in the accompanying figures, the folding device 34 comprises only fixed folding elements that are devoid of parts in movement and are arranged along the wrapping path P3; in particular, the folding device 34 is composed of two contrasts arranged on the two opposite ends of the wrapping path P3 and between which the cigarette packs 1 pass through. The straight wrapping path P3 develops from the transfer station S3 in which each almost complete and glued (i.e. provided with the glue 23) cigarette pack 1 comes out of the gluing conveyor 29 and gets into the linear wrapping conveyor 33 at a transfer station S4 in which each complete cigarette pack 1 comes out of the linear wrapping conveyor 33.

[0032] In the transfer station S4, each complete cigarette pack 1 comes out of the linear wrapping conveyor 33 and gets into a following linear drying conveyor 35 which is designed to move the complete cigarette pack 1 along a straight drying path P4, parallel and coaxial to the straight wrapping path P3. According to a possible embodiment, the drying conveyor 35 comprises two opposite conveyor belts, each of which is wrapped around two end pulleys (one motorized and one idle).

[0033] According to a preferred embodiment, a following cigarette pack 1 getting into the wrapping conveyor 33 (being pushed by the pusher 32) pushes in turn against the previous cigarette packs 1 (which are all packed against one another) by inserting the first cigarette pack 1 of the row into the drying conveyor 35; i.e. the thrust generated by the pusher 32 is transmitted to all the cigarette packs 1 that are in the wrapping conveyor 33 thus pushing the first cigarette pack 1 of the row into the drying conveyor 35.

[0034] The straight gluing path P2 is horizontal and parallel to the rotation axis 26 of the wrapping drum 25. The straight wrapping path P3 is horizontal and perpendicular to the rotation axis 26 of the wrapping drum 25 (i.e. is perpendicular to the gluing path P2). The straight drying path P4 is horizontal and parallel (coaxial) to the wrapping path P3. According to a preferred embodiment, at the end of the gluing path P2 (i.e. on the opposite side of the pusher 30 and after the transfer station S3), a reject station S5 is arranged in which possible faulty cigarette packs 1 are directed (identified for example by means of control cameras arranged along the wrapping path P1 and/or along the gluing path P2). In the reject station S5 a collection device 36 is arranged which receives the

faulty cigarette packs 1; typically, the collection device 36 is arranged lower than the gluing conveyor 29 and the faulty cigarette packs 1 fall by gravity towards the underlying collection device 36. It is important to highlight that the glue 23 is not applied to a possible faulty cigarette pack 1 by the gluing device 31 (by simply not activating the gluing device 31 when the faulty cigarette pack 1 passes). In order to direct a faulty cigarette pack 1 towards the reject station S5 it is sufficient not to activate the pusher 32 so that the faulty cigarette pack 1 does not get into the wrapping conveyor 33 remaining at the end of the gluing conveyor 29: the following cigarette pack 1 moving along the gluing path P2, when arriving in the transfer station S3, pushes the faulty cigarette pack 1 remained in the transfer station S3 out of the wrapping conveyor 33. According to a possible embodiment, pneumatic blowers could be provided which are activated for generating an additional push that contributes to pushing the faulty cigarette pack 1 out of the wrapping conveyor 33 (so as to reduce the stresses at the expense of the following cigarette pack 1 that has to push the faulty cigarette pack 1 out of the wrapping conveyor 33).

[0035] In the embodiment illustrated in the accompanying figures, also the pusher 28 is present in the output station S2 partially extracting an almost complete cigarette pack 1 from a respective pocket 27 (standing still in the output station S2), i.e. slightly moves the almost complete cigarette pack 1 away from the pocket 27 of the wrapping drum 25 pushing the almost complete cigarette pack 1 against a fixed striker plane (resting plane) which is on the outside of the wrapping drum 25 and is opposite the pocket 27 (in this manner it is possible to improve the holding of the almost complete cigarette pack 1 and make the positioning of the almost complete cigarette pack 1 more precise). It is important to highlight that the pusher 28 does not completely extract a cigarette pack 1 from a respective pocket 27 (standing still in the output station S2), i.e. does not completely separate the cigarette pack 1 from the pocket 25; on the contrary, the pusher 28 is restricted to only partially extracting (moving away) a cigarette pack 1 from a respective pocket 27 (standing still in the output station S2) anyway leaving the cigarette pack 1 at least partially inserted in the pocket 27. It is important to observe that the overall travel of the pusher 28 is modest, i.e. it is comprised between 2 and 5 mm, since the function thereof is not to completely extract the cigarette pack 1 from a respective pocket 27 (standing still in the output station S2) but to only partially extract the cigarette pack 1 from a respective pocket 27 (standing still in the output station S2); in Figure 10, the distance between the gluing conveyor 29 and the wrapping drum 25 (i.e. the travel of the pusher 28) was artfully exaggerated for the sake of the clarity of the drawing (i.e. so as to prevent the superimposition of too many lines).

[0036] According to a different embodiment not illustrated, the pusher 28 is absent and in the output station S2 the almost complete cigarette packs 1 are extracted from the pockets 27 of the wrapping drum 25 by the push-

er 30 of the gluing conveyor 29 without said cigarette packs 1 being preliminarily and partially radially extracted from the pockets 27 of the wrapping drum 25. This embodiment, on the one hand, is simpler as it does without the pusher 28, but on the other hand it does not allow pushing, in the output station S2, an almost complete cigarette pack 1 against a striker plane opposite the pocket 27. In this embodiment, along an initial part of the gluing path P2, a tilted plane can be provided which, while the cigarette pack 1 moves along the gluing path P2 pushed by the pusher 30, shifts the cigarette pack 1 laterally (i.e. transversally and thus perpendicularly to the gluing path P2) so as to push the cigarette pack 1 against the striker plane parallel to the gluing path P2 and opposite the wrapping drum 25.

[0037] In the presence of the pusher 28, the gluing path P2 followed by the cigarette packs 1 is perfectly straight; instead, in the absence of the pusher 28, the gluing path P2 followed by the cigarette packs 1 is substantially straight since in the initial part of the gluing path P2 the tilted plane also determines a slight lateral (transverse) shifting which can anyway be disregarded in first approximation.

[0038] As previously mentioned, a following cigarette pack 1 getting into the wrapping conveyor 33 (being pushed by the pusher 32) pushes in turn against the previous cigarette packs 1 (which are all packed against one another) inserting the first cigarette pack 1 of the row into the drying conveyor 35; i.e. the cigarette packs 1 accumulate along the wrapping path P3 forming a row of cigarette packs 1 in which the cigarette packs 1 are in mutual contact at the front and rear walls 7-8 and 11-12. Consequently, the row of the cigarette packs 1 moves stepwise along the wrapping path P3, in a synchronized manner with the movement of the pusher 32.

[0039] According to a preferred embodiment, braking members 37, which are arranged on opposite sides of the wrapping path P3, (slightly) squeeze, from opposite sides and towards one another, the lower wall 6 and the upper wall 10 of each cigarette pack 1 so as to increase the friction between the cigarette pack 1 and the fixed walls of the wrapping conveyor 33 (i.e. increase the force resisting the forward movement of the cigarette packs 1 along the wrapping path P3 and thus increase the necessary force for causing the cigarette packs 1 to move along the wrapping path P3); alternatively, the compression members 37 could act on the side walls 9 and 13 of each cigarette pack 1. The object of the braking members 37 is to improve the packing of the cigarette packs 1 standing in row along the wrapping path P3 so that the cigarette packs 1 always remain in close mutual contact without ever creating "holes" between two adjacent cigarette packs 1. Preferably, the braking members 37 are arranged at the end of the wrapping path P3 so as to make their packing effect of the row felt along the entire wrapping path P3, i.e. the braking members 37 are arranged in the proximity of the transfer station S4 in which the cigarette packs 1 get into the drying conveyor 35.

According to a preferred embodiment, the braking members 37 are composed of fixed plates against which the cigarette packs 1 slide; alternatively, the braking members 37 could be composed of belts that accompany the forward movement of the cigarette packs 1.

[0040] In order to prevent, once released from the pusher 32, the cigarette pack 1 just inserted in the wrapping conveyor 33 from being pushed back by the other cigarette packs 1 already present in the wrapping conveyor 33, a non-return member 38 could be provided which allows the cigarette packs 1 to move forward along the wrapping path P3 and prevents the cigarette packs 1 from moving back along the wrapping path P3. According to a preferred embodiment, the non-return member 38 comprises a pair of teeth having a triangular shape which are pushed towards the inside of the wrapping conveyor 33 by respective springs: when a cigarette pack 1 moves forward along the wrapping path P3, it progressively compresses the teeth pushing against a tilted wall thereof and consequently compressing the respective springs, whereas, when a cigarette pack 1 has gone past the teeth, said teeth by effect of the thrust exerted by the respective springs go back to protruding inside the wrapping conveyor 33 offering the cigarette pack 1 an upright wall thereof which prevents the cigarette pack 1 from moving back along the wrapping path P3 (i.e. the teeth prevent the cigarette pack 1 from possibly moving back). According to a different embodiment, the teeth are motorized (i.e. are handled by an electric actuator) and thus their movement can occur regardless of the thrust exerted by the cigarette packs 1 in transit; in this embodiment, the teeth could be not coupled to the springs (being shifted in both directions by the electric actuator) and could be not wedge-shaped (i.e. a triangular shape), since they no longer have to be pushed by the cigarette packs 1 in transit.

[0041] According to what illustrated in Figure 12, the pusher 30 is mounted on a support shaft 39 which is both axially movable along the transfer direction D2, and rotary around the transfer direction D2 (i.e. rotary around a rotation axis which is coaxial and coinciding with the transfer direction D2). In particular, the support shaft 39 (thus the pusher 30 mounted on the support shaft 39) is rotary between a (an angular) work position, in which the pusher 30 is able to engage a cigarette pack 1 that is in the output station S2 along the gluing path P2, and a (an angular) return position, in which the pusher 30 is not able to engage a cigarette pack 1 that is in the output station S2 along the gluing path P2.

[0042] The support shaft 39 is operated by an actuator device 40 which impresses on the support shaft 39 both an axial movement along the transfer direction D2, and a rotation around the transfer direction D2. Preferably, the actuator device 40 receives the rotary motion from a master motor of the packer machine 24, has a first cam that controls the axial movement along the transfer direction D2 of the support shaft 39, and has a second cam that controls the rotary movement around the transfer

direction D2 of the support shaft 39. Alternatively, the actuator device 40 has one or two electric motors that control the movements of the support shaft 39.

[0043] In use, the support shaft 39 (thus the pusher 30 mounted on the support shaft 39) is kept in the (angular) work position when the support shaft 39 performs a forward work travel for pushing a cigarette pack 1 standing in the output station S2 along the gluing path P2 and is instead kept in the (angular) return position when the support shaft 39 performs a return travel. In this manner, while the support shaft 39 (thus the pusher 30 mounted on the support shaft 39) performs a return travel, a new cigarette pack 1 can be pushed by the pusher 28 out of a pocket 27 of the wrapping drum 25 without having to wait for the support shaft 39 (thus the pusher 30 mounted on the support shaft 39) to arrive in the start position.

[0044] In the embodiment illustrated in the accompanying figures, the pusher 30 is rotary around the transfer direction D2 so as to shift between the work position and the return position. According to a different embodiment not illustrated, the pusher 30 linearly translates along the transfer direction D1 (or anyway along a direction substantially parallel to the transfer direction D1 and thus substantially perpendicular to the transfer direction D2) so as to shift between the work position and the return position; in this embodiment, the linear shifting between the work position and the return position of the pusher 30 could be obtained by means of an articulated quadrilateral which is deformed by a corresponding actuator.

[0045] Preferably, the pusher 30 is mounted on the support shaft 39 in an eccentric manner with respect to the support shaft 39 so that the rotation of the support shaft 39 determines a greater shifting of the pusher 30.

[0046] According to a different embodiment, the pusher 30 is composed of a roto-translating part and also by an only translating part: the roto-translating part (illustrated also in Figure 12) of the pusher 30 exerts the thrust on the cigarette packs 1 for moving the cigarette packs 1 along the gluing path P2, whereas the only translating part of the pusher 30 comprises the striker plane against which a cigarette pack 1 is pushed by the pusher 28 (or by the tilted plane that replaces the pusher 28) when the cigarette pack 1 is extracted from a pocket 27 in the output station S2. In other words, in this embodiment, the pusher 30, with respect to what illustrated in Figure 12, also comprises a further only translating part that has the function of constituting the striker plane against which a cigarette pack 1 is pushed by the pusher 28 when the cigarette pack 1 is extracted from a pocket 27. In other words, in this embodiment, the striker plane (which is anyway always present) against which a cigarette pack 1 is pushed by the pusher 28 when the cigarette pack 1 is extracted from a pocket 27 in the output station S2 is no longer fixed but translates together with the pusher 30 (without however rotating together with the pusher 30); in this manner, each cigarette pack 1 never slides with respect to such striker plane and thus tends to disassemble less (i.e. "to open" moving away the previously folded parts

of the blank 17 from the desired position). According to a possible embodiment, the striker plane that translates together with the pusher 30 also (at least) comprises a pushing tooth which contributes as well to the translation of a cigarette pack 1 along the gluing path P2 pushing against the front wall 11 of the lid 4 thus preventing the front wall 11 of the lid 4 from placing itself on top of the front wall 7 of the outer container 2. Summarizing, in this embodiment, the pusher 28 (or the tilted plane that replaces the pusher 28) pushes a cigarette pack 1 coming out of a pocket 27 against a striker plane that translates together (i.e. in an integral and synchronized manner) with the pusher 30 and is obviously opposite with respect to the pocket 27.

[0047] As previously mentioned, in the input station S1, a blank 17 is interposed between a pocket 27 of the wrapping drum 25 and a wrap 3 surrounded by a U-folded collar 16 so that the blank 17 gets into the pocket 27 U-folded around the wrap 3 surrounded by the collar 16. In particular, the packer machine 24 comprises a feeding unit 41 (illustrated in Figure 8 and better illustrated in Figure 13) which feeds, one after the other, the blanks 17 partially glued and partially folded (as it will be better described in the following) to the input station S1.

[0048] According to what illustrated in Figure 13, the feeding unit 41 comprises a hopper 42 that houses a stack of blanks 17 and has a lower output mouth from which single blanks 17 are extractable.

[0049] The feeding unit 41 comprises a moving drum 43 which is mounted so as to rotate (with an intermittent motion, i.e. "stepwise") around a horizontal rotation axis 44 (parallel to the rotation axis 26). The moving drum 43 supports five sucking holding heads 45, each of which is designed to hold a blank 17. The rotation of the moving drum 43 around the rotation axis 44 cyclically moves each holding head 45 along a circular path and through: a holding station S6 in which a blank 17 is retrieved from the lower output mouth of the hopper 42, and a following exchange station S7 in which the blank 17 is released.

[0050] The feeding unit 41 comprises a moving drum 46 which is mounted so as to rotate (with an intermittent motion, i.e. "stepwise") around a horizontal rotation axis 47 (parallel to the rotation axis 44). The moving drum 46 supports five sucking holding heads 48, each of which is designed to hold a blank 17. The rotation of the moving drum 46 around the rotation axis 47 cyclically moves each holding head 48 along a circular path and through: the exchange station S7 in which a blank 17 is received by a holding head 45, and a following exchange station S8 in which the blank 17 is released.

[0051] The feeding unit 41 comprises a moving conveyor belt 49 provided with a belt 50 wrapped around two end pulleys 51 and 52; as illustrated in Figure 11, the pulley 51 has a dimension (considerably) greater than the pulley 52. Furthermore, the pulley 51 can be a sucking pulley so as to hold the blanks 17 thereon. The moving conveyor 49 has a law of continuous motion (i.e. a constant forward movement speed) unlike the two moving

drums 43 and 46 that have a law of intermittent motion. The rotation of the two pulleys 51 and 52 cyclically moves the belt 50 through: the exchange station S8 in which a blank 17 is received by a holding head 48, and the following input station S1 in which the blank 17 is released to a corresponding pocket 27 of the wrapping drum 25.

[0052] The moving drum 43, the moving drum 46, and the moving conveyor 49 move the blanks 17 transversally, i.e. with the pre-weakened longitudinal folding lines oriented perpendicular to the forward movement direction and with the pre-weakened transverse folding lines oriented parallel to the forward movement direction.

[0053] At the holding station S6 a transfer arm 53 is arranged which is mounted so as to rotate (with an intermittent motion, i.e. "stepwise") around a horizontal rotation axis 54 (parallel to the rotation axis 44). The transfer arm 53 supports a sucking holding head 54 designed to hold a blank 17. The rotation of the transfer arm 53 around the rotation axis 54 moves the holding head 55 back and forth between the lower output mouth of the hopper 42 and the moving drum 43 so as to transfer the blanks 17 from the lower output mouth of the hopper 42 to the moving drum 43.

[0054] At the exchange station S7 a transfer arm 56 is arranged which is mounted so as to rotate (with an intermittent motion, i.e. "stepwise") around a horizontal rotation axis 57 (parallel to the rotation axis 54). The transfer arm 56 supports a sucking holding head 57 designed to hold a blank 17. The rotation of the transfer arm 56 around the rotation axis 57 moves the holding head 58 back and forth between the moving drum 43 and the moving drum 46 so as to transfer the blanks 17 from the moving drum 43 to the moving drum 46.

[0055] As illustrated in Figure 14, the moving drums 43 and 46 and the transfer arms 53 and 56 are made in a "comb-like manner", so that the transfer arm 53 can insert itself inside the moving drum 43 and that the transfer arm 56 can alternatively insert itself inside the moving drums 43 and 46.

[0056] According to what illustrated in Figure 13, the feeding unit 41 comprises a yielding station S9, which is coupled to the moving drum 43, is arranged between the holding station S6 and the transfer station S7, and is provided with a yielding device 59 that carries out a yield (i.e. a pre-folding) of the blank 17 carried by a holding head 45 along the two pre-weakened longitudinal folding lines. The yielding device 59 could be deactivated or could be absent if the function thereof is not necessary.

[0057] The feeding unit 41 comprises a gluing station S10, which is coupled to the moving drum 46, is arranged between the transfer station S7 and the transfer station S8, and is provided with a gluing unit 60 that carries out a gluing of the blank 17 carried by a holding head 48. In particular, the gluing unit 60 comprises a series of spraying gluing devices (in particular six spraying gluing devices) that deposit the cold glue 19, 20, 21 and 22 (illustrated in Figure 7). It is important to observe that the gluing devices 31 apply the glue 23 along a line directed longi-

tudinally, whereas the blank 17 moves longitudinally (i.e. with the most favorable orientation for applying the glue 23 along a line directed longitudinally); instead, the gluing devices of the gluing unit 60 apply the glue 19, 20, 21 and 22 along a line directed transversally, whereas the blank 17 moves transversally (i.e. with the most favorable orientation for applying the glue 19, 20, 21 and 22 along a line directed transversally).

[0058] Downstream of the gluing unit 60 (possibly also alongside the gluing unit 60 or integrated with the gluing unit 60), a further gluing unit 61 is arranged comprising a spraying gluing device that deposits the hot glue 18 (illustrated in Figure 7), i.e. deposits a hot glue point 18 (illustrated in Figure 7) on the flap 11" and alongside the previously applied cold glue 19.

[0059] The feeding unit 41 comprises a folding station S11, which is coupled to the moving conveyor 49, is arranged between the exchange station S8 and the input station S1, and is provided with a folding device 62 that carries out the folding of the flap 11" of each folding blank 17 by 180° against the panel 11'.

[0060] The feeding unit 41 can comprise a printing station S12, which is coupled to the moving conveyor 49, is arranged between the folding station S11 and the input station S1, and is provided with a tag device 63 that carries out on each blank 17 the printing of an identification code (for example indicating production place and date).

[0061] According to a preferred embodiment, the two moving drums 43 and 46 have different laws of motion: both the two moving drums 43 and 46 have an intermittent motion (i.e. a motion that provides for a cyclical alternation of motion steps and still steps), but the moving drum 43 has longer still steps and briefer motion steps (possibly also without traits at constant speed) whereas the moving drum 46 has briefer still steps and longer motion steps and especially with a trait at a (relatively) prolonged constant speed. The function of the moving drum 43 is to receive the blanks 17 coming from the lower output mouth of the hopper 42 and thus requires, in order to operate in an optimum manner, a prolonged still step so as to have the time to calmly extract a blank 17 from the lower output mouth of the hopper 42; instead, the function of the moving drum 46 is to allow the application of the glue 28-22 and thus requires, in order to operate in an optimum manner, a trait at a (relatively) prolonged constant speed since the glue 28-22 is applied on a blank 17 in a more precise manner when the blank 17 moves at constant speed.

[0062] In the embodiment illustrated in Figure 13, the feeding unit 41 only comprises the gluing unit 60 which is arranged along the moving drum 46 and applies all the glues 18-22; according to a different embodiment, the gluing unit 60 which is arranged along the moving drum 46 applies the sole cold glue 19, whereas the cold glue 20-22 is applied by a further gluing unit 64 which is arranged along the moving conveyor 49.

[0063] The embodiments described herein can be combined with one another without departing from the

scope of protection of the present invention.

[0064] The above-described packer machine 24 has numerous advantages.

[0065] Firstly, in the above-described packer machine 24 the depositing of the hot glue 23 can be carried out by using only two gluing devices 31 (one for each side of the blank 17) instead of eight gluing devices that are normally required in an analogous traditional packer machine; this result is obtained thanks to the fact that at the two gluing devices 31 the blank 17 moves longitudinally (i.e. with the most favorable orientation for applying the glue 23 along a line directed longitudinally).

[0066] Furthermore, in the above-described packer machine 24, the gluing devices 31 are very close to the folding device 34 (which folds the outer wings 9' and 13' against the inner wings 9" and 13") and consequently the cigarette packs 1 standing between the gluing devices 31 and the folding device 34 are very few (one or also none); this is important, since in the case of stop of the packer machine 24 all the cigarette packs 1 standing between the gluing devices 31 and the folding device 34 have to be rejected because, at the moment of the following restart, the hot glue 23 is by then dry and thus unable to stick (also in the case of a very brief stop, since the hot glue 23 dries in very few seconds). It is important to observe that having one or also no cigarette packs 1 standing between the gluing devices 31 and the folding device 34, by stopping the packer machine 24 in the suitable step (a result always obtainable when the stop is planned and is not performed in emergency conditions) it is possible to completely annul the cigarette packs 1 to be rejected.

[0067] In the above-described packer machine 24 and along the wrapping path P3, a cigarette pack 1 that is "closed" by the folding device 34 always remains in contact with the previous cigarette pack 1 already "closed" and with the following cigarette pack 1 "to be closed" subsequently; in this manner, the cigarette pack 1 that is "closed" by the folding device 34 always remains well "packed" to the total advantage of the final precision of the folds.

[0068] It is important to highlight that in use the gluing devices 31 are completely fixed, i.e. in use they do not perform any type of movement and thus always remain in the same position while the packer machine 24 is working; this characteristic remarkably simplifies the production of the gluing devices 31 and allows obtaining greater precision in the depositing of the hot glue 23. It is important to observe that the gluing devices 31, only when the packer machine 24 is still, i.e. when the gluing devices 31 are not in use, could shift towards a clearing position (cleaning, parking); however, this is a very slow movement that occurs occasionally only when the packer machine 24 is stationary while in use (i.e. when they have to deposit the glue 23), the gluing devices 31 are totally stationary (i.e. they are completely fixed).

[0069] The above-described packer machine 24 also allows reducing the overall amount of cold glue that has

to be applied to each blank 17; in this manner, the production costs of the cigarette packs 1 are reduced and also the overall dimension of the gluing unit 60 is reduced (also this contributes to making the feeding unit 41 more compact and thus completely housable within the bulk of the remaining part of the packer machine 24). The above-described packer machine 24 has a reduced number of shaped parts with respect to an analogous known packer machine; in particular, in the above-described packer machine 24 and in the case of a change of shape, it is not necessary to modify the cam that moves the counter-pusher standing in the input station S1 and accompanies the radial getting into a pocket 27 of a wrap 3, of a collar 16 and of a blank 17.

[0070] Finally, the above-described packer machine 24 is compact and has an optimum accessibility to all its components; in fact, an operator who is in front of the packer machine 24 is able to reach all the active parts of the packer machine 24 with his/her hands in a simple, quick and ergonomic manner. This result is obtained also thanks to the conformation of the feeding unit 41 which is particularly compact and easy to access not protruding out of the bulk of the remaining part of the packer machine 24.

[0071] The embodiment illustrated in the accompanying figures refers to the production of a cigarette pack, but the present invention is applicable without substantial modifications also to the production of any other type of pack of smoking articles (for example a pack of cigars, a pack of electronic cigarettes of the liquid vaporization type, a cigarette pack of next generation without combustion of the tobacco...).

Claims

1. A packer machine (24) to produce a cigarette pack (1) provided with an outer container (2) and with a hinged lid (4) obtained by folding a blank (17) around a wrap (3) enclosing a group (14) of smoking articles; the blank (17) comprises a pair of first wings (9', 13') and a pair of second wings (9", 13"), which are placed on top of one another and glued so as to build respective side walls (9, 13) of the outer container (2) and of the lid (4); the packer machine (24) comprises:

a pocket (27) configured to simultaneously receive the wrap (3) and the blank (17);
 a wrapping drum (25), which is mounted so as to rotate, with an intermittent motion, around a first rotation axis (26) and is configured to move the pocket (27) along a first circular wrapping path (P1) extending between an input station (S1), where the wrap (3) and the blank (17) are inserted into the pocket (27) together and simultaneously, and an output station (S2);
 a first folding device, which is arranged along the first wrapping path (P1) and folds the blank

(17) around the wrap (3) placing the pair of second wings (9", 13") in contact with the wrap (3) and arranging the pair of first wings (9', 13') coplanar to one another and perpendicular to the pair of second wings (9", 13");

a gluing conveyor (29), which receives the wrap (3) wrapped in the blank (17) from the pocket (27) of the wrapping drum (25) in the output station (S2) and moves the wrap (3) wrapped in the blank (17) up to a first transfer station (S3) along a substantially straight gluing path (P2), which is parallel to the first rotation axis (26) of the wrapping drum (25);

at least one gluing device (31), which is arranged along the gluing path (P2) and applies glue (23) on the first wings (9', 13') or on the second wings (9", 13"); and

a second folding device (34), which is arranged downstream of the gluing device (31) and folds the first wings (9', 13') by 90° against the second wings (9", 13"), thus completing the production of the cigarette pack (1);

wherein, in the output station (S2), the gluing conveyor (29) directly extracts the wrap (3) wrapped in the blank (17) from the pocket (27) of the wrapping drum (25) going through the pocket (27) from side to side; and

wherein the gluing conveyor (29) comprises a first pusher (30), which is movable with a reciprocating motion along the gluing path (P2) and is configured to go through the pocket (27) standing still in the output station (S2) from side to side by means of an axial movement along a first transfer direction (D2) parallel to the first rotation axis (26);

the packer machine (24) is **characterized in that** the first pusher (30) is also movable between a work position, in which the first pusher (30) is able to engage the cigarette pack (1) standing in the output station (S2), and a return position, in which the first pusher (30) is not able to engage the cigarette pack (1) standing in the output station (S2).

2. The packer machine (24) according to claim 1, wherein the first pusher (30) is rotary around the first transfer direction (D2) so as to shift between the work position and the return position.
3. The packer machine (24) according to claim 1, wherein the first pusher (30) translates linearly so as to shift between the work position and the return position.
4. The packer machine (24) according to claim 1, 2 or 3 and comprising an actuator device (40), which is configured to keep the first pusher (30) in the work position when the first pusher (30) makes a forward

- work travel in order to push the cigarette pack (1) standing in the output station (S2) along the gluing path (P2) and to keep the first pusher (30) in the return position when the first pusher (30) makes a return travel.
5. The packer machine (24) according to one of the claims from 1 to 4 and comprising a second pusher (28), which is arranged in the output station (S2) and is configured to only partially extract the wrap (3) wrapped in the blank (17) from the pocket (27) of the wrapping drum (25) by means of a movement along a second transfer direction (D1), which is perpendicular to the first wrapping path (P1) and to the gluing path (P2).
 6. The packer machine (24) according to claim 5, wherein the second pusher (28) is configured to push the wrap (3) wrapped in the blank (17) against a striker plane, which is on the outside of the wrapping drum (25) and is opposite the pocket (27).
 7. The packer machine (24) according to one of the claims from 1 to 6 and comprising a second wrapping conveyor (33), which is configured to receive the wrap (3) wrapped in the blank (17) from the gluing conveyor (29) in the first transfer station (S3) and is configured to move the wrap (3) wrapped in the blank (17) along a second straight wrapping path (P3), which is perpendicular to the gluing path (P2), up to a second transfer station (S4).
 8. The packer machine (24) according to claim 7, wherein the second folding device (34) is arranged along the second wrapping path (P3).
 9. The packer machine (24) according to claim 7 or 8, wherein the second wrapping conveyor (33) comprises a third pusher (32), which is configured to retrieve the wrap (3) wrapped in the blank (17) from the gluing conveyor (29) in the first transfer station (S3) and moves the wrap (3) wrapped in the blank (17) along the second wrapping path (P3) up to the second transfer station (S4).
 10. The packer machine (24) according to claim 9, wherein:

a reject station (S5) is provided, which is configured to receive possible faulty cigarette packs (1) and is arranged at the end of the gluing path (P2) downstream of the third pusher (32); and in order to direct a faulty cigarette pack (1) towards the reject station (S5), the third pusher (32) is not activated so that the faulty cigarette pack (1) does not get into the second wrapping conveyor (33) and remains at the end of the gluing conveyor (29).
 11. The packer machine (24) according one of the claims from 7 to 10 and comprising a drying conveyor (35), which is configured to receive the cigarette pack (1) from the second wrapping conveyor (33) in the second transfer station (S4) and is configured to move the cigarette pack (1) along a straight drying path (P4), which is parallel and coaxial to the second wrapping path (P3).
 12. The packer machine (24) according to one of the claims from 7 to 11 and comprising braking members (37), which are arranged on opposite sides of the wrapping path (P3) and are configured to squeeze, from opposite sides and towards one another, respective walls (6, 10) of the cigarette pack (1) so as to increase the force resisting the forward movement of the cigarette pack (1) along the second wrapping path (P3).
 13. The packer machine (24) according to one of the claims from 7 to 12 and comprising at least one non-return member (38), which is arranged along the second wrapping path (P3) and is configured to allow the cigarette pack (1) to move forward along the second wrapping path (P3) and prevents the cigarette pack (1) from moving back along the second wrapping path (P3).
 14. The packer machine (24) according to one of the claims from 1 to 13 and comprising a reject station (S5), which is configured to receive possible faulty cigarette packs (1) and is arranged at the end of the gluing path (P2).
 15. The packer machine (24) according to one of the claims from 1 to 14 and comprising a feeding unit (41), which feeds the blank (17) to the input station (S1) and comprises, in turn:

a hopper (42), which houses a stack of blanks (17) and has a lower output mouth;

a first moving drum (43), which is mounted so as to rotate, preferably with an intermittent motion, around a second rotation axis (44) and supports at least one first sucking holding head (45), which is designed to receive the blank (17) coming from the lower output mouth of the hopper (42);

a second moving drum (46), which is mounted so as to rotate, preferably with an intermittent motion, around a third rotation axis (47) and supports at least one second sucking holding head (48), which is designed to receive the blank (17) from the first holding head (45); and

a moving conveyor belt (49), which is provided with a belt (50), which is wound around two end pulleys (51, 52) and preferably moves with a continuous motion so as to receive the blank

(17) from the second holding head (48) and release the blank (17) to the wrapping drum (25) in the input station (S1).

16. A wrapping method to produce a cigarette pack (1) 5
provided with an outer container (2) and with a
hinged lid (4) obtained by folding a blank (17) around
a wrap (3) enclosing a group (14) of smoking articles;
the blank (17) comprises a pair of first wings (9', 13') 10
and a pair of second wings (9", 13"), which are placed
on top of one another and glued so as to build re-
spective side walls (9, 13) of the outer container (2)
and of the lid (4); the wrapping method comprises
the steps of:

moving, by means of a wrapping drum (25), 15
which is mounted so as to rotate, with an inter-
mittent motion, around a first rotation axis (26),
a pocket (27) along a first circular wrapping path
(P1) extending between an input station (S1), 20
where the wrap (3) and the blank (17) are insert-
ed into the pocket (27) together and simultane-
ously, and an output station (S2);
folding, by means of a first folding device, which 25
is arranged along the first wrapping path (P1),
the blank (17) around the wrap (3) placing the
pair of second wings (9", 13") in contact with the
wrap (3) and arranging the pair of first wings (9',
13') coplanar to one another and perpendicular 30
to the pair of second wings (9", 13");
moving, by means of a gluing conveyor (29),
which receives the wrap (3) wrapped in the blank
(17) from the pocket (27) of the wrapping drum
(25) in the output station (S2), the wrap (3) 35
wrapped in the blank (17) along a substantially
straight gluing path (P2), which is perpendicular
to the wrapping path (P1), up to a transfer station
(S3);
applying, by means of at least one gluing device 40
(31) arranged along the gluing path (P2), glue
(23) on the first wings (9', 13') or on the second
wings (9", 13"); and
folding, by means of a second folding device (34) 45
arranged downstream of the gluing device (31),
the first wings (9', 13') by 90° against the second
wings (9", 13"), thus completing the production
of the cigarette pack (1);
wherein, in the output station (S2), the gluing
conveyor (29) directly extracts the wrap (3) 50
wrapped in the blank (17) from the pocket (27)
of the wrapping drum (25) and going through the
pocket (27) from side to side; and
wherein the gluing conveyor (29) comprises a
first pusher (30), which is movable with a recip- 55
rocating motion along the gluing path (P2) and
goes through the pocket (27) standing still in the
output station (S2) from side to side by means
of an axial movement along a first transfer di-

rection (D2) parallel to the first rotation axis (26);
the wrapping method (24) is **characterized in
that** it comprises the further step of shifting the
first pusher (30) between a work position, in
which the first pusher (30) is able to engage the
cigarette pack (1) standing in the output station
(S2), and a return position, in which the first
pusher (30) is not able to engage the cigarette
pack (1) standing in the output station (S2).

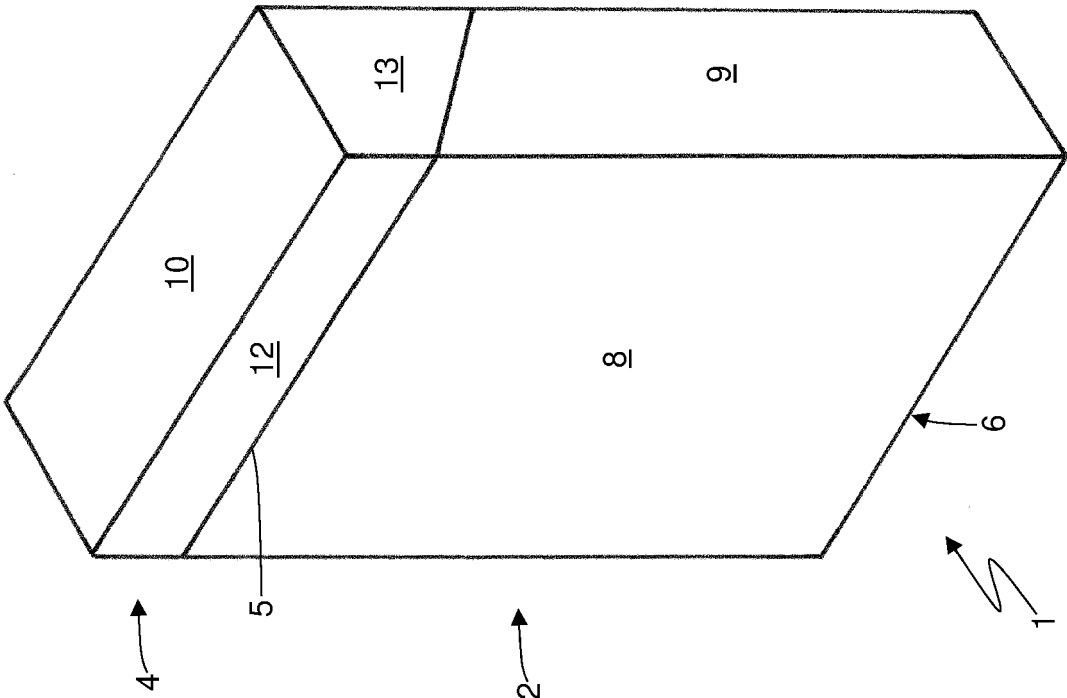


Fig. 1

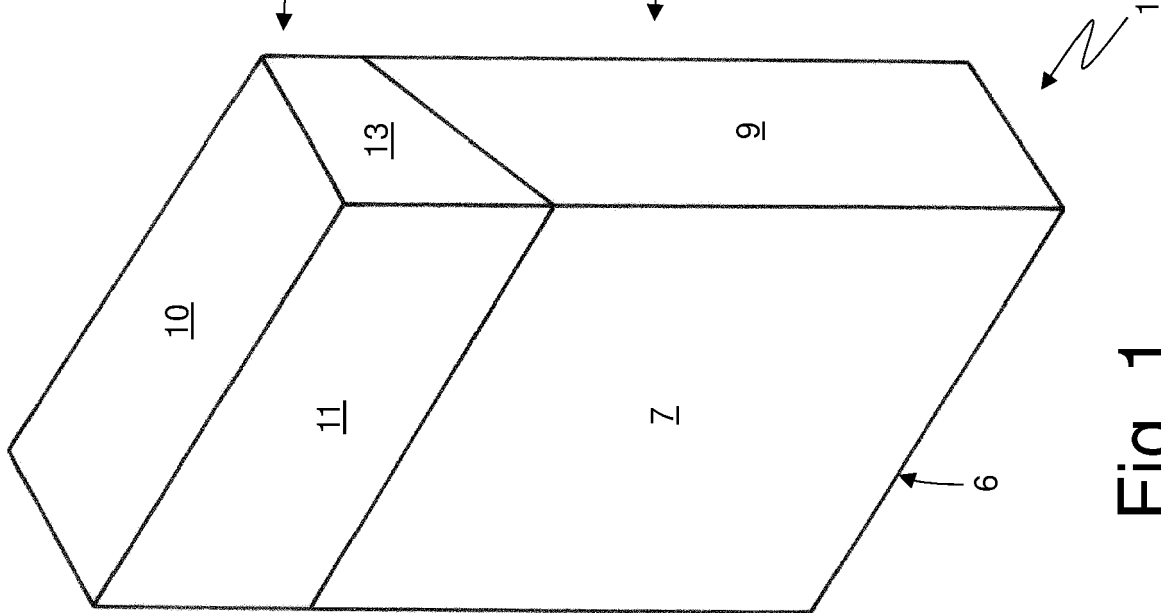


Fig. 2

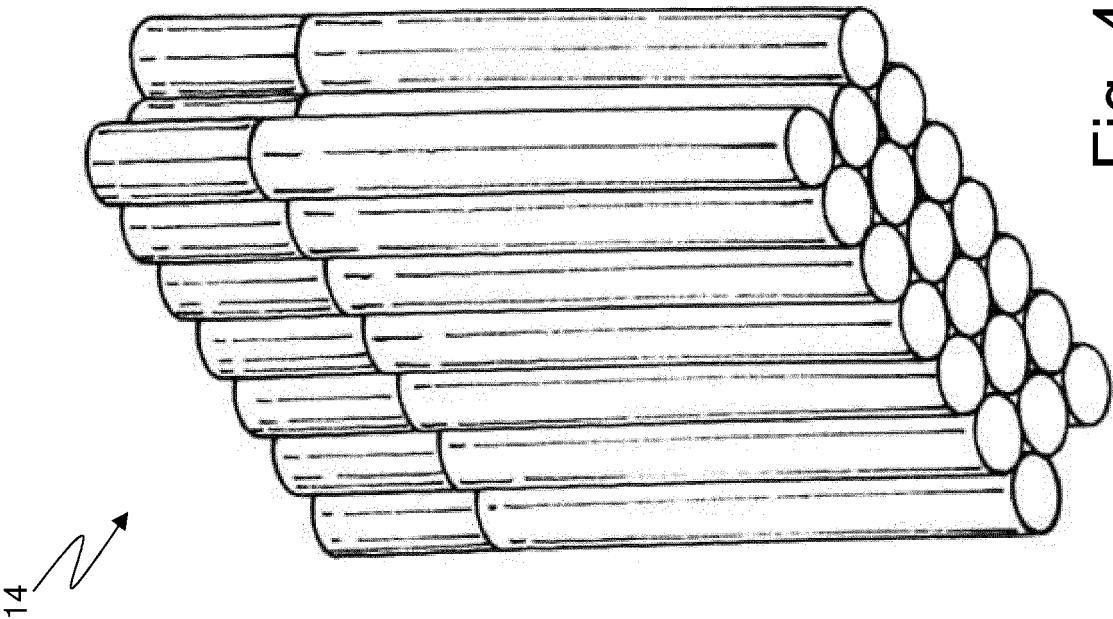


Fig. 4

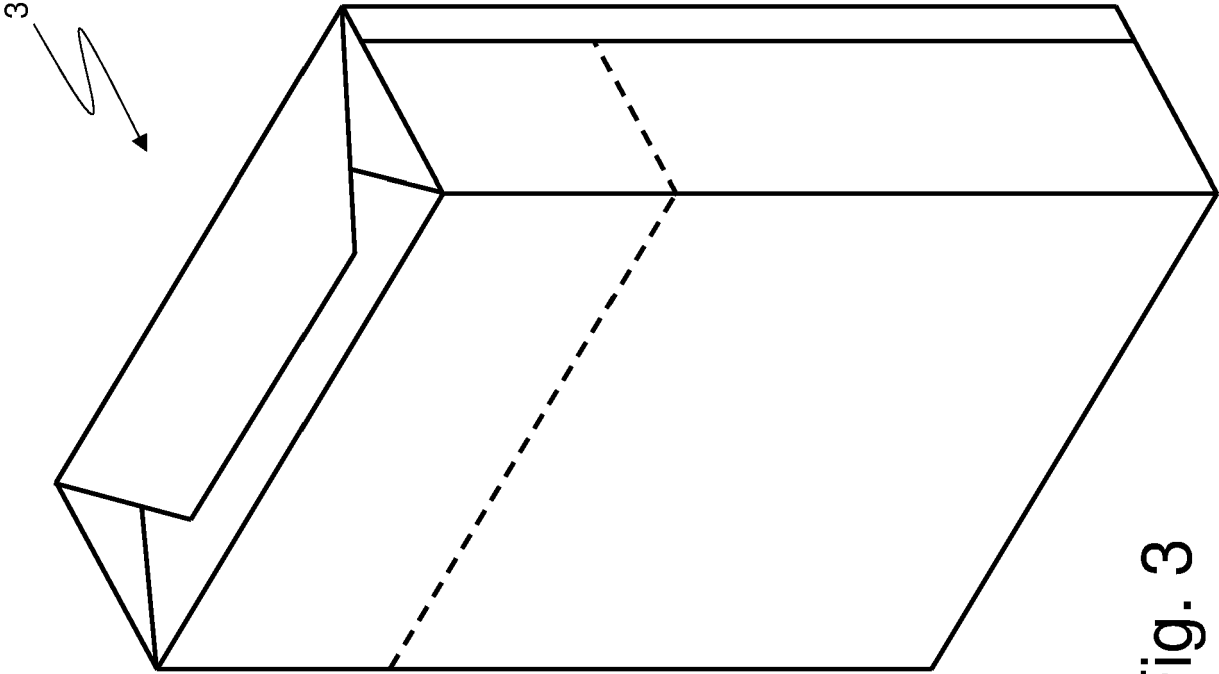


Fig. 3

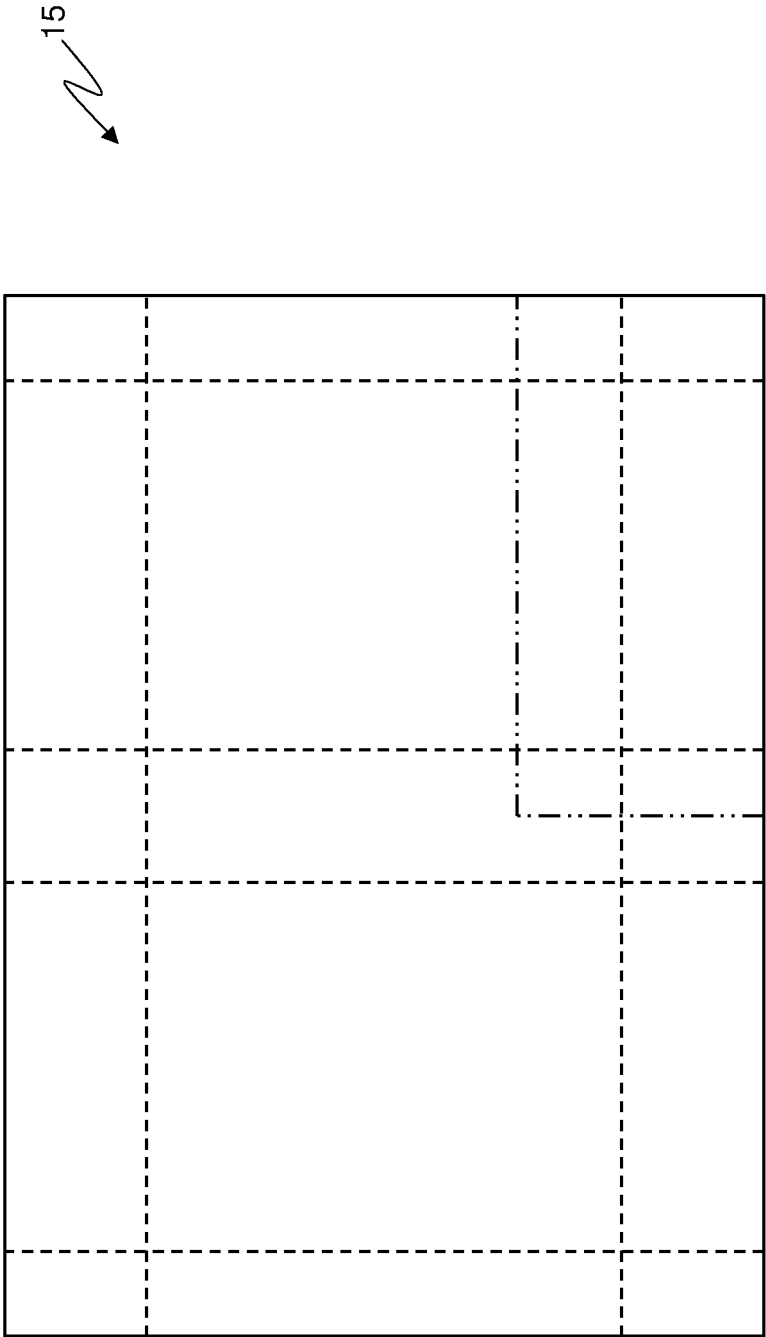


Fig. 5

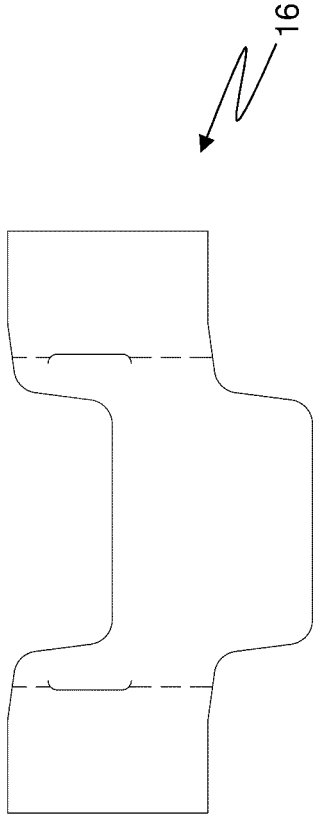


Fig. 6

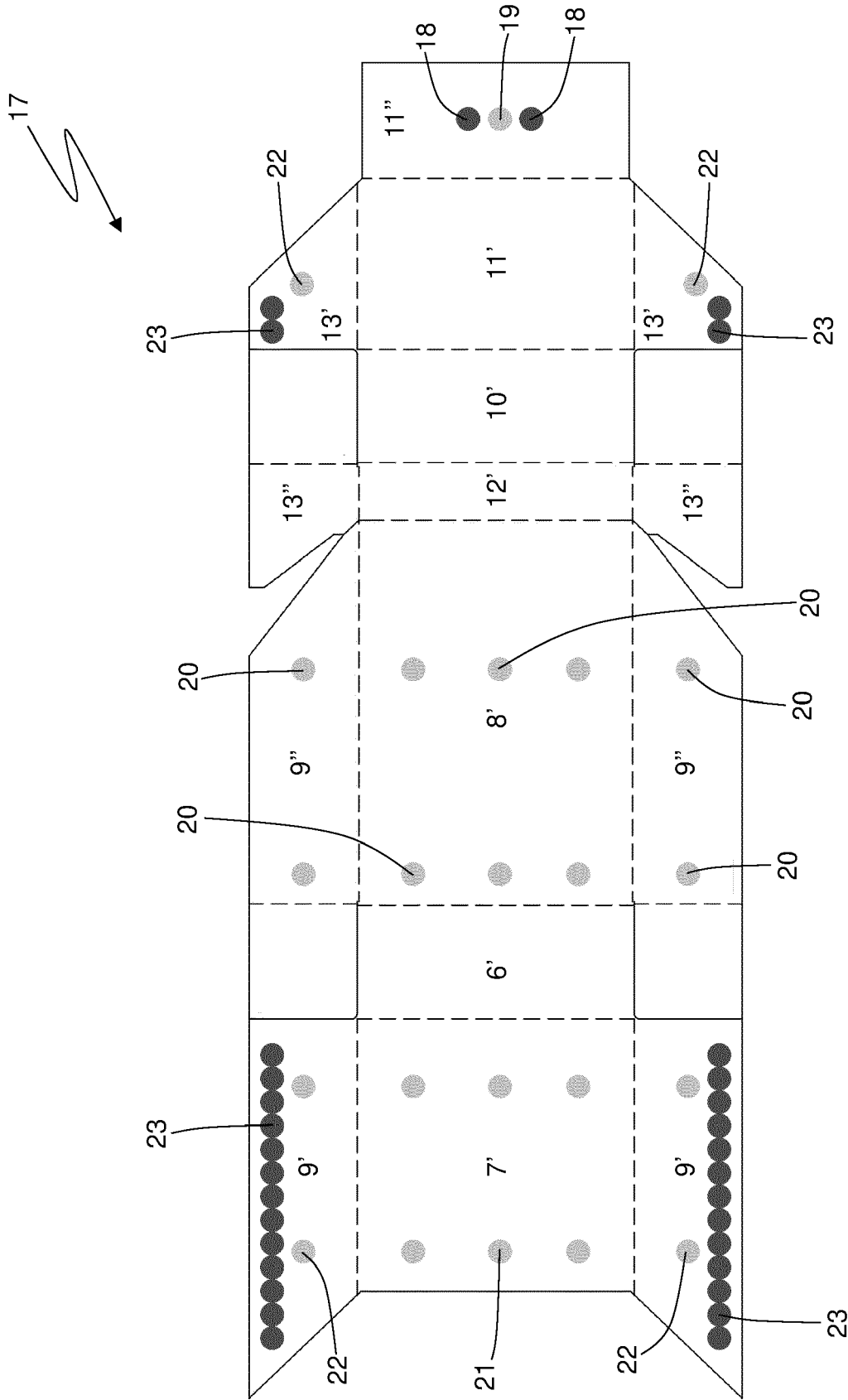
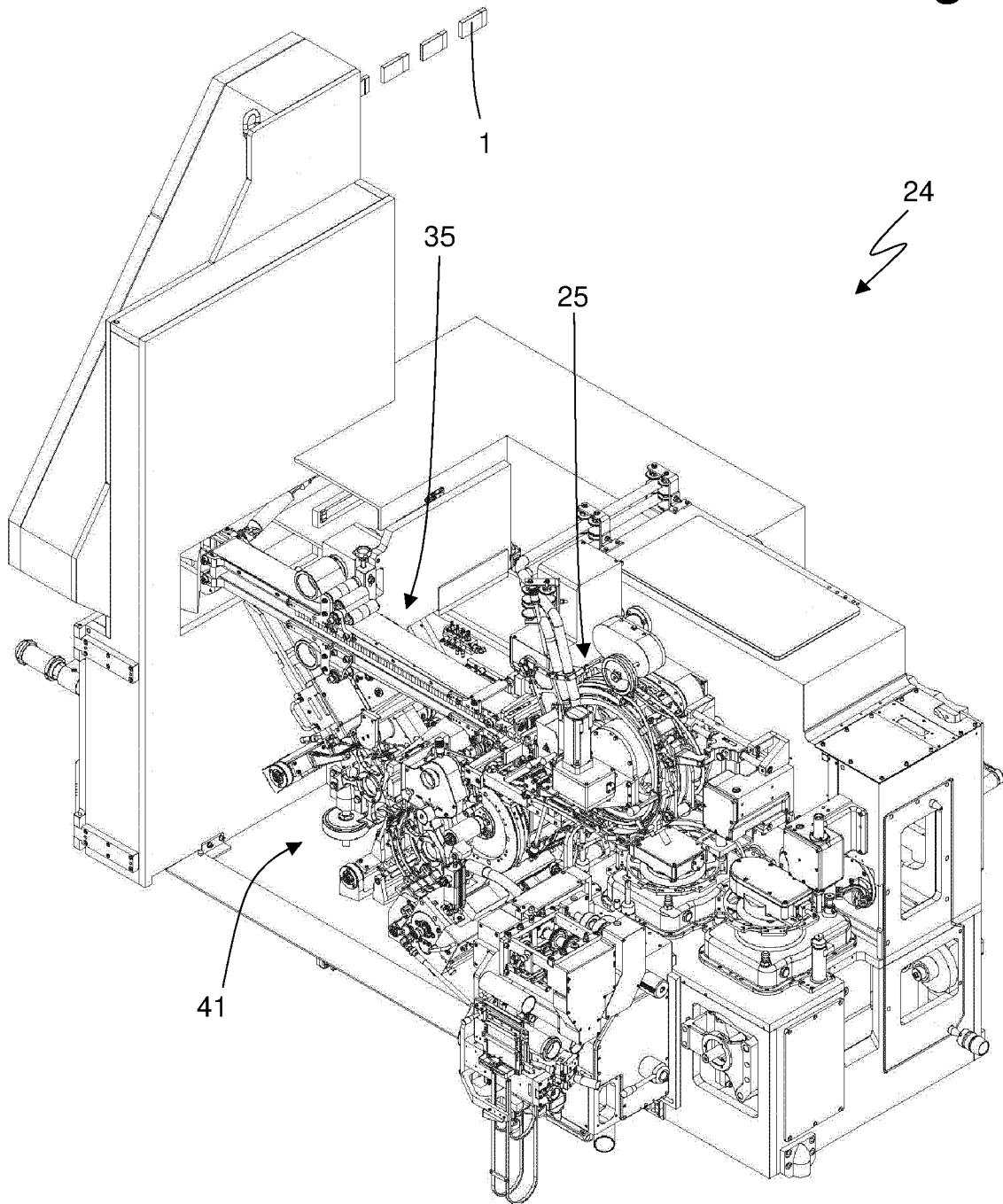


Fig. 7

Fig. 8



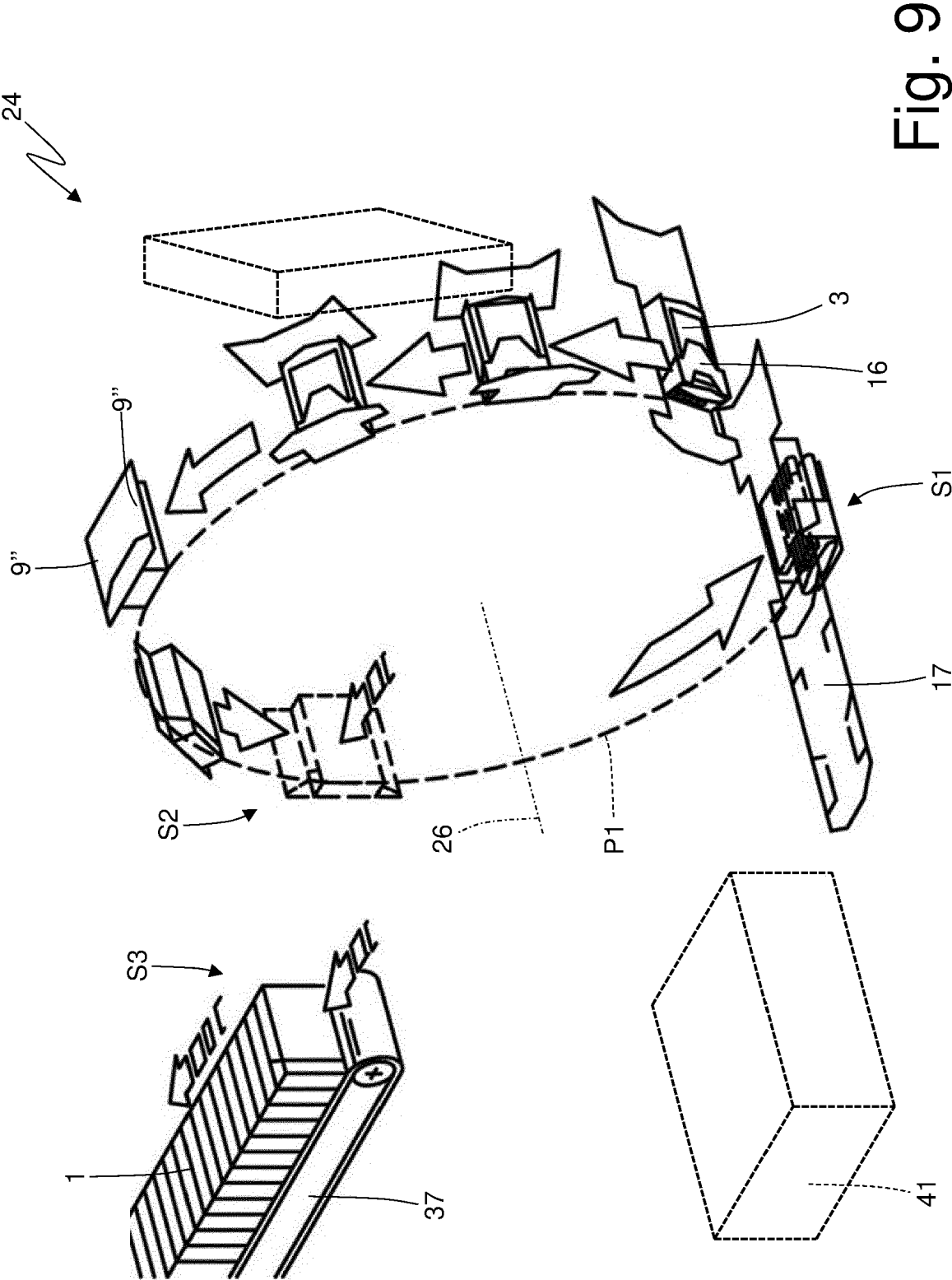


Fig. 9

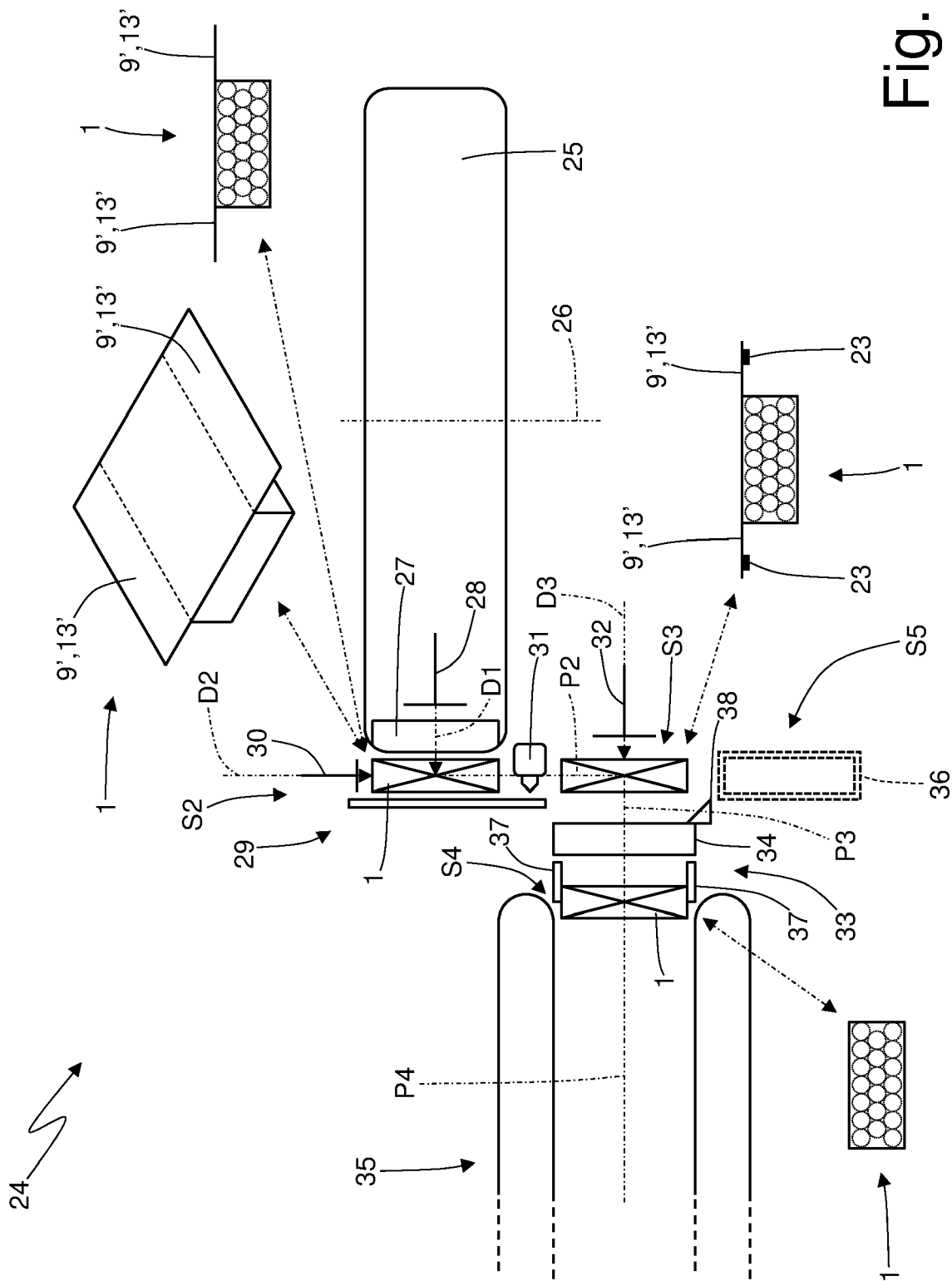
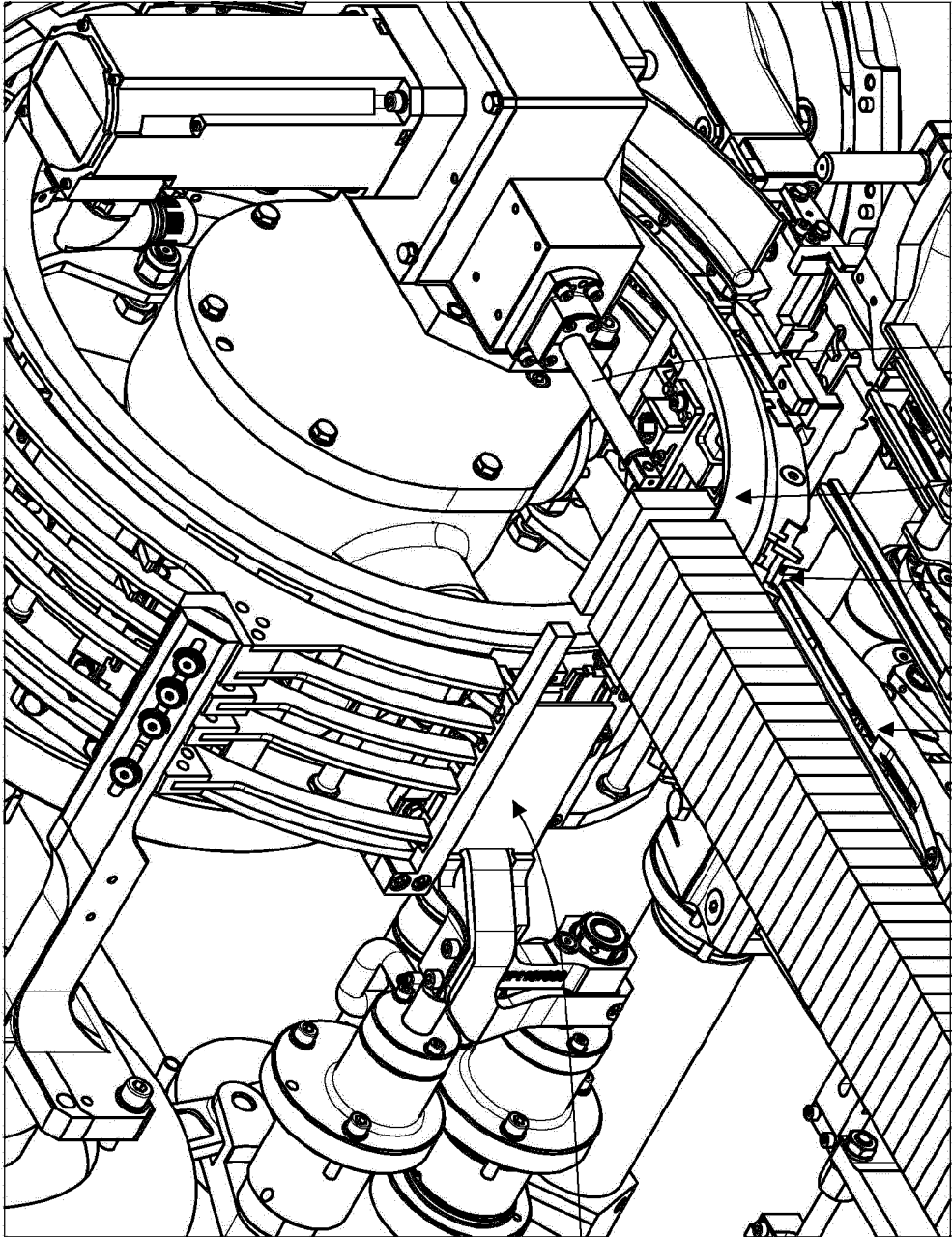


Fig. 10

24 ↗

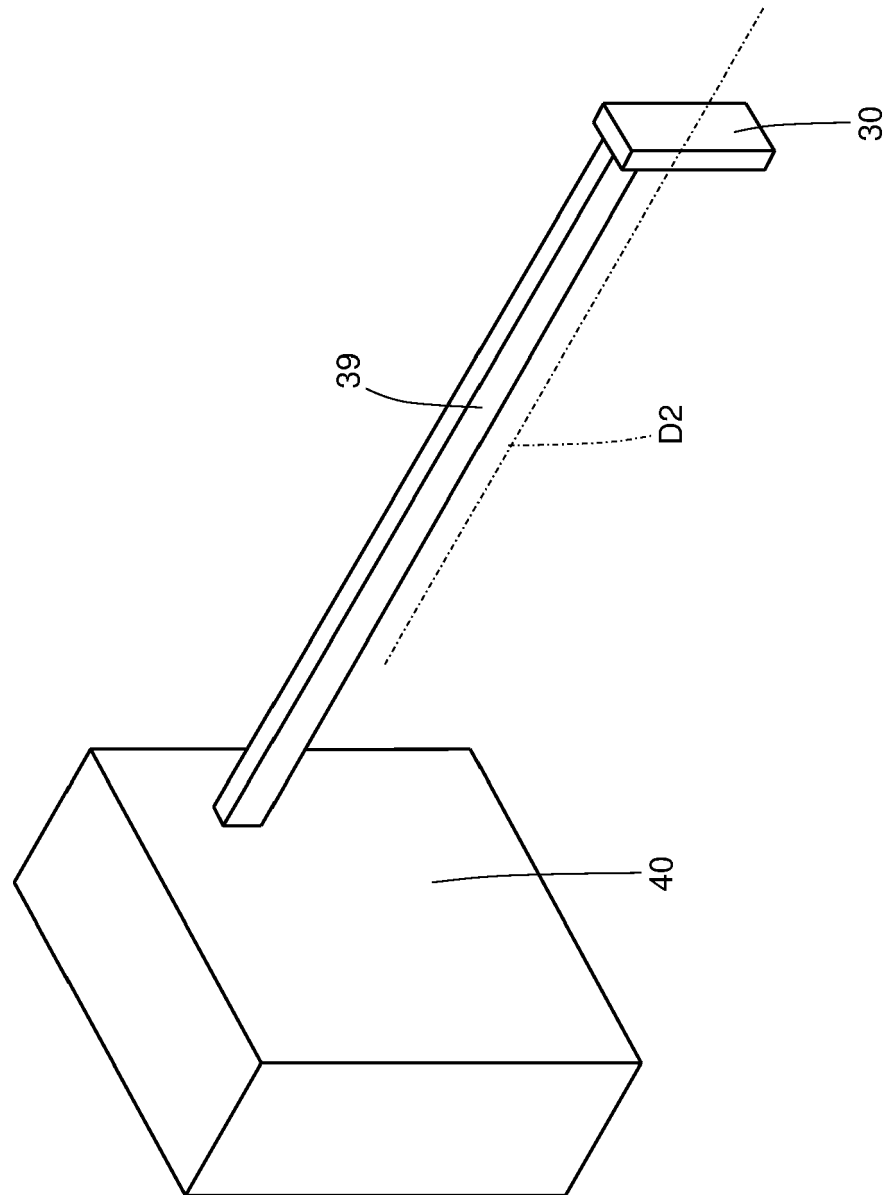
25 →

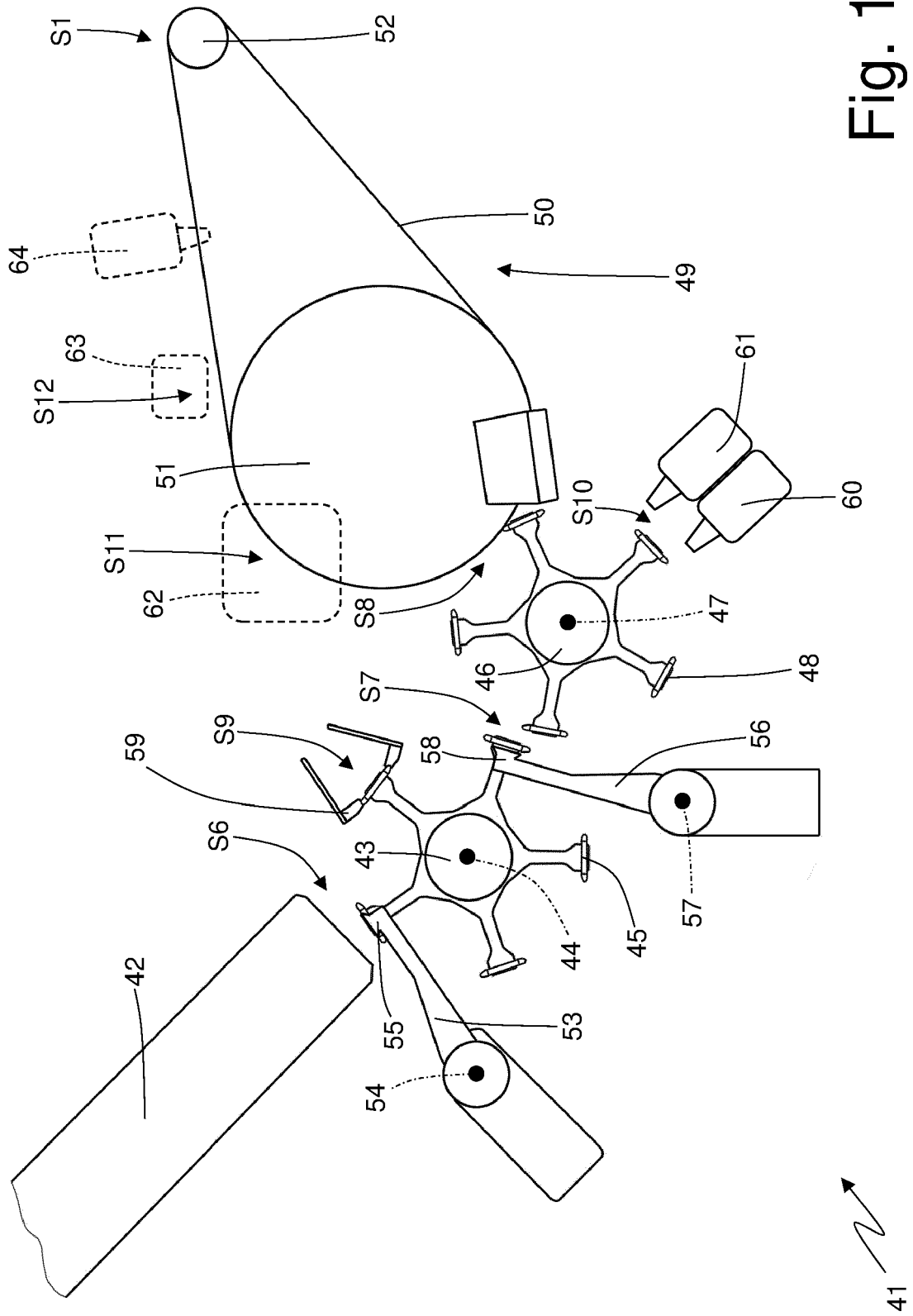


S2

Fig. 11

Fig. 12





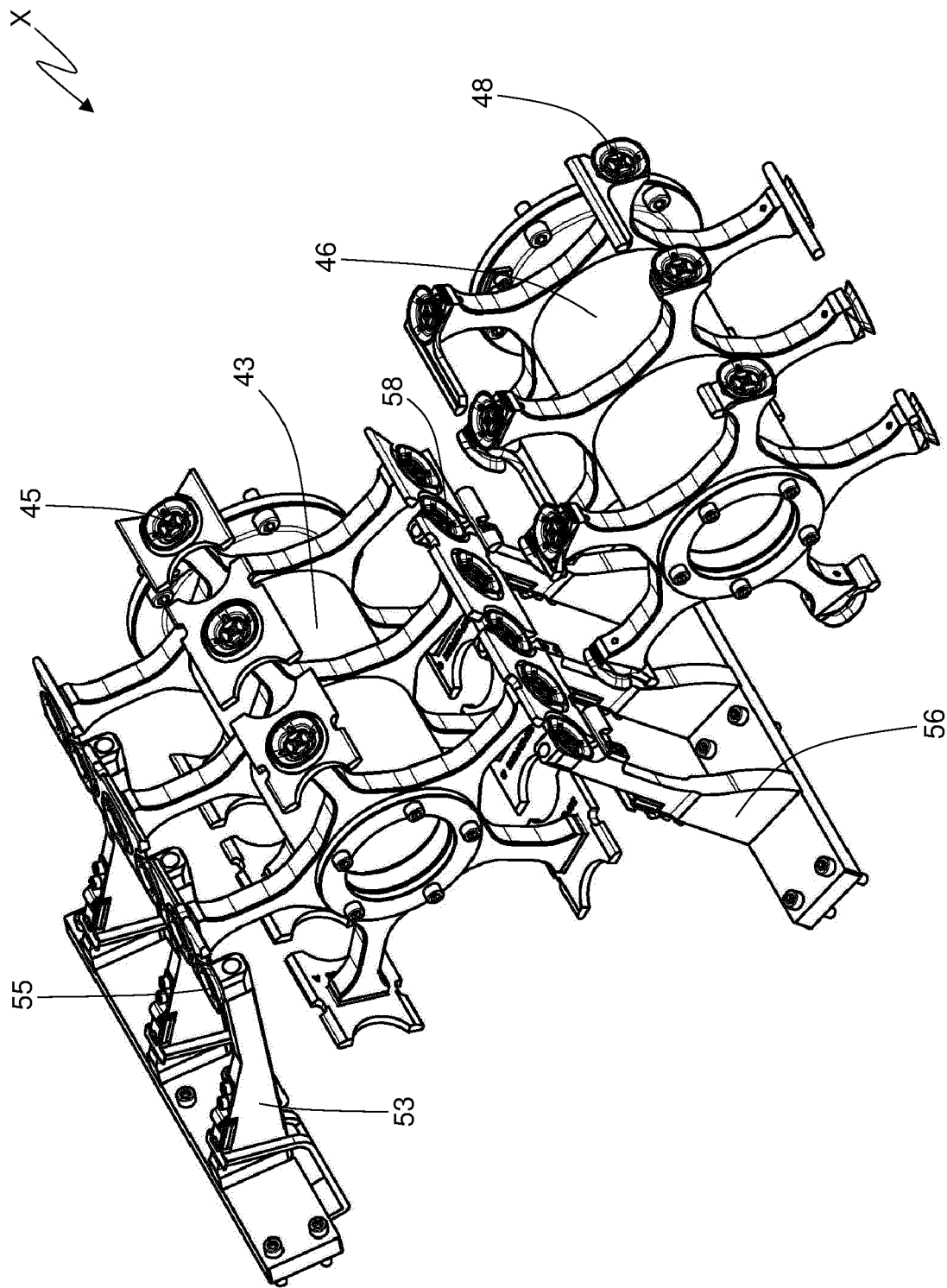


Fig. 14



EUROPEAN SEARCH REPORT

Application Number

EP 22 15 8344

5

10

15

20

25

30

35

40

45

50

55

1

EPO FORM 1503 03.82 (P04C01)

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 2 935 015 B1 (G D SOCIETA' PER AZIONI [IT]) 14 June 2017 (2017-06-14) * figures 9, 20, 24 * * paragraphs [0092], [0094], [0095] * -----	1-16	INV. B65B19/22 B65B51/02 B65B61/00 B65B35/20 B65B61/24
A	EP 3 546 377 A1 (GD SPA [IT]) 2 October 2019 (2019-10-02) * figures 9, 25 * * paragraphs [0068] - [0069] * -----	1-16	
A	US 3 924 386 A (SCHERMUND ALFRED) 9 December 1975 (1975-12-09) * figure 3 * * column 5, lines 10-26 * * column 9, line 50 - column 10, line 37 * -----	1-16	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 15 June 2022	Examiner Schmitt, Michel
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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

EP 22 15 8344

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

15-06-2022

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
EP 2935015	B1	14-06-2017	EP	2935015 A1		28-10-2015
			JP	6258967 B2		10-01-2018
			JP	2016501791 A		21-01-2016
			PL	2935015 T3		29-12-2017
			RU	2015129759 A		27-01-2017
			US	2015336697 A1		26-11-2015
			WO	2014097276 A1		26-06-2014

EP 3546377	A1	02-10-2019	NONE			

US 3924386	A	09-12-1975	BE	806003 A		01-02-1974
			DD	106808 A5		05-07-1974
			DE	2350111 A1		02-05-1974
			FR	2208818 A1		28-06-1974
			GB	1440923 A		30-06-1976
			JP	S4973293 A		15-07-1974
			JP	S5437873 B2		17-11-1979
			US	3924386 A		09-12-1975

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

- IT 102021000004127 [0001]
- EP 3680185 A1 [0005]
- EP 2935015 B1 [0010]
- EP 3546377 A1 [0011]