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(54) **AN APPARATUS FOR FORMING A PACK CONTAINING A GROUP OF SMOKING ARTICLES**

VORRICHTUNG ZUR HERSTELLUNG EINER PACKUNG MIT EINER GRUPPE VON RAUCHARTIKELN

APPAREIL DE FORMATION D'UN EMBALLAGE CONTENANT UN GROUPE D'ARTICLES À FUMER

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**EP-A2- 2 419 335 GB-A- 1 425 009**

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## Description

**[0001]** The present invention relates to an apparatus, and the relative process, for forming a pack containing a group of products, in particular smoking articles, for example, cigarettes.

**[0002]** It should be noted that, in the present text, reference will be made indiscriminately to the specific example of "cigarettes" rather than to the more generic expression "smoking articles", without however losing generality in relation to other types of articles (such as cigars, small cigars or cigarillos, electronic cigarettes or ecgis, auxiliary products such as filters, refills for ecgis and other tobacco-based products or with tobacco-alternative or -replacement components).

**[0003]** The apparatus described here is of the type comprising:

- a forming wheel, provided with a plurality of seats for receiving respective groups of products and casing blanks, and rotatable around a rotation axis for advancing each seat from a position of loading of the group of products and of the blanks, to a position of unloading semifinished packs from said forming wheel, obtained from the folding of said blanks around said group of products;
- at least one folding device for folding said blanks around the respective groups of products and producing said semifinished packs, in the tract followed by the respective seats of said forming wheel, from said loading position to said unloading position;

wherein each semifinished pack has a first and a second wall oppositely positioned, with respect to said group of products, and at least one flap of said blank yet to be folded is connected to said second wall;

- a pushing member configured to engage the first wall of the pack contained in the seat of the forming wheel that finds itself in the unloading position, and to advance it along a feeding direction that is transversal to said first wall, so as to push it outside of said seat, and to feed it along said feeding direction;
- an opposing device configured to exert a force on said second wall of said semifinished pack pushed by said pushing member, said force being opposite to the force exerted by said pushing device on said first wall.

**[0004]** In the apparatus in question, in a manner known *per se* in the art, the semi-finished pack that is pushed out of the forming wheel, is pressed by two opposing forces, on its larger walls, and, in this condition, its two outer flaps, still to be folded, of the smaller side walls, are folded against the corresponding inner flaps to form these walls and complete the pack.

**[0005]** In the known apparatuses, the aforementioned opposing device, configured to act in opposition to the

pusher member, is constituted by a counter-pusher arranged to engage the aforesaid second wall of the semi-finished pack and move simultaneously with the pusher member, accompanying the displacement of the pack, and exerting thereon a force opposite to that exerted by the pusher member.

**[0006]** An apparatus of the known type is, for example, described in the document EP 2 419 335 B1.

**[0007]** The present invention proposes to provide an improved solution with respect to the known apparatuses indicated, in particular, with a simpler structure and a more reliable operating mode.

**[0008]** This object is achieved by means of an apparatus and a method according to claims 1 and 8, respectively.

**[0009]** The claims form an integral part of the technical disclosure provided here in relation to the invention.

**[0010]** Further characteristics and advantages of the invention will become apparent from the description that follows with reference to the attached drawings, provided purely by way of non-limiting example, wherein:

- Figure 1 represents - in a simplified manner - a preferred embodiment of the apparatus described herein;
- Figure 2 represents an example of a pack formed by means of the apparatus described herein;
- Figure 3 represents a casing blank to produce the pack of Figure 2;
- Figure 4 represents an example of a semi-finished pack, which is produced by the forming wheel of the apparatus described herein;
- Figure 5 shows - in detail - the outlet region of the packs from the forming wheel, in a condition in which a pack carried by the forming wheel has just reached the unloading position;
- Figure 6 represents the same outlet region represented in Figure 5, in a condition in which the aforementioned pack has been ejected from the forming wheel;
- Figure 7 represents a detail of the outlet region shown in Figures 5 and 6;
- Figure 8 represents a folding member of the apparatus described here according to a preferred embodiment thereof;
- Figure 9 represents the same outlet region represented in Figure 5, in a condition in which the aforementioned pack is approaching the unloading position;
- Figure 10 represents a different embodiment of the apparatus described herein;
- Figure 11 represents another embodiment of the apparatus described herein.

**[0011]** In the following description, various specific details are illustrated aimed at a thorough understanding of the embodiments. The embodiments may be implemented without one or more of the specific details, or with

other methods, components, materials, etc. In other cases, known structures, materials or operations are not shown or described in detail to avoid obscuring various aspects of the embodiments.

**[0012]** The references used here are for convenience only and do not therefore define the field of protection or the scope of the embodiments.

**[0013]** As mentioned above, the solution described herein relates to an apparatus, and a process, for forming a pack containing a group of products, in particular smoking articles, for example cigarettes.

**[0014]** This forming is carried out starting from a casing blank, which is commonly constituted by a sheet material cut out according to a predetermined contour, and provided with predefined folding lines, to ensure a univocal folding of the sheet that produces the outer casing of the pack.

**[0015]** Figure 2 represents - by way of example - a pack of cigarettes which can be formed by the solution described herein.

**[0016]** The pack shown is a "hinged-lid" pack type.

**[0017]** In particular, this pack comprises a group of cigarettes G wrapped in an inner wrapper (not shown), and a rigid outer casing 2, containing the group of cigarettes G.

**[0018]** The casing 2 consists of a container 2A, which contains the group of cigarettes G, and has, at the top, an opening for picking up the cigarettes, and a lid 2B, which is hinged to the container 2A so that it is movable between a closed position and an open position.

**[0019]** Overall, in the closed condition of the cover 2B, the casing 2 has a parallelepiped shape, defining a front wall 21, a rear wall 211, two shorter side walls 2111, an upper wall 211V and a lower wall 211V.

**[0020]** The walls 21 and 2111 are each defined by the juxtaposition of respective portions of the container 2A and of the cover 2B.

**[0021]** Figure 3 represents a blank for forming the casing 2 shown in Figure 2.

**[0022]** This blank has a prevalent development along a main axis B, and centrally defines, along the axis B, the portions 102, 103, 104, 105, 106 and 107, which are connected to each other by respective folding lines transverse to the main axis B.

**[0023]** A pair of flaps are connected to each of the portions 102, 104, 105 and 107 through folding lines parallel to the main axis B, said flaps being arranged on opposite sides of the relative portion with respect to the main axis B.

**[0024]** These flaps are indicated in the figures, with the reference numerals 109, 110, 111 and 112, respectively (the flaps of the same portion being indicated with the same reference number), starting from the edges of the portion 102.

**[0025]** With reference to the casing of Figure 2, an expert skilled in the art will understand that the portions 102, 103 and 104 and the respective side flaps 109, 110 form the container 2A, while the portions 105, 106 and

107 and the respective side flaps 111, 112, form the cover 2B.

**[0026]** It will also be understood that the portions 102 and 107 together define the front wall 21, the portions 104 and 105 the rear wall 211, and the flaps 109, 110, 111 and 112 define the side walls 2111. The portions 103 and 106 instead define, respectively, the upper wall 211V and the lower wall 211V of the casing 2.

**[0027]** With reference now to Figure 1, the apparatus described herein is arranged to associate together a blank 100 with a group of cigarettes G, and to fold the blank around the group of cigarettes G so as to obtain a closed casing 2 containing the group of cigarettes G.

**[0028]** The apparatus described herein comprises, first of all, a forming wheel 20, which is rotatable about a rotation axis I, and is provided along its periphery with a plurality of seats 22, arranged to receive and maintain the blank 100 and the group of cigarettes G in a given reciprocal position.

**[0029]** At the forming wheel there are defined, respectively, a loading position C1 of the blanks and of the groups of cigarettes in respective seats 22 of the forming wheel 20, and a position C2 for unloading semi-finished packs from the forming wheel, said packs containing the groups of cigarettes G.

**[0030]** The two positions C1 and C2 are located along the peripheral region of the wheel 20, and are mutually arranged at a predetermined angular distance.

**[0031]** The location of the two positions C1 and C2, and their distance, depend on the configuration of the equipment provided for the specific application.

**[0032]** In various preferred embodiments, as in the illustrated one, the loading position C1 is at 270° - with reference to a theoretical trigonometric circumference centered on the axis I - and the unloading position C2 is at 180°.

**[0033]** In the illustrated example, the blanks 100 are fed to the forming wheel 20 along a direction Y parallel to the rotation axis I, and are oriented with their own axis B parallel to the direction Y.

**[0034]** The apparatus described herein comprises a series of folding devices arranged to fold the various portions and the various flaps of the blank 100 to wrap the group of cigarettes G.

**[0035]** With reference to the illustrated example, in the single seat 22 of the forming wheel, the group of cigarettes G is arranged on the portions 104 and 105 of the blank 100, which, as seen above, will define the rear wall 211 of the casing 2.

**[0036]** The forming of the casing 2, therefore, envisages the folding of the other portions, and of the various flaps of the blank, against the group of cigarettes G.

**[0037]** The folding devices in question and their mode of operation are already known in the art, so that they will not be described in detail herein to avoid overloading the present discussion.

**[0038]** Figure 4 shows the configuration of the semi-finished pack that reaches the unloading position C2.

**[0039]** As shown in this Figure, the pack is partially complete, since the flaps 109 and 112 are in an open condition and therefore still need to be folded against the flaps 110 and 111 (see Figure 3).

**[0040]** Figure 5 represents the instant in which a semi-finished pack P1 has reached the unloading position C2.

**[0041]** This pack is oriented with the walls 21 and 211 orthogonal to the radial direction of the wheel. The indicated flaps 109 and 112, which are connected to the wall 21, protrude above and below from this wall.

**[0042]** The apparatus described herein comprises a pusher member 30, arranged to engage the wall 211 of the semi-finished pack that has reached the unloading position C2, and to push the pack out of the seat 22 and of the wheel 20, along a direction X coinciding with the radial direction of the wheel.

**[0043]** In the illustrated embodiment, the pusher member 30 is constituted of a stem member mounted in a movable manner inside the forming wheel, along the direction X, and provided with a disc-like end portion 30A, facing outwardly from the wheel, and of an opposite end portion 30B, on which a toothed profile is provided, arranged to be engaged by means for actuating the pusher member.

**[0044]** The disc-like portion 30A is orthogonal to the direction X and is intended to engage the walls 211 of the semi-finished pack.

**[0045]** As will be seen better below, during operation of the apparatus, the pusher member 30 is operated according to an alternating movement along the direction X.

**[0046]** The direction X also constitutes the feeding direction of the packs downstream of the forming wheel.

**[0047]** Usually, downstream of the apparatus described herein, a drying channel is provided for the glue that has previously been applied to the blank 100 to fix it in the closed configuration of the casing 2.

**[0048]** At the unloading position C2, the apparatus described herein comprises a conveying section 50 for the packs, configured for connecting the forming wheel 20 with the mentioned drying channel (not illustrated).

**[0049]** For the reasons that will become apparent below, the formed packs P2 accumulate within this section, creating a row of packs that extends along the direction X, and in which the packs are in mutual contact at their longer side walls.

**[0050]** As will be seen in detail, the semi-finished pack P1 pushed by the pushing member 30 is first brought into contact with the packs P2, and then continues, together with these, for a further tract, keeping in contact with each other.

**[0051]** The row of packs P2 advances in steps along the feeding direction X, in a manner synchronized with the movement of the pusher member 30 (in some embodiments, pushed by the same member 30, as will be seen below).

**[0052]** Again for reasons which will be explained below, the first pack of the row of already formed packs P2 protrudes beyond the inlet of the conveying section 50,

towards the forming wheel 20, so that the semi-finished pack P1 is first placed against the row of packs P2, and, subsequently, enters inside the section 50.

**[0053]** The conveying section 50 comprises a device 52, which has the function of creating a force on the wall 21 of the semi-finished pack P1 pushed by the pusher 30, said force being opposite to the force exerted by the member 30, similarly to the counter-pusher device mentioned at the beginning with reference to the solutions of the prior art.

**[0054]** Unlike the counter-pusher device provided in the known solutions, the device 52 is arranged to act, not directly on the wall 21 of the semi-finished pack, but on the row of already formed packs P2, and by friction, as will be seen below.

**[0055]** In particular, the device 52 comprises two opposed members 52B, which are arranged on opposite sides of the row of packs P2, engaging their side walls 2111.

**[0056]** The two members 52B act on these walls by friction so as to exert an action on the packs P2 that is resistant to their movement along the direction X.

**[0057]** In this way, when the semi-finished pack P1 is pushed against the packs P2 by the pusher member 30, these, retained by friction by the two members 52B, exert a force on the wall 21 of the same semi-finished pack P1, said force being opposite to the force exerted by the pusher 30.

**[0058]** In a first embodiment, corresponding to that illustrated in Figures 1, 5, 6 and 9, the two members 52B consist of two fixed plates that press on the walls 2111 of the packs P2 to cause a given friction force.

**[0059]** The packs P2 advance with respect to the two plates 52B, pushed by the same pusher member 30.

**[0060]** As stated above, when the semi-finished pack P1 is carried against the row of packs P2, the packs braked by the plates 52B exert a force on the wall 21 of the semi-finished pack which is opposite to the force exerted by the pusher member 30.

**[0061]** The person skilled in the art will understand that the friction force exerted by the plates 52B initially corresponds to a detachment force, when the packs P2 are still stationary, and then to a sliding friction force, when they start to move under the action of the pusher member 30.

**[0062]** The two plates 52B can be adjustable in position to vary the force with which they press on the packs.

**[0063]** The optimal adjustment can be identified by means of a series of tests carried out on the apparatus in operation, during a preparation step of the packing installation.

**[0064]** In a second embodiment, which is schematically illustrated in Figure 10, instead of the plates, two belt members 53B are provided, controlled by a braking device 54.

**[0065]** The two belt members 53B are mounted on respective pulleys so as to extend along a closed loop path, and define respective opposed straight branches 53B', oriented along the feeding direction X.

**[0066]** Also in this embodiment, the packs P2 engaged by the two belt members 53B advance along the direction X pushed by the pusher member 30.

**[0067]** However, in this embodiment, the two indicated branches 53B' move together with the packs, dragged by them.

**[0068]** The braking device 54 exerts an action resistant to the movement of the two branches 53B', which is transmitted to the same packs P2, through the friction force exerted by the belt members 53B' on the walls 2III of the packs. The force exerted on the wall 2I of the semi-finished pack P1 therefore depends on the action of the braking device 54.

**[0069]** The person skilled in the art will understand that - in this case - the friction force exerted by the two belt members 53B is solely an adherence force, since there is no relative motion between the two belt members and the side walls 2III of the packs.

**[0070]** The braking device 54 can be an electromagnetic brake, which can be adjusted by the control unit of the installation. In this case as well, the optimal adjustment can be identified by means of tests carried out on the apparatus during operation.

**[0071]** In a further embodiment, illustrated in Figure 11, a motorized drive system 56 is associated with the same belt members 53B, described above, for moving the two members.

**[0072]** The mode of operation of this embodiment substantially corresponds to that described with reference to the previous embodiment.

**[0073]** In particular, the two belt members 53B move together with the packs and there is no relative motion between them.

**[0074]** In this embodiment, the packs P2 are, however, moved by the same belt members 53B, which are operated by the drive system 56.

**[0075]** The movement of the belt members 53B is controlled on the basis of the actuation of the pusher member 30, so that the packs P2 only move after the semi-finished pack P1 has been brought against them, and the expected force between the packs P2 and the pack P1 has been determined, opposite to the force exerted by the pusher member 30.

**[0076]** Thanks to the drive system provided in this embodiment, the two belt members 53B are able to guarantee a predefined and precise positioning of the packs, for example, in order to carry out the rejection of defective packs through a window provided along the conveying section 50, and can also recover any empty spaces between adjacent packs.

**[0077]** In various preferred embodiments, as well as in the illustrated one (see in particular Figure 7), the inlet of the conveying section 50 consists of two blocks 58 carried by a fixed structure of the apparatus, which are arranged close to the forming wheel 20 and are spaced apart from each other vertically, to define a restricted passage W for the inlet of the packs coming from the wheel 20.

**[0078]** The two blocks 58 each have a tapered edge 58A, facing the forming wheel 20, and a horizontal wall 58B which extends, without interruption, from the tapered edge 58A, and faces the wall 58B of the opposite block 58.

**[0079]** The distance between the two walls 58B is substantially equal to the width of the two walls 2I and 2II of the semi-finished pack P1 that is present in the unloading position C2.

**[0080]** In view of the above, it will be understood that when the semi-finished pack P1 is extracted from the forming wheel 20 and is inserted inside the passage W, the tapered edges 58A of the two blocks 58 act on the still open flaps 109 and 112 of the pack P1 to close them against the flaps 110 and 111.

**[0081]** On the other hand, the two walls 58B perform the function of keeping the flaps 109 and 112 in the just-reached closed condition.

**[0082]** In preferred embodiments, the two blocks 58 are both mounted on the fixed structure indicated with the possibility of a fine adjustment of their mutual distance, for example, through screw means.

**[0083]** As anticipated above, the first pack P2 of the row of packs contained in the conveying section 50 protrudes from the blocks 58 towards the forming wheel 20 (see in particular Figures 10 and 11).

**[0084]** This causes firstly the semi-finished pack P1 to be brought into contact with the first pack P2 of the row, and only thereafter its flaps 109 and 112 are engaged by the tapered edges 58A of the two blocks 58.

**[0085]** Therefore, the two flaps 109 and 112 are folded when the pack P1 is already pressed to the opposite sides, due to the action of the pusher member 30 and of the device 52, as seen above.

**[0086]** This condition ensures that the casing 2 is closed perfectly folded in the predetermined shape.

**[0087]** Once released from the pusher member 30, in order to prevent the pack P1 just inserted into the passage W of the section 50 from being pushed away from the other packs P2, the apparatus described herein comprises a blocking member 70, which is arranged to engage the wall 211 of the pack P1 as soon as it is released by the pusher member 30 (Figure 7).

**[0088]** In various preferred embodiments, as well as in the one illustrated, the member 70 comprises a rod provided with a pair of teeth 72 protruding laterally and spaced apart from each other by a distance slightly less than the distance of the walls 58B of the two blocks 58.

**[0089]** This member is controlled by a respective actuator (not illustrated) in a straight movement along a horizontal direction, between an inoperative position in which the two teeth 72 are kept outside the passage W, and the pack P1 can be inserted into this passage, and an operative position in which the two teeth 72 are placed within or overlapping the passage W (with respect to a view according to a plane orthogonal to the direction X), so as to engage the wall 211 of the pack P1, after this has been inserted into the passage W and has been re-

leased by the pusher member 30. In an alternative embodiment, a pair of rods with teeth is provided, positioned symmetrically with respect to the passage W.

**[0090]** Returning to the forming wheel 20, it is preferable that the semi-finished pack formed thereby present the flaps 109 and 112 that are not coplanar with the front wall 21, but partially folded towards the flaps 110 and 111, so as to present themselves at the unloading position C2 with the flaps 109 and 112 slightly folded towards the inside of the wheel.

**[0091]** In this way, it is possible to arrange the blocks 58 and the blocking element 70 in immediate proximity to the forming wheel 20, so that the packs P2 are found at a minimum distance from the semi-finished pack P1 that has reached the unloading position C2 (for example, less than 6 mm), without the packs P2 interfering with the semi-finished pack P1 approaching the unloading position C2 (see Figure 9).

**[0092]** The apparatus described herein, therefore, comprises a folding device configured to partially fold the flaps 109 and 112 towards the flaps 110 and 111.

**[0093]** In this regard, Figure 8 illustrates - by way of example - a moment in which, in a seat 22 of the forming wheel that is in an intermediate position between the loading position C1 and the unloading position C2, a generic folding member 24 is pressing on the flaps 109 and 112 to bring them into a partially folded position.

**[0094]** In various preferred embodiments, as well as in the illustrated one, the seat 22 is arranged with blocking elements configured to hold these flaps in the folded condition, to avoid their elastic return.

**[0095]** Preferably, these elements are constituted by simple teeth 23 positioned in two diametrically opposite peripheral areas of the seat 22, on which the flaps 109, 112 are carried after the portion 102 of the blank 100 has been folded above the group of cigarettes G.

**[0096]** The teeth 23 have a tapered upper end 23A to allow the folding of the flaps 109, 112, and an undercut edge 23B, against which the flaps 109 and 112 are brought into contact after being folded below the end 23A.

**[0097]** With reference now to the operation of the described apparatus, following the formation of a single pack, the blank 100 is received together with a group of cigarettes G inside a seat 22 of the forming wheel which is in the loading position C1.

**[0098]** During displacement from the loading position C1 to the unloading position C2, the blank 100 is folded around the group of cigarettes G and is presented at the unloading position C2 in the configuration shown in Figure 4.

**[0099]** Preferably, during this movement, its flaps 109 and 112 are partially folded towards the flaps 110 and 111, and are held in this condition by the retaining teeth 23.

**[0100]** At the unloading position C2, the semifinished pack P1 thus obtained is pushed out of the seat 22 by the pusher member 30.

**[0101]** During the stroke of the pusher member, the

semi-finished pack P1 is first brought into contact with the row of already formed packs P2, arranged in the conveying section 50.

**[0102]** Due to the action of the device 52, the row of packs P2 exerts an action resistant to the movement of the pack P1, generating a predetermined force on the wall 21 thereof, opposite to that exerted on the wall 211 by the pusher member 30.

**[0103]** Subjected to these opposing forces, the pack P1 continues to advance, and its flaps 109, 112 encounter the edges 58A, which then fold these flaps against the flaps 110, 111.

**[0104]** At the end of the stroke of the pusher member 30, the completed pack is inserted into the inlet passage W of the conveying section 50 and is held back by a possible retraction by the retaining device 70.

**[0105]** During the successive strokes of the pusher 30, the pack passes through the section 50 in a stepwise motion and reaches the drying channel mentioned above.

**[0106]** Of course, without prejudice to the principle of the invention, the details of construction and the embodiments may vary, even significantly, with respect to those illustrated here, purely by way of non-limiting example, without departing from the scope of the invention as defined by the attached claims.

**[0107]** In particular, the forming wheel 20, which in the illustrated example is mounted with its own vertically arranged rotation axis I, may also be mounted according to other arrangements, for example, with its rotation axis arranged horizontally.

**[0108]** The arrangement of the other means of the apparatus will vary accordingly.

**[0109]** Moreover, the outer casing 2 of the pack may also envisage other configurations, and its opposite walls which are engaged by the pusher 30 and the row of already formed packs P2, may not necessarily be its longer walls, and likewise its flaps that are bent by the blocks 58 are not necessarily the flaps of its shorter side walls.

## Claims

1. An apparatus for forming a pack containing a group of products, particularly smoking articles (G), said apparatus comprising:

- a forming wheel (20), provided with a plurality of seats (22) for receiving respective groups of products (G) and casing blanks (100), and rotatable around a rotation axis (I) for advancing each seat (22) from a position of loading (C1) of said group of products (G) and of said blanks (100), to a position (C2) of unloading semifinished packs (P1) obtained from folding of said blanks (100) around said group of products (G);
- at least one folding device for folding said blanks (100) around the respective groups of

products (G) and producing said semifinished packs (P1), in the tract followed by the respective seats (22) of said forming wheel (20), from said loading position (C1) to said unloading position (C2);

wherein each semifinished pack (P1) has a first and a second wall (211, 21) oppositely positioned, with respect to said group of products (G), and at least one flap (109, 112) of the blank (100) yet to be folded is connected to said second wall (21);

- a pushing member (30) configured to engage the first wall (211) of the semifinished pack (P1) contained in the seat (22) of the forming wheel (20) that finds itself in the unloading position (C2), and to advance said pack (P1) along a feeding direction (X) that is transversal to said first wall (211), so as to push it outside of said seat (22) and to feed it along said feeding direction (X);

- an opposing device (50, 52) configured to exert a force on said second wall (21) of said semifinished pack (P1) pushed by said pushing member (30), said force being opposite to the one exerted by said pushing device (30) on said first wall (211),

said apparatus being **characterized in that:**

- said opposing device (50, 52) comprises a section (50) for conveying packs along said feeding direction (X), which is configured to accumulate packs (P2) previously formed by said forming wheel (20), according to an arrangement wherein said packs (P2) are ordered in a row along said feeding direction (X) and arranged in contact one against the other;

- said conveying section (50) being positioned next to said unloading position (C2) of said forming wheel (20) in such a way that each semifinished pack (P1) that is pushed by said pushing member (30) outside of said forming wheel (20) enters into contact with its second wall (21), against said row of packs (P2) that is contained within said conveying section (50), and advances together with said row of packs (P2) along said feeding direction (X);

- in said conveying section (50) two opposed members (52B; 53B) are provided, which are configured to receive between them said row of previously formed packs (P2), and which are configured to act by friction on walls (211) of said packs (P2) that are orthogonal to the first and second walls (211, 21) of said packs (P2), in such a way that, when said semifinished pack (P2) pushed by said pushing member (30), enters into contact with said row of packs (P2), the latter

exerts a predetermined force on the second wall (21) of said semifinished pack (P1), which corresponds to said force opposite to the force exerted by said pushing member (30),

wherein said conveying section (50) comprises two opposed blocks (58) at the inlet, between which said semifinished pack (P1) inserts itself, pushed by said pushing member (30), which are configured to fold said at least one flap (109, 112) of the blank (100) into a position orthogonal to said first and second walls (211, 21) said apparatus comprising a system for driving said pushing member (30), which is configured to make said pushing member (30) move for a tract along said feeding direction (X) that is such that said pushing member (30) pushes the semifinished pack (P1) outside of said forming wheel (20) and inserts it between said two blocks (58) until an end-stroke position is reached in which said semifinished pack (P1) remains protruding from said blocks (58), towards said forming wheel (20), said semifinished pack (P1) remaining to protrude from said blocks (58) becoming the first pack of the row of already formed packs (P2), which protrudes beyond the inlet of the conveying section (50), towards the forming wheel (20), so that the next semi-finished pack (P1) is first placed against the row of packs (P2), and, subsequently, enters inside the conveying section (50).

2. An apparatus according to claim 1, comprising at least one blocking member (70) configured to engage said first wall (211) of the pack (P1) that has been pushed, between said two blocks, up to said end-stroke position.

3. An apparatus according to any one of the previous claims, wherein said opposed members (52B; 53B) are a pair of opposed and fixed plates (52B).

4. An apparatus according to claim 1 or 2, wherein said opposed members (52B; 53B) are two belt members (53B), which are mounted so as to be mobile along a closed ring path, and have respective portions (53B') opposed to one another and oriented along said feeding direction (X), and wherein said apparatus comprises a braking device (54) configured to exert a braking action on said belt members (53B).

5. An apparatus according to claim 1 or 2, wherein said opposed members (52B; 53B) are two belt members (53B) which are mounted so as to be mobile along a closed ring path, and have respective portions (53B') opposed to one another and oriented along said feeding direction (X), and wherein said apparatus comprises a system for driving said belt members (53B) that is configured to drive said belt members (53B) so that said row of packs (P2) engaged by said belt

members exerts said predetermined force on the second wall (21) of said semifinished pack (P2) pushed by said pushing member (30), said force being opposite to the force exerted by said pushing member (30).

6. An apparatus according to any one of the preceding claims, comprising at least one folding member (24) configured to fold said flap (109, 112) of said blank (100) into a partially folded condition, and wherein each seat (22) of said forming wheel is provided with a blocking member (23) configured to maintain said flap (109, 112) in said partially-folded condition.
7. An apparatus according to any one of the previous claims, which lacks a counter-pushing member configured to act directly on said second wall (21) of said semifinished pack (P1).
8. A method for forming a pack around a group of products (G), said method comprising:

- receiving a casing blank (100) and a group of products (G) within a seat (22), which is at a loading position (C1), of a forming wheel (20);
- folding said blank (100) around said group of products (G) to obtain a semifinished pack (P1) containing said group of products (G), said semifinished pack (P1) having a first and a second wall (211, 21) oppositely positioned, with respect to said group of products (G), and at least one flap (109, 112) of the blank (100) yet to be folded, which is connected to said second wall (21);
- carrying said seat (22) containing said semifinished pack (P1) into an unloading position (C2), through rotation of said forming wheel (20);
- engaging - by means of a pushing member (30) - said first wall (211) of said semifinished pack (P1) and pushing said pack along a feeding direction (X) transversal to said first wall (211) of said semifinished pack (P1),

wherein during the movement of said semifinished pack (P1) by said pushing member (30), said method includes the steps of:

- bringing said semifinished pack (P1) against a row of packs (P2) that have been previously formed by said forming wheel (20), which are accumulated within a conveying section (50) arranged downstream of said forming wheel (20), the first pack of the row of already formed packs (P2) protruding beyond the inlet of the conveying section (50), towards the forming wheel (20), so that the semi-finished pack (P1) is first placed against the row of packs (P2), and, subsequent-

ly, enters inside the conveying section (50);  
 - by means of one or more members (52B; 53B) arranged in said conveying section (50), acting by friction on walls (211) of said packs (P2) that are orthogonal to the first and second walls (211, 21) of said packs (P2), so that said row of packs (P2) exerts a predetermined force on said second wall (21) of said semifinished pack (P1) that is opposite to the force exerted by said pushing member (30) on said first wall (211); and  
 - advancing said row of packs (P2) and said semifinished pack (P1) along said feeding direction (X), while said semifinished pack (P1) is subjected to the force exerted by said pushing member (30) and to said opposite predetermined force,

said method including, after said semifinished pack (P1) has been placed against the row of already formed packs (P2), and while said semifinished pack (P1) advances together with the row of already formed packs (P2) along said feeding direction (X), a step of folding said at least one flap (109, 112) into a position orthogonal to said first and second walls (211, 21), via two blocks (58) arranged opposed to one another and positioned at the inlet of said conveying section (50).

## 30 Patentansprüche

1. Vorrichtung zum Formen einer Verpackung, die eine Gruppe von Produkten enthält, insbesondere Rauchartikel (G), wobei die Vorrichtung Folgendes umfasst:

- ein Formungsrad (20), das mit mehreren Aufnahmen (22) zur Aufnahme jeweiliger Gruppen von Produkten (G) und Verpackungsrohlingen (100) versehen ist und um eine Drehachse (I) drehbar ist, um jede Aufnahme (22) von einer Beladeposition (C1) der Gruppe von Produkten (G) und der Rohlinge (100) in eine Entladeposition (C2) halbfertiger Verpackungen (P1), die durch das Falten der Rohlinge (100) um die Gruppe von Produkten (G) erhalten wurden, vorwärts zu bewegen;
- mindestens eine Falteinrichtung zum Falten der Rohlinge (100) um die jeweiligen Gruppen von Produkten (G) und Erzeugen der halbfertigen Verpackungen (P1) in dem von den jeweiligen Aufnahmen (22) des Formungsrad (20) gefolgt Abschnitt von der Beladeposition (C1) in die Entladeposition (C2);

wobei jede halbfertige Verpackung (P1) eine erste und eine zweite Wand (211, 21), die in Bezug zu der Gruppe von Produkten (G) einander entgegenge-

setzt positioniert sind, aufweist und mindestens eine noch zu faltende Klappe (109, 112) des Rohlings (100) mit der zweiten Wand (2I) verbunden ist;

- ein Schiebeelement (30), das dazu ausgelegt ist, in die erste Wand (2II) der in der Aufnahme (22) des Formungsrads (20), die sich in der Entladeposition (C2) befindet, enthaltenen halbfertigen Verpackung (P1) einzugreifen und die Verpackung (P1) entlang der Zuführrichtung (X), die quer zur ersten Wand (2II) verläuft, vorwärts zu bewegen, um sie aus der Aufnahme (22) heraus zu schieben und sie entlang der Zuführrichtung (X) zu führen;
- eine entgegengesetzte Einrichtung (50, 52), die dazu ausgelegt ist, eine Kraft auf die zweite Wand (2I) der halbfertigen Verpackung (P1) aufzubringen, die von dem Schiebeelement (30) geschoben wird, wobei die Kraft der von der Schiebeeinrichtung (30) auf die erste Wand (2II) aufgebrauchten entgegengesetzt ist,

wobei die Vorrichtung **dadurch gekennzeichnet ist, dass:**

- die entgegengesetzte Einrichtung (50, 52) einen Abschnitt (50) umfasst, um Verpackungen entlang der Zuführrichtung (X) zu befördern, der dazu eingerichtet ist, Verpackungen (P2), die zuvor durch das Formungsrads (20) geformt wurden, gemäß einer Anordnung, bei der die Verpackungen (P2) in einer Reihe entlang der Zuführrichtung (X) geordnet und in Kontakt miteinander angeordnet sind, zu sammeln;
- der Beförderungsabschnitt (50) derart neben der Entladeposition (C2) des Formungsrads (20) positioniert ist, dass jede halbfertige Verpackung (P1), die von dem Schiebeelement (30) aus dem Formungsrads (20) herausgeschoben wird, mit seiner zweiten Wand (2I) mit der Reihe aus Verpackungen (P2), die in dem Beförderungsabschnitt (50) enthalten ist, in Kontakt kommt und sich zusammen mit der Reihe aus Verpackungen (P2) entlang der Zuführrichtung (C2) vorwärtsbewegt,
- im Beförderungsabschnitt (50) zwei entgegengesetzte Elemente (52B; 53B) vorgesehen sind, die dazu ausgelegt sind, zwischen ihnen die Reihe aus zuvor geformten Verpackungen (P2) aufzunehmen, und die dazu ausgelegt sind, durch Reibung auf Wänden (2III) der Verpackungen (P2), die senkrecht zur ersten und zweiten Wand (2II, 2I) der Verpackungen (P2) sind, derart zu wirken, dass, wenn die halbfertige Verpackung (P2) von dem Schiebeelement (30) geschoben wird, mit der Reihe von Verpackungen (P2) in Kontakt kommt, die letztere eine festgelegte Kraft auf die zweite Wand (2I) der halbfertigen

Verpackung (P1) aufbringt, die der Kraft entspricht, die der von dem Schiebeelement (30) aufgebrauchten Kraft entgegengesetzt ist,

wobei der Beförderungsabschnitt (50) zwei entgegengesetzte Blöcke (58) am Einlass umfasst, zwischen denen sich die halbfertige Verpackung (P1), geschoben von dem Schiebeelement (30), selbst einsetzt, die dazu ausgelegt sind, die mindestens eine Klappe (109, 112) des Rohlings (100) in eine Position senkrecht zur ersten und zweiten Wand (2II, 2I) zu falten, wobei die Vorrichtung ein System zum Antreiben des Schiebeelements (30) umfasst, das dazu ausgelegt ist, das Schiebeelement (30) einen Abschnitt entlang der Zuführrichtung (X) zu bewegen, sodass das Schiebeelement (30) die halbfertige Verpackung (P1) aus dem Formungsrads (20) schiebt und zwischen die zwei Blöcke (58) einsetzt, bis eine Endhubposition erreicht ist, in der die halbfertige Verpackung (P1) von den Blöcken (58) weiterhin zum Formungsrads (20) hin vorsteht, wobei die halbfertige Verpackung (P1), die weiterhin von den Blöcken (58) vorsteht, die erste Verpackung der Reihe bereits geformter Verpackungen (P2) wird, die über den Einlass des Beförderungsabschnitts (50) zum Formungsrads (20) hin vorsteht, sodass die nächste halbfertige Verpackung (P1) zunächst gegen die Reihe von Verpackungen (P2) platziert wird und anschließend in den Beförderungsabschnitt (50) eintritt.

2. Vorrichtung nach Anspruch 1, mindestens ein Blockierelement (70) umfassend, das dazu ausgelegt ist, in die erste Wand (2II) der Verpackung (P1) einzugreifen, die zwischen den zwei Blöcken bis in die Endhubposition geschoben wurde.
3. Vorrichtung nach einem der vorstehenden Ansprüche, wobei die entgegengesetzten Elemente (52B; 53B) ein Paar entgegengesetzte und fixierte Platten (52B) sind.
4. Vorrichtung nach Anspruch 1 oder 2, wobei die entgegengesetzten Elemente (52B; 53B) zwei Bandlelemente (53B) sind, die derart montiert sind, dass sie entlang eines geschlossenen Ringwegs beweglich sind und jeweilige Abschnitte (53B') aufweisen, die einander entgegengesetzt und entlang der Zuführrichtung (X) ausgerichtet sind, und wobei die Vorrichtung eine Bremseinrichtung (54) umfasst, die dazu ausgelegt ist, eine Bremswirkung auf die Bandlelemente (53B) aufzubringen.
5. Vorrichtung nach Anspruch 1 oder 2, wobei die entgegengesetzten Elemente (52B; 53B) zwei Bandlelemente (53B) sind, die derart montiert sind, dass sie entlang eines geschlossenen Ringwegs beweg-

lich sind und jeweilige Abschnitte (53B') aufweisen, die einander entgegengesetzt und entlang der Zuführriechung (X) ausgerichtet sind, und wobei die Vorrichtung ein System zum Antreiben der Bandlelemente (53B) umfasst, das dazu ausgelegt ist, die Bandlelemente derart anzutreiben, dass die von den Bandlelementen eingegriffene Reihe von Verpackungen (P2) die festgelegte Kraft auf die zweite Wand (2I) der halb fertigen Verpackung (P2), die von dem Schiebeelement (30) geschoben wird, aufbringt, wobei die Kraft der von dem Schiebeelement (30) aufgebrauchten Kraft entgegengesetzt ist.

6. Vorrichtung nach einem der vorstehenden Ansprüche, mindestens ein Faltelement (24) umfassend, das dazu ausgelegt ist, die Klappe (109, 112) des Rohlings (100) in einen teilweise gefalteten Zustand zu falten, und wobei jede Aufnahme (22) des Formungsrad mit einem Blockierelement (23) versehen ist, das dazu ausgelegt ist, die Klappe (109, 112) in dem teilweise gefalteten Zustand zu halten.
7. Vorrichtung nach einem der vorstehenden Ansprüche, die kein Gegenschiebeelement aufweist, das dazu ausgelegt ist, direkt auf die zweite Wand (2I) der halb fertigen Verpackung (P1) zu wirken.
8. Verfahren zum Formen einer Verpackung um eine Gruppe von Produkten (G), wobei das Verfahren Folgendes umfasst:
  - Aufnehmen eines Verpackungsrohlings (100) und einer Gruppe von Produkten (G) in einer Aufnahme (22), die sich in einer Beladeposition (C1) eines Formungsrad (20) befindet;
  - Falten des Rohlings (100) um die Gruppe von Produkten (G), um eine halb fertige Verpackung (P1) zu erhalten, die die Gruppe von Produkten (G) enthält, wobei die halb fertige Verpackung (P1) eine erste und eine zweite Wand (2II, 2I), die in Bezug zu der Gruppe von Produkten (G) einander entgegengesetzt positioniert sind, und mindestens eine noch zu faltende Klappe (109, 112) des Rohlings (100), die mit der zweiten Wand (2I) verbunden ist, aufweist;
  - Tragen der die halb fertige Verpackung (P1) enthaltenden Aufnahme (22) in eine Entladeposition (C2) durch Drehung des Formungsrad (20);
  - Eingreifen, mittels eines Schiebeelements (30), in die erste Wand (2II) der halb fertigen Verpackung (P1) und Schieben der Verpackung entlang einer Zuführriechung (X) quer zur ersten Wand (2II) der halb fertigen Verpackung (P1),

wobei während der Bewegung der halb fertigen Verpackung (P1) durch das Schiebeelement (30) das Verfahren die folgenden Schritte umfasst:

- Bringen der halb fertigen Verpackung (P1) gegen eine Reihe von Verpackungen (P2), die zuvor durch das Formungsrad (20) geformt wurden, die sich innerhalb eines Beförderungsabschnitts (50) gesammelt haben, der dem Formungsrad (20) nachgelagert angeordnet ist, wobei die erste Verpackung der Reihe bereits geformter Verpackungen (P2) über den Einlass des Beförderungsabschnitts (50) hinaus zum Formungsrad (20) hin vorsteht, sodass die halb fertige Verpackung (P1) zunächst gegen die Reihe von Verpackungen (P2) platziert wird und anschließend in den Beförderungsabschnitt (50) eintritt;

- mittels eines oder mehrerer Elemente (52B; 53B), die in dem Beförderungsabschnitt (50) angeordnet sind, Wirken durch Reibung auf Wände (2III) der Verpackungen (P2), die senkrecht zur ersten und zweiten Wand (2II, 2I) der Verpackungen (P2) angeordnet sind, sodass die Reihe von Verpackungen (P2) eine festgelegte Kraft auf die zweite Wand (2I) der halb fertigen Verpackung (P1) aufbringt, die der Kraft entgegengesetzt ist, die durch das Schiebeelement (30) auf die erste Wand (2II) aufgebracht wird; und

- Vorwärtsbewegen der Reihe von Verpackungen (P2) und der halb fertigen Verpackung (P1) entlang der Zuführriechung (X), während die halb fertige Verpackung (P1) der Kraft ausgesetzt ist, die durch das Schiebeelement (30) aufgebracht wird, und der entgegengesetzten festgelegten Kraft,

wobei das Verfahren, nachdem die halb fertige Verpackung (P1) gegen die Reihe bereits geformter Verpackungen (P2) platziert wurde und während die halb fertige Verpackung (P1) sich zusammen mit der Reihe bereits geformter Verpackungen (P2) entlang der Zuführriechung (X) vorwärtsbewegt, einen Schritt des Falten der mindestens einen Klappe (109, 112) in eine Position senkrecht zur ersten und zweiten Wand (2II, 2I) mittels zweier Blöcke (58), die einander entgegengesetzt angeordnet sind und am Einlass des Beförderungsabschnitts (50) positioniert sind, umfasst.

## Revendications

1. Appareil de formation d'un paquet contenant un groupe de produits, en particulier des articles à fumer (G), ledit appareil comprenant :

- une roue de formation (20), pourvue d'une pluralité de supports (22) destinés à recevoir des groupes respectifs de produits (G) et des découpes de boîtes (100), et rotative autour d'un axe

de rotation (I) pour déplacer chaque support (22) d'une position de chargement (C1) dudit groupe de produits (G) et desdites découpes de boîtes (100), à une position de déchargement (C2) de paquets semi-finis (P1) obtenus par pliage des-

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dites découpes (100) autour dudit groupe de produits (G) ;  
- au moins un dispositif de pliage destiné à plier lesdites découpes (100) autour des groupes respectifs de produits (G) et à produire lesdits paquets semi-finis (P1), le long du trajet suivi par les supports (22) respectifs de ladite roue de formation (20), de ladite position de chargement (C1) à ladite position de déchargement (C2) ;

chaque paquet semi-fini (P1) comportant des première et deuxième parois (2II, 2I) placées de manière opposée, relativement audit groupe de produits (G), et au moins un rabat (109, 112) de la découpe (100) à plier étant raccordé à ladite deuxième paroi (2I) ;

- un élément de poussée (30) conçu pour entrer en contact avec la première paroi (2II) du paquet semi-fini (P1) présent dans le support (22) de la roue de formation (20) se trouvant dans la position de déchargement (C2), et pour déplacer ledit paquet (P1) le long d'une direction d'avance (X) qui est transversale à ladite première paroi (2II), de façon à le pousser hors dudit support (22) et à le faire avancer le long de ladite direction d'avance (X) ;

- un dispositif d'opposition (50, 52) conçu pour exercer une force sur ladite deuxième paroi (2I) dudit paquet semi-fini (P1) poussé par ledit élément de poussée (30), ladite force étant opposée à celle exercée par ledit élément de poussée (30) sur ladite première paroi (2II),

ledit appareil étant **caractérisé en ce que** :

- ledit dispositif d'opposition (50, 52) comprend une section (50) destinée à acheminer les paquets le long de ladite direction d'avance (X), qui est conçue pour accumuler des paquets (P2) formés auparavant par ladite roue de formation (20), selon un agencement dans lequel lesdits paquets (P2) sont ordonnés en rang le long de ladite direction d'avance (X) et placés en contact les uns avec les autres ;

- ladite section d'acheminement (50) est située à côté de ladite position de déchargement (C2) de ladite roue de formation (20) de telle sorte que chaque paquet semi-fini (P1) qui est poussé par ledit élément de poussée (30) hors de ladite roue de formation (20) entre en contact, par le biais de sa deuxième paroi (2I), avec ledit rang

de paquets (P2) présent dans ladite section d'acheminement (50), et se déplace conjointement audit rang de paquets (P2) le long de ladite direction d'avance (X) ;

- ladite section d'acheminement (50) comporte deux éléments opposés (52B ; 53B) qui sont conçus pour recevoir entre eux ledit rang de paquets (P2) formés auparavant et qui sont conçus pour agir par frottement sur des parois (2III) desdits paquets (P2) qui sont orthogonales aux première et deuxième parois (2II, 2I) desdits paquets (P2), de telle sorte que, lorsque ledit paquet semi-fini (P2) poussé par ledit élément de poussée (30) entre en contact avec ledit rang de paquets (P2), ce dernier exerce une force prédéterminée sur la deuxième paroi (2I) dudit paquet semi-fini (P1), qui correspond à ladite force opposée à la force exercée par ledit élément de poussée (30),

ladite section d'acheminement (50) comprenant deux blocs opposés (58) à l'entrée, entre lesquels vient s'insérer ledit paquet semi-fini (P1) poussé par ledit élément de poussée (30), qui sont conçus pour plier ledit au moins un rabat (109, 112) de la découpe (100) pour le mettre dans une position orthogonale auxdites première et deuxième parois (2II, 2I), ledit appareil comprenant un système d'entraînement dudit élément de poussée (30), qui est conçu pour amener ledit élément de poussée (30) à se déplacer sur un certain trajet le long de ladite direction d'avance (X) qui est tel que ledit élément de poussée (30) pousse le paquet semi-fini (P1) hors de ladite roue de formation (20) et l'insère entre lesdits deux blocs (58) jusqu'à ce qu'une position de course finale soit atteinte, dans laquelle ledit paquet semi-fini (P1) reste en saillie vis-à-vis desdits blocs (58), en direction de ladite roue de formation (20), ledit paquet semi-fini (P1) restant en saillie vis-à-vis desdits blocs (58) devenant le premier paquet du rang de paquets (P2) déjà formés, qui fait saillie au-delà de l'entrée de la section d'acheminement (50) en direction de la roue de formation (20), de telle sorte que le paquet semi-fini (P1) suivant est d'abord placé contre le rang de paquets (P2) et entre, ensuite, dans la section d'acheminement (50).

2. Appareil selon la revendication 1, comprenant au moins un élément de blocage (70) conçu pour entrer en contact avec ladite première paroi (2II) du paquet (P1) qui a été poussé entre lesdits deux blocs jusqu'à ladite position de course finale.

3. Appareil selon l'une quelconque des revendications précédentes, dans lequel lesdits éléments opposés (52B ; 53B) sont une paire de plaques fixes opposées (52B).

4. Appareil selon la revendication 1 ou 2, dans lequel lesdits éléments opposés (52B ; 53B) sont deux éléments de type courroie (53B), qui sont installés de façon à être mobiles le long d'un chemin circulaire fermé, et comportent des parties (53B') respectives opposées l'une à l'autre et orientées le long de ladite direction d'avance (X), et ledit appareil comprenant un dispositif de freinage (54) conçu pour exercer une action de freinage sur lesdits éléments de type courroie (53B).
- 5.
5. Appareil selon la revendication 1 ou 2, dans lequel lesdits éléments opposés (52B ; 53B) sont deux éléments de type courroie (53B), qui sont installés de façon à être mobiles le long d'un chemin circulaire fermé, et comportent des parties (53B') respectives opposées l'une à l'autre et orientées le long de ladite direction d'avance (X), et ledit appareil comprenant un système d'entraînement desdits éléments de type courroie (53B) qui est conçu pour entraîner lesdits éléments de type courroie de telle sorte que ledit rang de paquets (P2) avec lequel lesdits éléments de type courroie sont en contact exerce ladite force prédéterminée sur la deuxième paroi (2I) dudit paquet semi-fini (P2) poussé par ledit élément de poussée (30), ladite force étant opposée à la force exercée par ledit élément de poussée (30).
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6. Appareil selon l'une quelconque des revendications précédentes, comprenant au moins un élément de pliage (24) conçu pour plier ledit rabat (109, 112) de ladite découpe (100) de façon à le mettre dans un état partiellement plié, et dans lequel chaque support (22) de ladite roue de formation est pourvu d'un élément de blocage (23) conçu pour maintenir ledit rabat (109, 112) dans ledit état partiellement plié.
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7. Appareil selon l'une quelconque des revendications précédentes, dépourvu d'un élément de contre-poussée conçu pour agir directement sur ladite deuxième paroi (2I) dudit paquet semi-fini (P1).
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8. Procédé de formation d'un paquet autour d'un groupe de produits (G), ledit procédé comprenant :
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- recevoir une découpe de boîte (100) et un groupe de produits (G) dans un support (22), qui se trouve au niveau d'une position de chargement (C1), d'une roue de formation (20) ;
  - plier ladite découpe (100) autour dudit groupe de produits (G) afin d'obtenir un paquet semi-fini (P1) contenant ledit groupe de produits (G), ledit paquet semi-fini (P1) comportant des première et deuxième parois (2II, 2I) placées de manière opposée, relativement audit groupe de produits (G), et au moins un rabat (109, 112) de la découpe (100) à plier qui est raccordé à ladite
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- deuxième paroi (2I) ;
- déplacer ledit support (22) contenant ledit paquet semi-fini (P1) jusqu'à une position de déchargement (C2) par rotation de ladite roue de formation (20) ;
  - mettre un élément de poussée (30) en contact avec ladite première paroi (2II) dudit paquet semi-fini (P1) et pousser ledit paquet le long d'une direction d'avance (X) transversale à ladite première paroi (2II) dudit paquet semi-fini (P1),
- ledit procédé, lors du déplacement dudit paquet semi-fini (P1) par ledit élément de poussée (30), comprenant les étapes suivantes :
- amener ledit paquet semi-fini (P1) contre un rang de paquets (P2) qui ont été formés auparavant par ladite roue de formation (20), qui sont accumulés dans une section d'acheminement (50) située en aval de ladite roue de formation (20), le premier paquet du rang de paquets (P2) déjà formés faisant saillie au-delà de l'entrée de la section d'acheminement (50) en direction de la roue de formation (20), de telle sorte que le paquet semi-fini (P1) est d'abord placé contre le rang de paquets (P2), et entre, ensuite, dans la section d'acheminement (50) ;
  - au moyen d'un ou de plusieurs éléments (52B ; 53B) situés dans ladite section d'acheminement (50), agir par frottement sur des parois (2III) desdits paquets (P2) qui sont orthogonales aux première et deuxième parois (2II, 2I) desdits paquets (P2), de telle sorte que ledit rang de paquets (P2) exerce une force prédéterminée sur ladite deuxième paroi (2I) dudit paquet semi-fini (P1) qui est opposée à la force exercée par ledit élément de poussée (30) sur ladite première paroi (2II) ; et
  - déplacer ledit rang de paquets (P2) et ledit paquet semi-fini (P1) le long de ladite direction d'avance (X), tandis que ledit paquet semi-fini (P1) est soumis à la force exercée par ledit élément de poussée (30) et à ladite force opposée prédéterminée,
- ledit procédé comprenant, une fois que ledit paquet semi-fini (P1) a été placé contre le rang de paquets (P2) déjà formés, et tandis que ledit paquet semi-fini (P1) se déplace conjointement au rang de paquets (P2) déjà formés le long de ladite direction d'avance (X), une étape consistant à plier ledit au moins un rabat (109, 112) de façon à l'amener à une position orthogonale auxdites première et deuxième parois (2II, 2I), par le biais de deux blocs (58) disposés de manière opposée l'un par rapport à l'autre et placés à l'entrée de ladite section d'acheminement (50).

FIG. 1

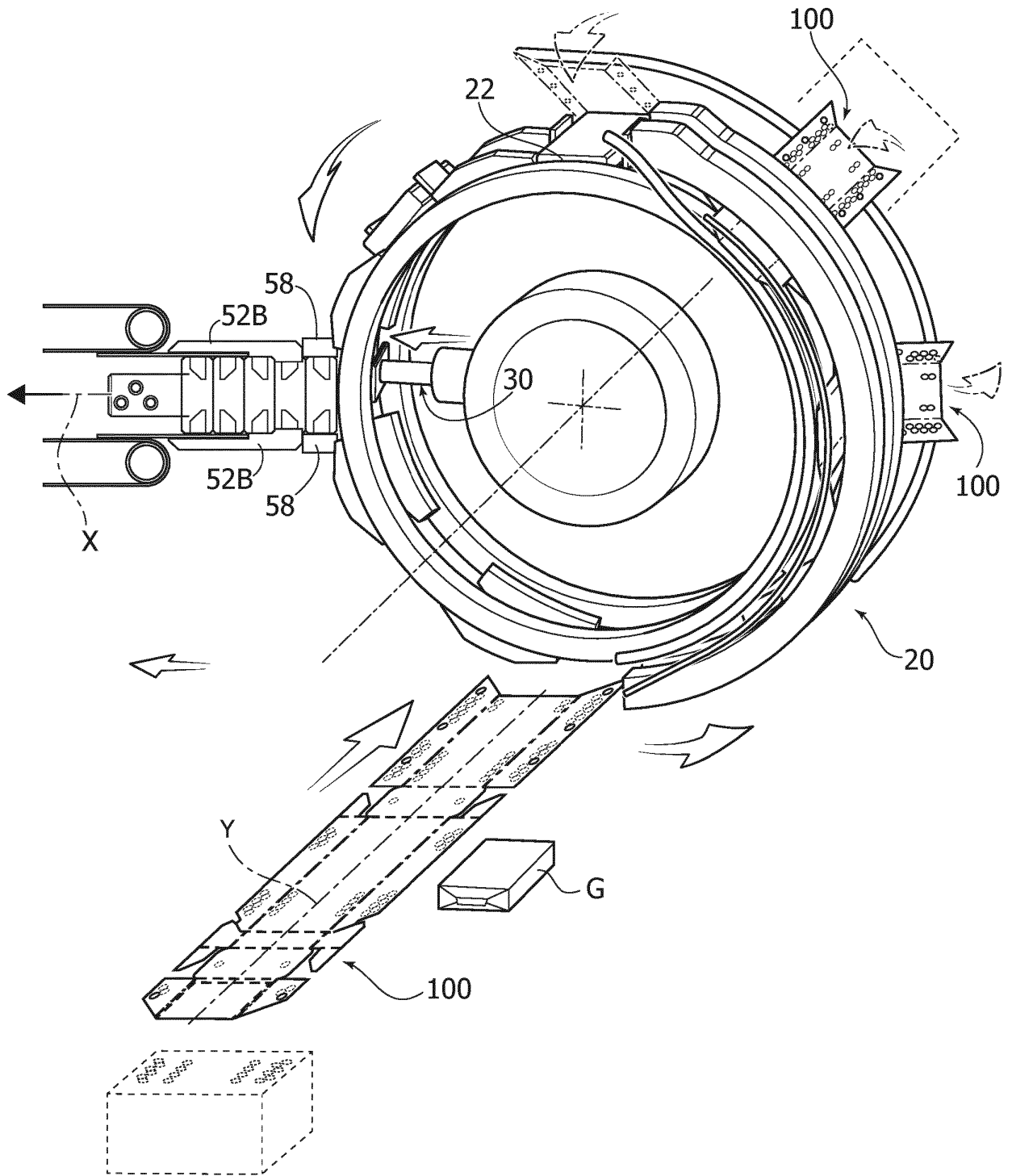


FIG. 4

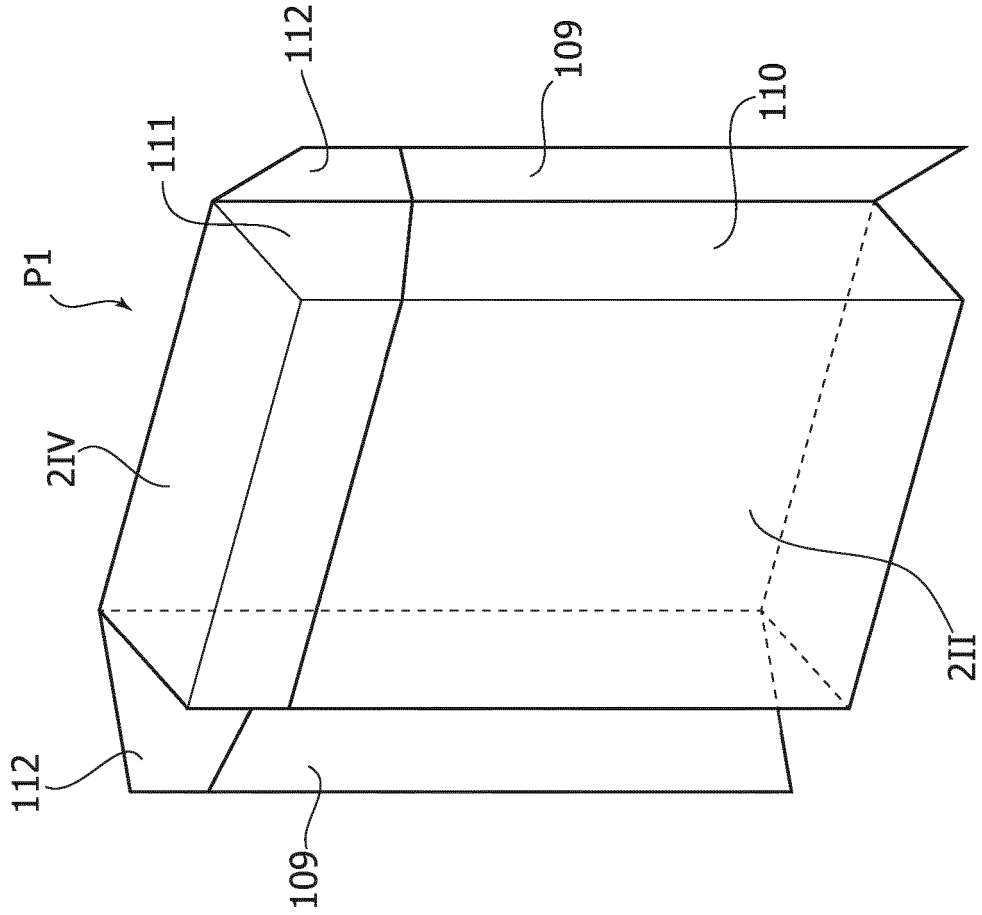


FIG. 2

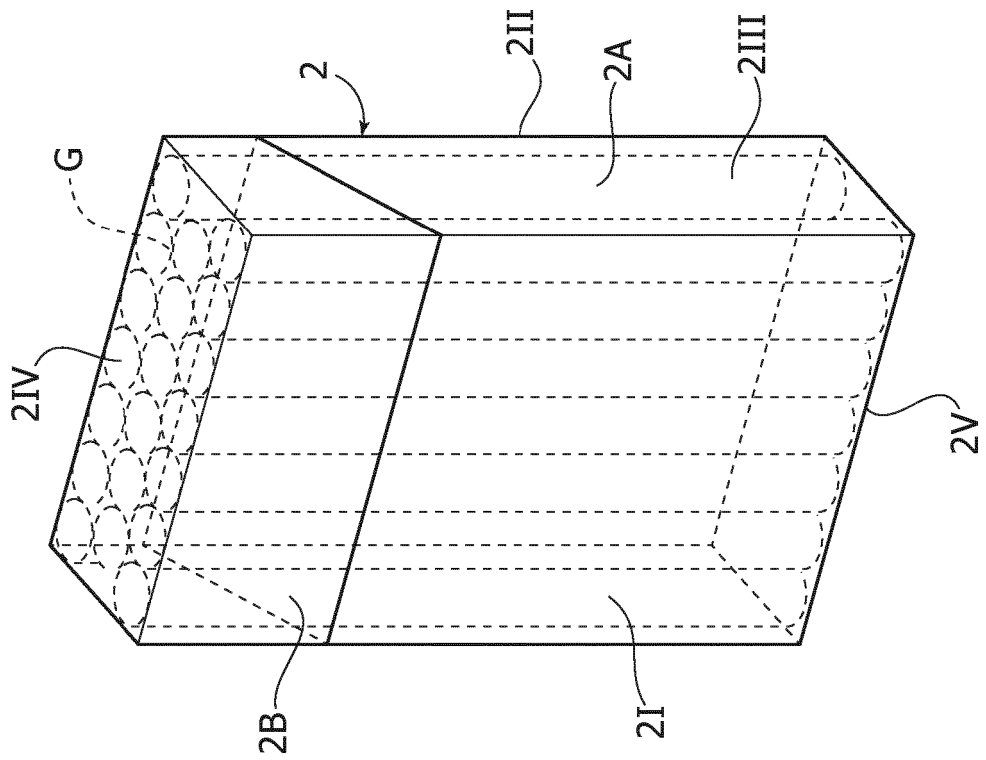


FIG. 3

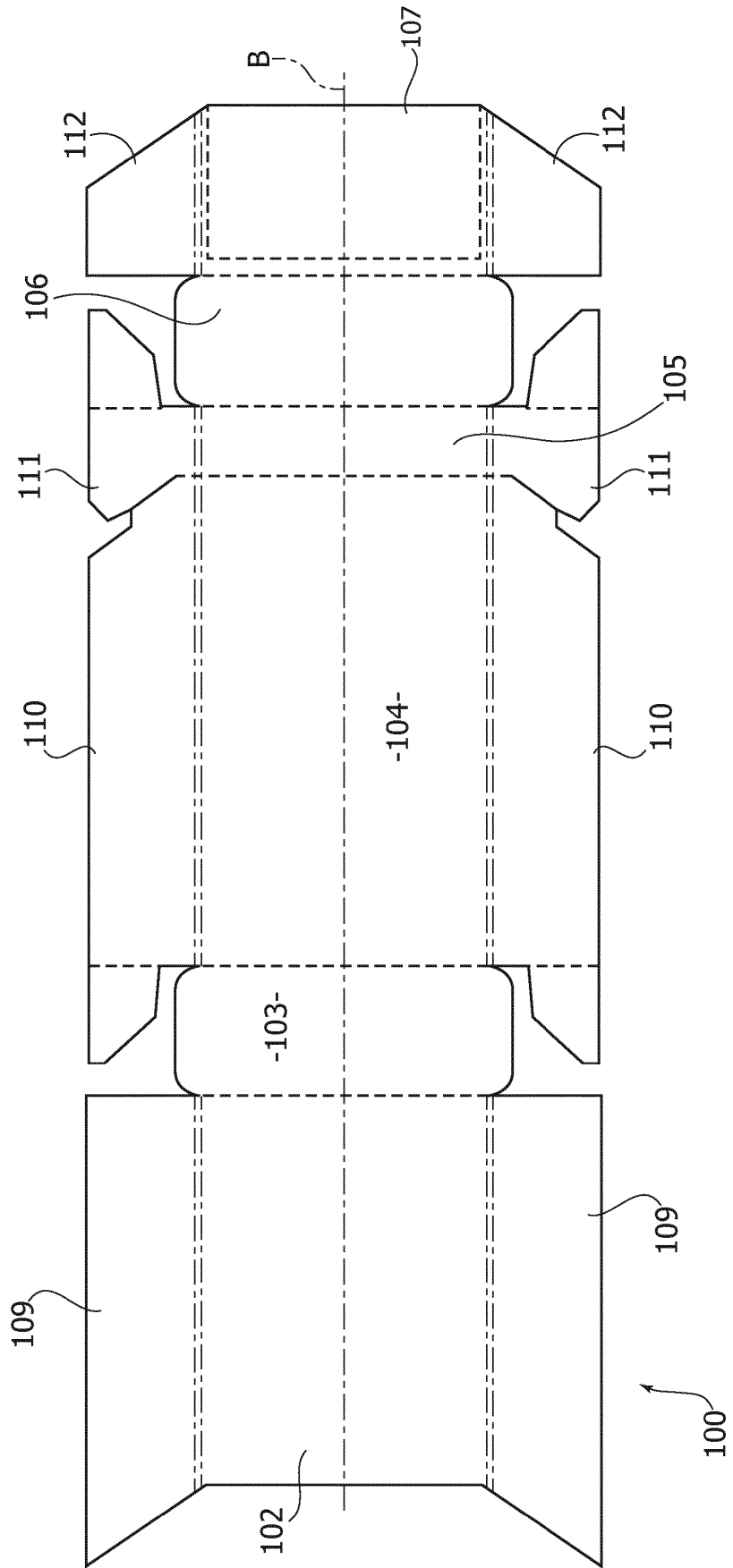


FIG. 5

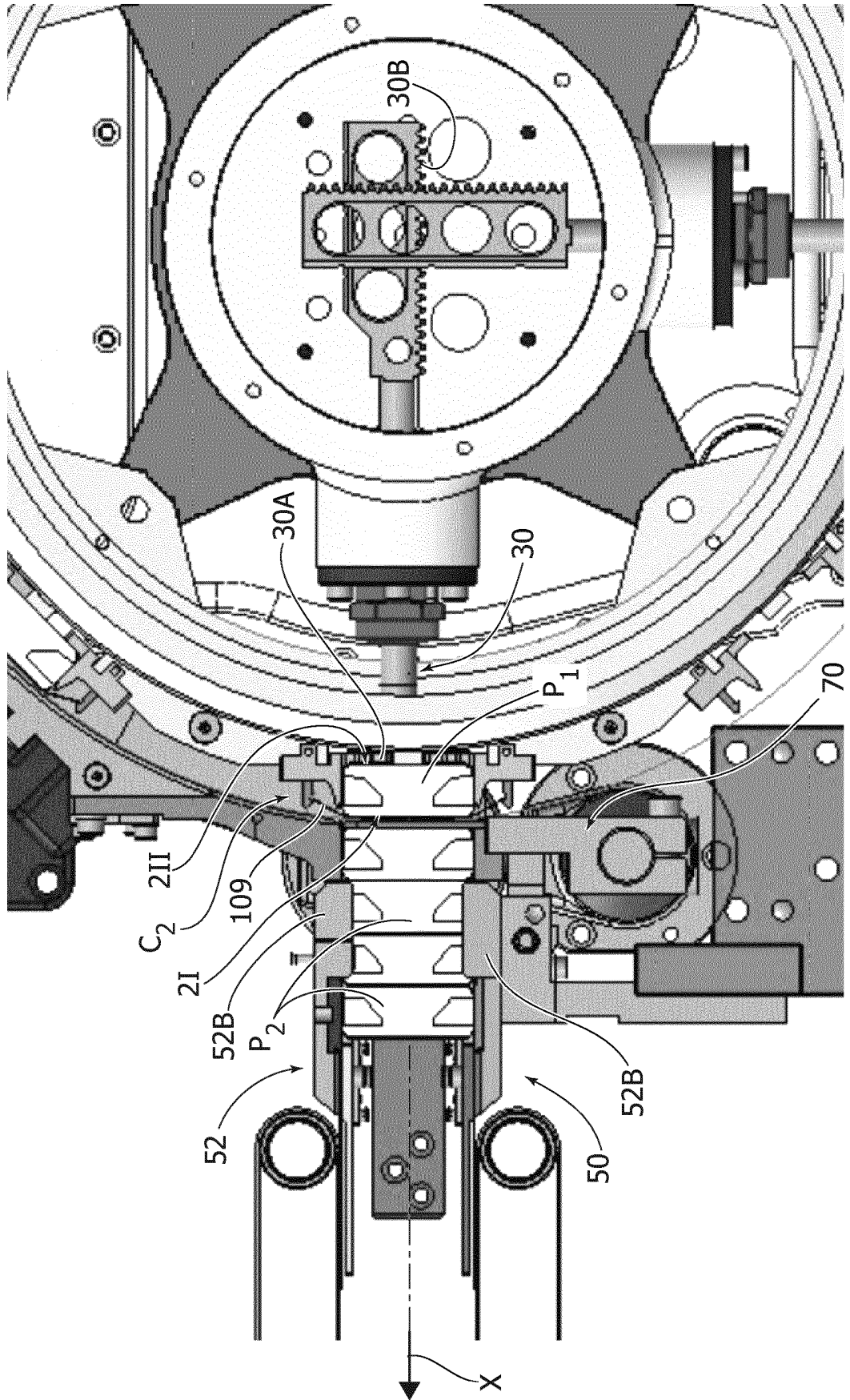


FIG. 6

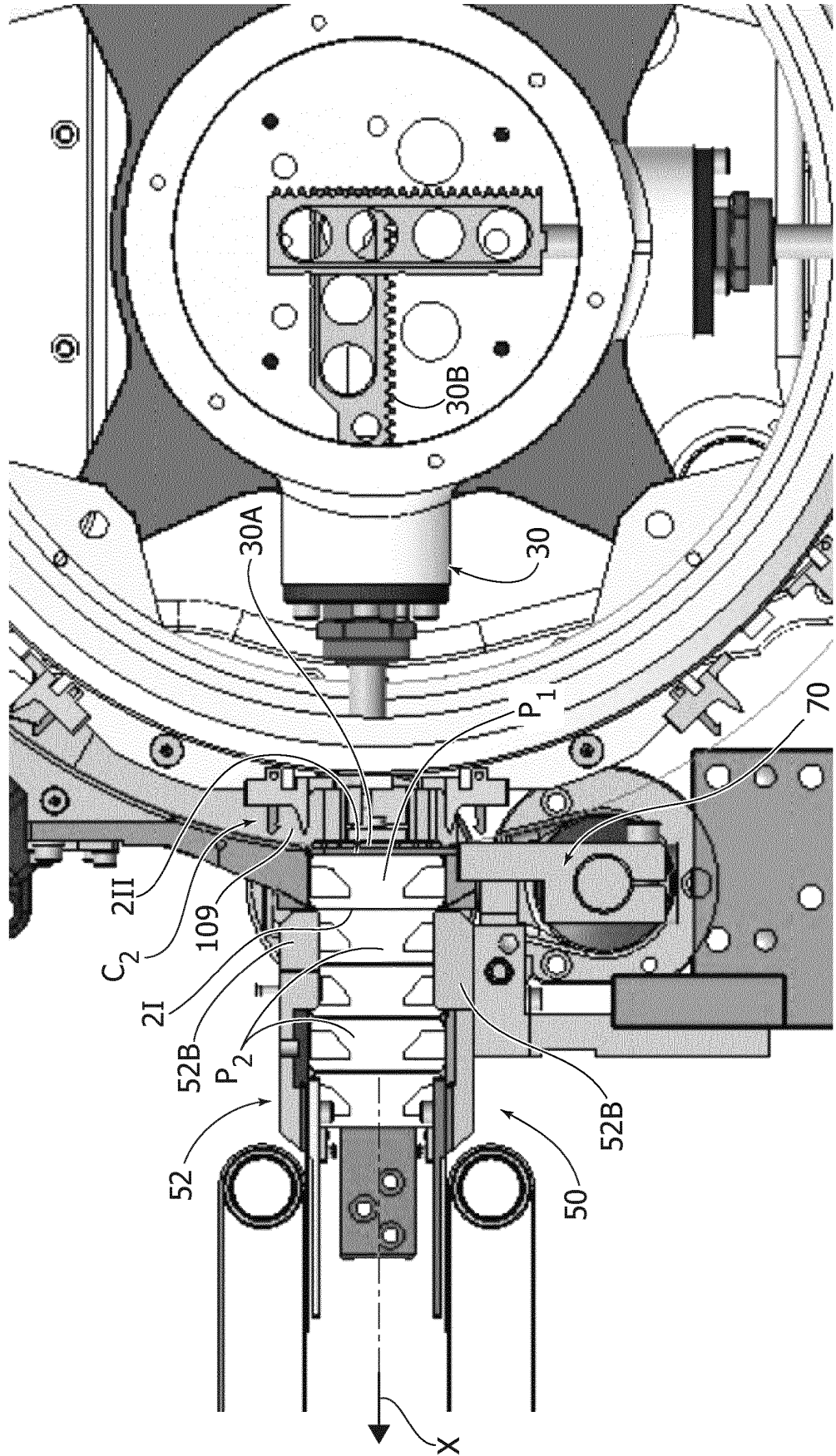


FIG. 7

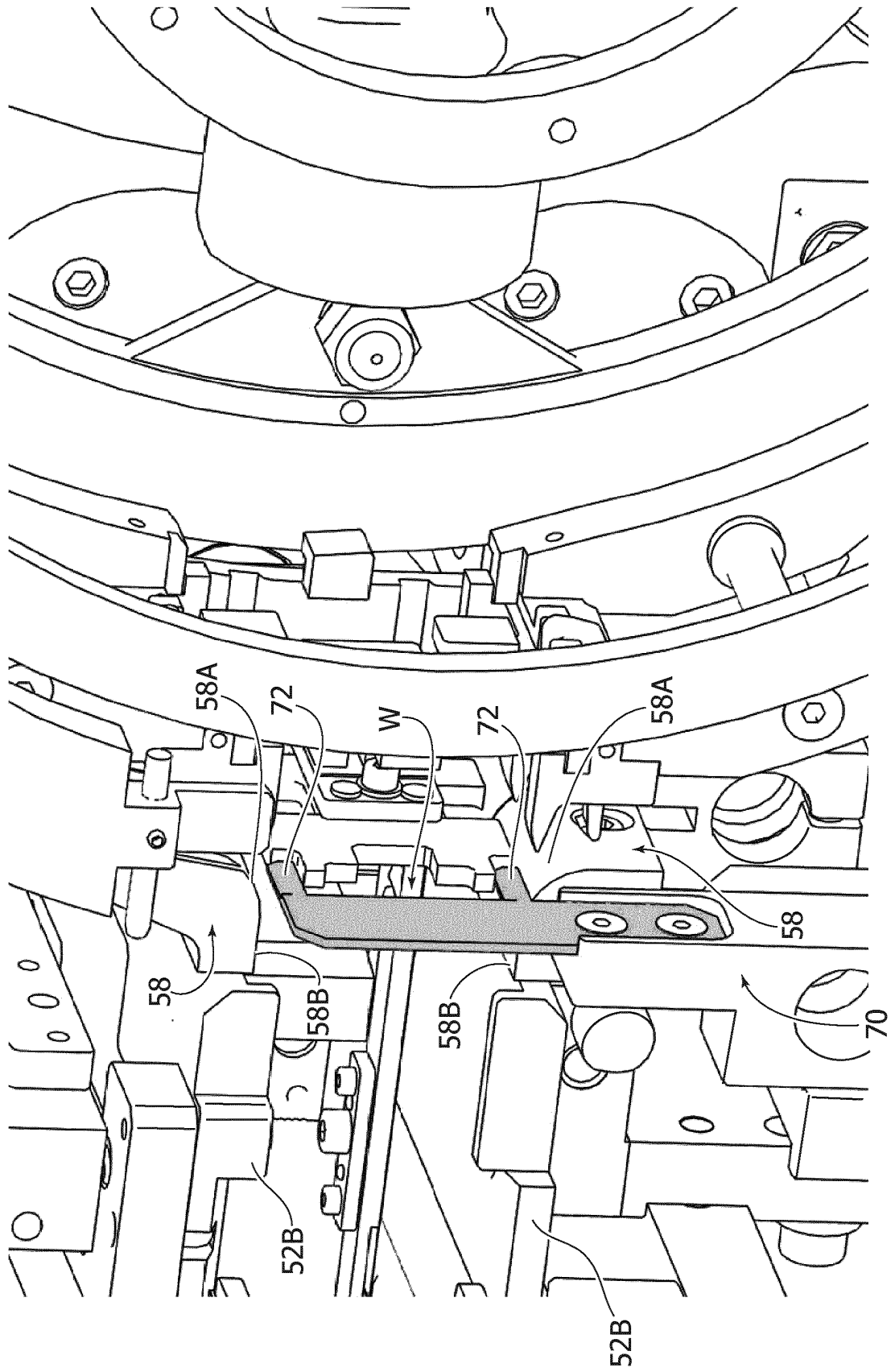


FIG. 8

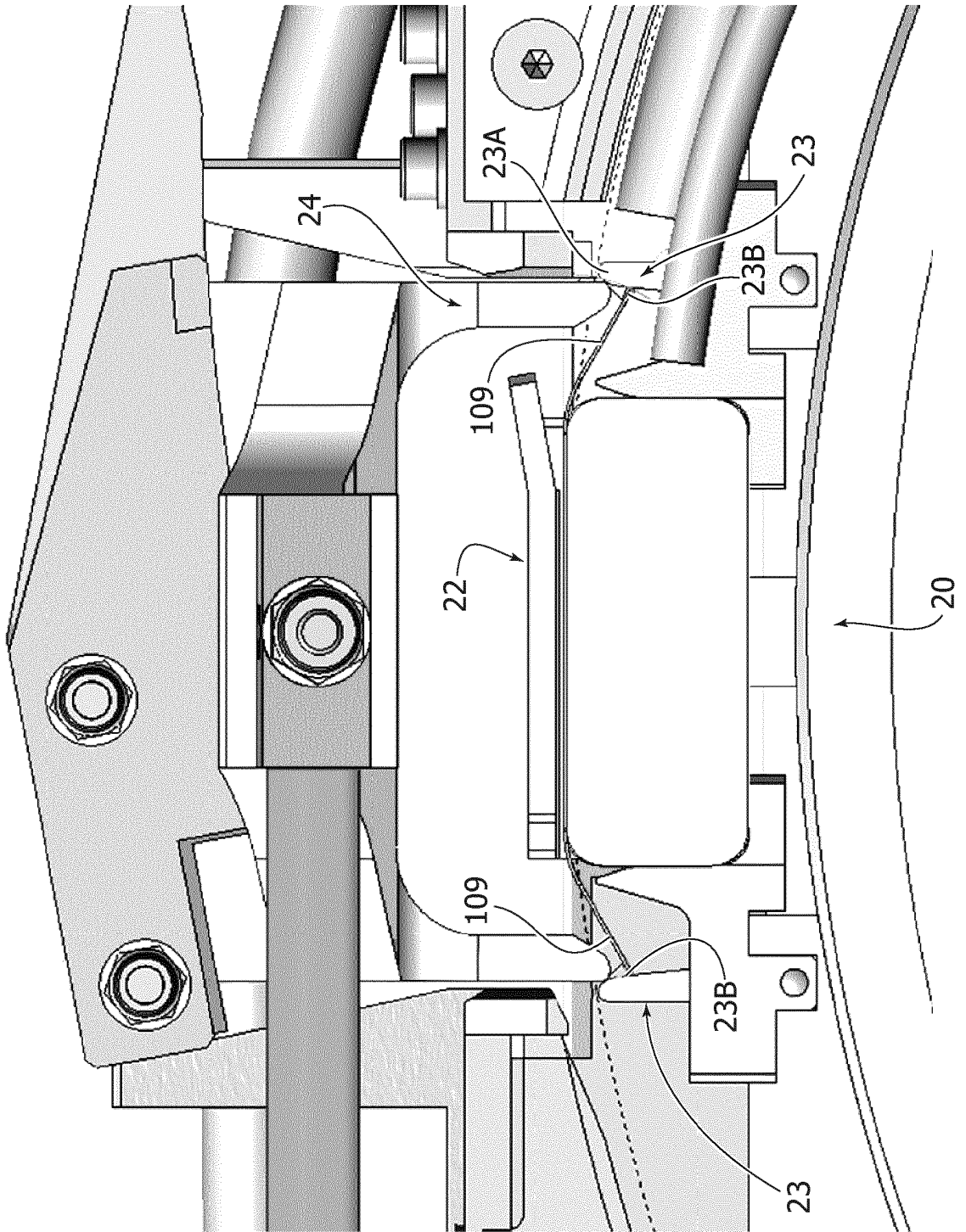


FIG. 9

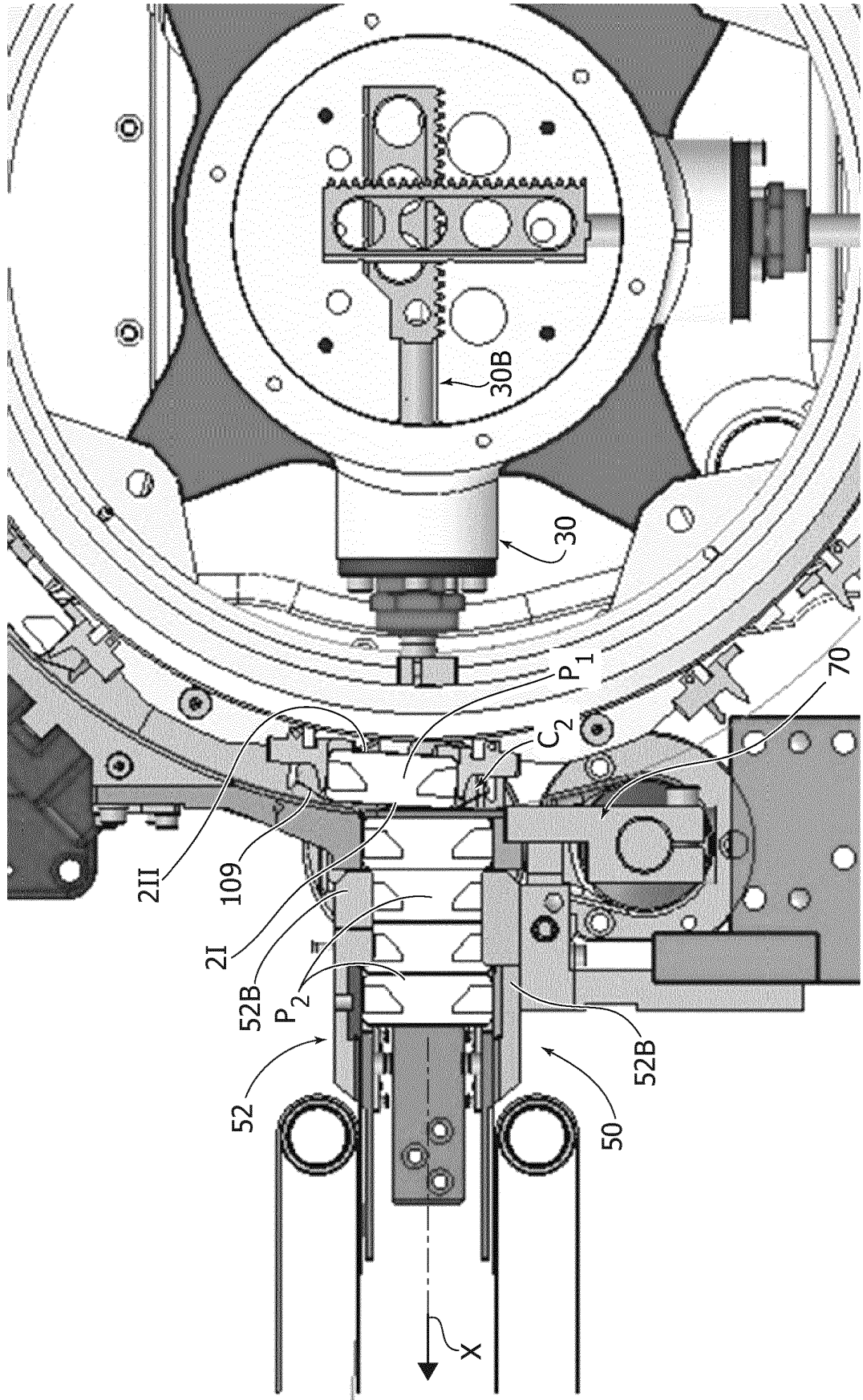


FIG. 11

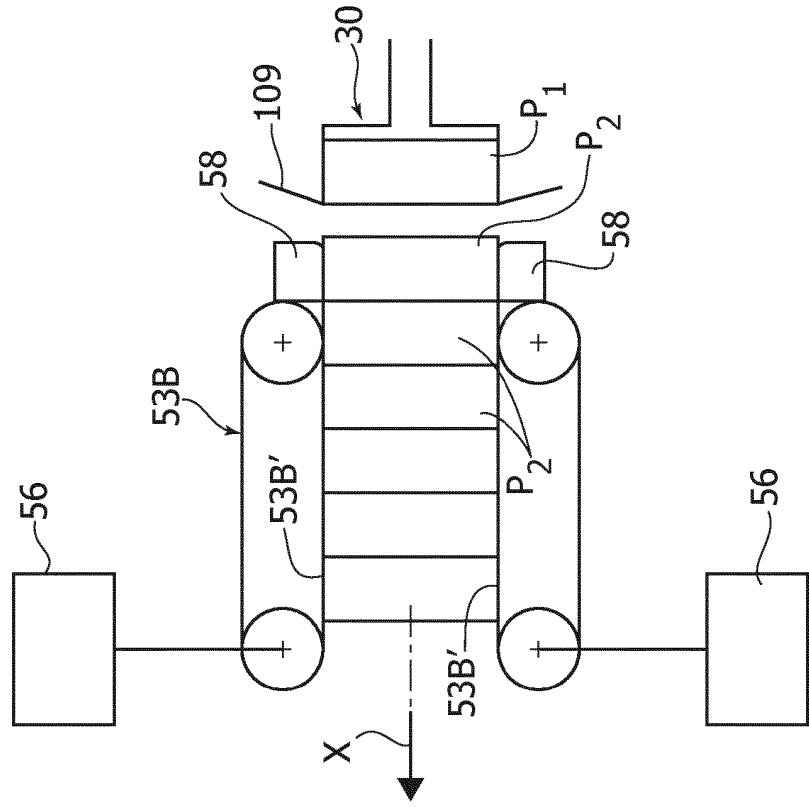
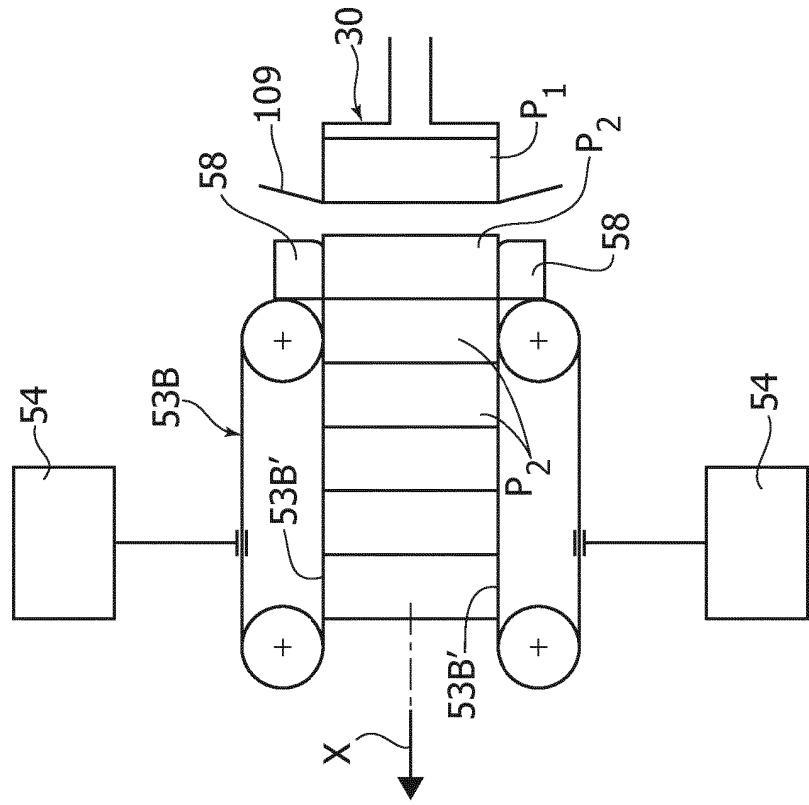


FIG. 10



**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- EP 2419335 B1 [0006]