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(71) Applicant: **Laservideo S.R.L.**  
**46029 Suzzara (MN) (IT)**

(72) Inventor: **FLISI, Massimo**  
**46029 SUZZARA (MN) (IT)**

(74) Representative: **Corradini, Corrado et al**  
**Ing. C. Corradini & C. S.r.l.**  
**Via Dante Alighieri 4**  
**42121 Reggio Emilia (IT)**

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(54) **AUTOMATIC DISTRIBUTOR OF ARTICLES**

(57) The invention relates to an automatic distributor (1) of a plurality of articles (P), equipped with a distribution group (10) comprising: a first store (55) for housing the articles (P) equipped with a bearing surface (70) adapted for supporting said articles (P) at the bottom, a first thrusting element (80) housed in the first store (55), adapted for moving the articles (P) present in the first store (55) on the bearing surface (70) of the first store (55) along an advancing direction (X1) between a storage area (60) of the first store (55) and an unloading area (65) of the first store (55), a second store (125) for housing the articles (P) at least partially juxtaposed in plan over the first store (55) and equipped with a bearing surface (140) adapted for supporting the articles (P) housed in the second store (125) at the bottom, and a second thrusting element (150) housed in the second store (125), adapted for moving the products (P) present in the second store (125) on the bearing surface (140) of the second store (125) along an axis (X2) between a storage area (130) of the second store (125) and an unloading area (135) of the second store (125). Said distribution group (10) is characterised in that it comprises: a first channel (95) for conveying the articles (P) present in the first store (55), which is equipped with an inlet mouth (100) arranged immediately downstream of the unloading area (65) of the first store itself, and a second channel (165) for conveying the articles (P) present in the second store (125), which is distinct from the first channel (95) and is equipped with an inlet mouth (170) arranged immediately downstream of the unloading area (135) of the second store (125).

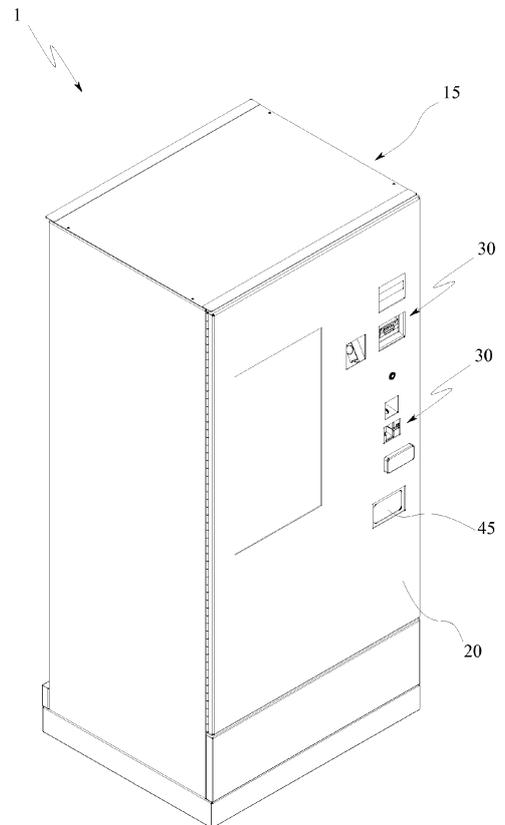


FIG. 1

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**Description**TECHNICAL FIELD

**[0001]** The present invention relates to an automatic distributor of articles.

**[0002]** More in particular, the present invention relates to a distributor for the automatic dispensing and the sale of bagged articles, for example packets of shredded tobacco.

PRIOR ART

**[0003]** As is well known, there are automatic distributors of products, such as articles of shredded tobacco or other consumer products, that are intended to be installed outside tobacco shops, or otherwise in areas intended for the inflow of users, who, by inserting the required amount of money and selecting a product indicated in a selection push-button panel, can pick up the selected product from a dedicated outlet dispensing the article.

**[0004]** These automatic distributors comprise a support case adapted to support a plurality of stores, in each of which is stored a single type of articles.

**[0005]** Each store comprises a thrusting element adapted to thrust a packet from a storage area, defined by the store, to a chute that brings the products to the pick-up area, which is defined by a pick-up outlet in which the user pick-up the selected product.

**[0006]** There are known distributors in which the thrusting element, for example comprising a helical body, moves the products on a bearing surface maintaining them with the respective longitudinal axes substantially perpendicular to the bearing surface and translating them along a horizontal axis until an edge of said bearing surface beyond which the products fall by gravity on an underlying chute.

**[0007]** A problem of this solution is that, if there are multiple stores of this kind superposed in plan one on the other and facing a same pick-up area, the packet of shredded tobacco can become stuck in the underlying store, generally in the thrusting element of the underlying store.

**[0008]** This is because upon exiting from the store, during the fall towards the underlying chute, the packet can rotate forwards or backwards with respect to its own center of gravity and one of its ends can enter the underlying store. This case is more frequently recurring if the products are light and have elongated shape, for example shredded tobacco articles.

**[0009]** A secondary problem of this solution is that, especially in the case in which the products are packet with elongated shape and particularly light, said packet may remain stuck between the unloading area of the thrusting element and a wall of said chamber facing said unloading area.

**[0010]** This is because the rotation of the packet that

can take place upon existing the unloading area, can cause the packet to have the longitudinal axis substantially horizon and to rest one of its ends on a wall of the store and an opposite end on a wall, facing the unloading area, of the volume downstream of said unloading area. In this case, the weight of the packet of shredded tobacco is not sufficient to overcome the friction generated by the ends of the packet against the walls and to make the fall of the packet towards the chute continue.

**[0011]** To overcome this problem, generally, the volume downstream of the unloading area is made in such a way that the distance between the unloading area of the thrusting element and the opposite wall of the volume downstream is greater than the length of the largest packet of shredded tobacco that can be housed inside the store, i.e. greater than the distance between the longitudinal ends of said packet.

**[0012]** This solution obligates, for equal available volume, to reduce the length of the store and hence to reduce the number of articles that can be stored, compelling more frequent replenishment.

**[0013]** According to another solution, the thrusting element moves the products along a substantially vertical axis, bringing them from a storage area positioned above to an unloading area positioned above and directly superposed to the chute.

**[0014]** One problem of this solution is that, especially if the thrusting element comprises a helical body and the product is a packet of shredded tobacco, the packet can become stuck between the thrusting element and the guiding elements of the packet, thus without being dispensed.

**[0015]** In addition, while this solution makes it possible to approach the unloading area of the thrusting element to the chute, has the drawback that it cannot house a great variety of articles with different dimensions, unlike the solution in which the thrusting element translates the products along the horizontal axis.

**[0016]** A purpose of the present invention is to make available an automatic distributor able to overcome the aforementioned constraints of the prior art in a simple, rational manner.

**[0017]** This purpose is achieved by the features of the invention indicated in the independent claim. The dependent claims outline preferred and/or particularly advantageous aspects of the invention.

DESCRIPTION OF THE INVENTION

**[0018]** The invention makes available a distributor of articles comprises a plurality of stores, each provided with a thrusting element able to maintain the packet in substantially vertical position, each of which comprises a channel downstream of the unloading surface.

**[0019]** In particular, the invention makes available an automatic distributor of a plurality of articles, equipped with a distribution group comprising: a first store for housing the articles equipped with a bearing surface adapted

for supporting said articles at the bottom, a first thrusting element housed in the first store, adapted for moving the articles present in the first store on the bearing surface of the first store along an advancing direction between a storage area of the first store and an unloading area of the first store, a second store for housing the articles at least partially superposed in plan to the first store and equipped with a bearing surface adapted for supporting the articles housed in the second store at the bottom, and a second thrusting element housed in the second store, adapted for moving the articles present in the second store on the bearing surface of the second store along an advancing direction between a storage area of the second store and an unloading area of the second store, said distribution group being characterised in that it comprises: a first channel for conveying the articles present in the first store, which is provided with an inlet mouth positioned immediately downstream of the unloading area of the first store, and a second channel for conveying the articles present in the second store, which is distinct from the first channel and is provided with an inlet mouth positioned immediately downstream of the unloading area of the second store.

**[0020]** Thanks to this solution, an automatic distributor is made available that is provided with substantially horizontal and superposed stores, in which there is no possibility that the articles may become stuck in the underlying store during the fall of the article from the unloading area of the store towards an area where the article is picked up.

**[0021]** According to one aspect of the invention, each channel comprises a conveying surface projecting cantilevered from an end of the respective bearing surface in the opposite direction with respect to the thrusting element.

**[0022]** In this way, the risk that the article may become stuck in the underlying store during the fall is further reduced, because the passage from the bearing surface to the channel takes place seamlessly, hence the channel of a store totally shields the underlying store.

**[0023]** According to another aspect of the invention each channel can comprise an additional conveying surface, opposite to the respective conveying surface and facing it, which extends in the sliding direction of the products through the channel itself at an elevation at least equal to the maximum elevation of the thrusting element.

**[0024]** In this way, the distribution group is even more effective in preventing the article from becoming stuck, because the additional conveying surface thus shaped prevents the article, if it rotates forwards upon exiting from the unloading area, from positioning itself in such a way as to obstruct the inlet mouth.

**[0025]** According to another aspect of the invention, each store can comprise a pair of guide surfaces laterally arranged to the respective thrusting element, and wherein the length in the direction perpendicular to the axis of the inlet mouth of every channel is substantially equal to the distance between the respective guide surfaces.

**[0026]** In this way, it is additionally assured that the article will not become stuck in the path from the unloading area of the store to the dispensing area of the distributor, because the length of the channel is sufficiently small to prevent the article from rotating laterally, i.e. with respect to the axis of translation of the thrusting element, and hence to be positioned substantially horizontal and the ends resting on two opposite surfaces of the volume downstream of the unloading area. Moreover, the solution allows to obtain, for equal capacity, a more compact distributor with respect to prior art devices.

**[0027]** Advantageously, each cross section of each channel has substantially equal length to the distance between the respective guide surfaces.

**[0028]** In this way, the article is guided along the entire channel so that it cannot rotate, and hence become stuck inside the channel.

**[0029]** According to another aspect of the invention, each thrusting element can comprise a helical body wound along the respective axis and able to move the products present in the corresponding store towards the unloading area. In this way, the thrusting element is effective and simple to produce. According to another aspect of the invention, the inlet mouth of each channel can have width in the direction of the respective axis between 1.05 and 1.2 times the helical pitch of the respective helical body.

**[0030]** This characteristic allows further to reduce the risk that the articles may become stuck when falling from the unloading area of the store to the pick-up area of the distributor. This is because the width of the channel is sufficiently small to prevent the article from rotating forwards or backwards with respect to the position in which it is when it is moved by the thrusting element, and hence from positioning itself with substantially horizontal longitudinal axis and the ends resting on two opposite surfaces of the volume downstream of the unloading area. Moreover, the solution allows to obtain, for equal capacity, a more compact distributor with respect to prior art devices.

**[0031]** Preferably, each cross section of each channel is shaped substantially like the inlet mouth.

**[0032]** In this way, the article is guided along the entire channel so that it cannot rotate, and hence become stuck inside.

**[0033]** According to another aspect of the invention, each channel can comprise an outlet mouth, and the distribution group can comprise a chute, arranged below the outlet mouths of the channels and having a width in the direction transverse to the sliding direction of the articles P comprised between 100mm and 300mm.

**[0034]** Thanks to the presence of the channel downstream of the unloading area it is possible to implement a chute of reduced dimensions, thus allowing to obtain a more compact automatic distributor with respect to prior art devices.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0035]** Further features and advantages of the invention will be more apparent after reading the following description provided by way of a non-limiting example, with the aid of the accompanying drawings.

Figure 1 is an axonometric view of the distributor according to the invention.

Figure 2 is an axonometric view of the distributor of Fig. 1 in which an inner space is visible.

Figure 3 is a front view of the distributor of Fig. 2.

Figure 4 is a lateral view of a distribution group of the distributor of the previous figures according to the plane of view BB.

Figure 5 is an axonometric view of the distribution group in Figure 4.

Figure 6 is an axonometric view of the distribution group in Figure 5 closed by a panel.

Figure 7 is a section view of figure 4, taken along the plane VII-VII.

Figure 8 is an axonometric view of a packet adapted to be moved by the distribution group.

## BEST MODE OF THE INVENTION

**[0036]** With particular reference to the figures, the reference numeral 10 globally designates an automatic distributor of articles, for example tobacconist articles such as packs of cigarettes, packets of shredded tobacco, chewing gum and other articles.

**[0037]** The packets P have elongated shape in the direction of a longitudinal axis PP, for example they are shaped as bags.

**[0038]** Each packet P has opposite longitudinal ends.

**[0039]** In particular, each packet P comprises a first edge P1 and a second edge P2 opposite to the first edge P1, which are incident to the longitudinal axis PP. Each packet P also comprises a third edge P3 and a fourth edge P4 opposite to the third edge P4.

**[0040]** The third edge P3 and the fourth edge P4 are substantially parallel to the longitudinal axis PP.

**[0041]** Preferably, the third edge P3 extends from a first end of the first edge P1 to a first end of the second edge P2 and the fourth edge P4 extends from a second end of the first edge P1 to a second end of the second edge P2.

**[0042]** The third edge P3 and the fourth edge P4 have greater length than the first edge P1 and of the second edge P2.

**[0043]** For example, the first edge P1 has the same length of the second edge P3. Similarly, the third edge P3 has the same length of the fourth edge P4.

**[0044]** Each packet P comprises a first face F1, for example having rectangular shape, and an opposite second face F2, for example also having rectangular shape.

**[0045]** The first face F1 is joined to the second face F2 along at least the first edge P1, preferably also along the

second edge P2, the third edge P3 and the fourth edge P4.

**[0046]** The packet P has a center of gravity, for example positioned between the first face F1 and the second face F2, substantially aligned to the geometric centres of said face.

**[0047]** The articles P have reduced weight, for example less than 45g.

**[0048]** The distributor 1 comprises a box case 15, for example of the cabinet type, provided with a door 20 hinged to the case 15 adapted to allow access to an inner space 25 of the case 15.

**[0049]** The distributor 1 comprises a plurality of interface devices 30 for interfacing with the user, for example a device for choosing the articles, a device for verifying the payments, etc.

**[0050]** Said interface device 30 are housed in the door 20 of the case 15.

**[0051]** The distributor also comprises a pick-up mouth 45 adapted to allow access from the exterior to an area for picking up the articles positioned inside the distributor 10 and accessible from the exterior of the case 15 by means of said pick-up mouth 45.

**[0052]** The pick-up mouth 45 is obtained in the case 15, for example in the door 20. The distributor 10 comprises a storage and dispensing unit 50 for storing and moving articles contained inside the distributor, for example configured for storing and dispensing packs of cigarettes, or parallelepiped-shaped articles. Said storage and dispensing unit 50 is housed inside the inner space 25. The distributor 1 comprises a distribution group 10 for articles, for example packets P, preferably packets P of shredded tobacco P.

**[0053]** The distribution group is housed in a portion of the inner space 25 of the distributor 1.

**[0054]** The distribution group 10 is slidably associated by means of guides to the case 15 according to a horizontal sliding axis, so as to slide between a first position in which it is fully contained in the inner space 25 and a second position in which it projects at least partially from the inner space 25. Preferably in the second position, the distribution group 10 completely projects outside the inner space.

**[0055]** The distribution group 10 comprises a first store 55 for storing a plurality of articles, or of packets P.

**[0056]** The first store 55 extends from a storage area 60 to an unloading area 65 along an advancing direction of the articles.

**[0057]** The first store 55 comprises a bearing surface 70, for example horizontal, adapted to support the articles at the bottom.

**[0058]** The bearing surface 70 extends along the entire extension of the first store 55 along the advancing direction of the articles between a first edge and a second edge, which is at the unloading area 65.

**[0059]** The bearing surface 70 is substantially flat.

**[0060]** The first store 55 comprises a pair of guide surfaces 75 adapted to guide the articles so as to prevent a

rotation of said articles with respect to an axis parallel to the advancing direction.

**[0061]** The guide surfaces 75 are positioned at opposite sides of the bearing surface 70 and extend in a parallel direction to the advancing direction, for example they are perpendicular to the bearing surface 70.

**[0062]** The guide surfaces 75 are distanced from each other so as to receive with reduced play the articles present in the first store 55.

**[0063]** The distribution group 10 comprises a first thrusting element 80 adapted to move the articles above the bearing surface 70 of the first store 55, along the advancing direction from the storage area 60 to the unloading area 65.

**[0064]** For example, the first thrusting element 80 is configured to move the articles maintaining them substantially standing, i.e. with the longitudinal axis of the article inclined with respect to the bearing surface 70.

**[0065]** The first thrusting element 80 comprises a helical body 85 arranged with the central axis X1 parallel to the advancing direction, for example also parallel to the bearing surface 70.

**[0066]** In particular, the central axis X1 defines the advancing direction of the articles in the first store 55.

**[0067]** In this description, the term "helical body" means a body shaped as a helix, i.e. a three-dimensional curve in space wound around a cylinder, i.e. it is substantially shaped as a helical compression spring.

**[0068]** The helical body 85 is shaped in such a way that the space between the two consecutive coils of the helix defines the volume in which the article is at least partially housed, for example housed with longitudinal axis inclined with respect to the bearing surface 70.

**[0069]** In particular, the helical body 85 has such a helical pitch that the packet P is housed in the space between a coil and the consecutive one of the helical body 85 and rotation is prevented with respect to an axis perpendicular to the central axis X1 of the helical body 85 and incident to the bearing surface 70. Or, the faces of the packet P rest on two consecutive coils of the helical body 85.

**[0070]** The first thrusting element 80 further comprises an actuating means, for example a motor 90, adapted to set in rotation the helical body 85 around its own central axis X1 to move the articles from the storage area 60 to the unloading area 65.

**[0071]** The distribution group 10 comprises a first channel 95, which is provided with an inlet mouth 100, for example with rectangular shape, positioned in the unloading area 65 of the first store 55 and with an opposite outlet mouth 105, for example with rectangular shape.

**[0072]** The inlet mouth 100 and the outlet mouth 105 are the only accesses to an inner volume of the first channel 95.

**[0073]** The first channel 95 is so shaped as to prevent the rotation of the article, during the traversing of the first channel itself, with respect to any axis of the article.

**[0074]** The first channel 95 has a substantially vertical

longitudinal axis.

**[0075]** The inlet mouth 100 of the first channel 95 is positioned immediately downstream of the unloading area 65 and its length in the direction perpendicular to the advancing direction of the articles in the first store 55 is substantially equal to the distance between the guide surfaces 75 of the first store 55.

**[0076]** The inlet mouth 100 of the first channel 95 has its width in the direction of the axis X1 between 1.05 and 1.2 times the helical pitch of the respective helical body 85.

**[0077]** The inlet mouth 100 is co-planar to the bearing surface 70 of the first store 55.

**[0078]** The outlet mouth 105 of the first channel 95 is substantially shaped like the inlet mouth 100 of the respective channel.

**[0079]** The first channel 95 further comprises a conveying surface 110, which projects cantilevered from an end of the bearing surface 70 of the first store 55 in the opposite direction with respect to the thrusting element 80.

**[0080]** In particular, the conveying surface 110 projects cantilevered from the second end of the bearing surface 70 of the first store 55.

**[0081]** The conveying surface 110 extends from the inlet mouth 100 to the outlet mouth 105.

**[0082]** The first channel 95 comprises an additional conveying surface 115, which is positioned at an opposite side of the inlet mouth 100 with respect to the conveying surface 110 and it faces it.

**[0083]** Said additional conveying surface 115 extends to an elevation at least equal to the maximum elevation of the thrusting element 80 and, in the opposite direction, to the outlet mouth 105.

**[0084]** The conveying surfaces 110, 115 are substantially parallel to each other, and they are positioned at such a distance as to allow the downwards sliding of the article through the first conveying channel 95 precluding the rotation of the article.

**[0085]** The first channel 95 comprises a pair of lateral conveying surfaces 120 that are substantially parallel, for example co-planar, to the guide surfaces 75 of the first store 55.

**[0086]** The conveying surface 110, the additional conveying surface 115 and the pair of lateral conveying surfaces 120 define, respectively in an upper portion of the first channel 95, the inlet mouth 100 and, in a lower portion of the first channel 95 and the perimeter of the outlet mouth 105.

**[0087]** The distribution group 10 comprises a second store 125 for storing a plurality of articles, or of packets P.

**[0088]** The second store 125 is superposed in plan to the first store 55.

**[0089]** The second store 125 extends from a storage area 130 to an unloading area 135 along an advancing direction of the articles.

**[0090]** The advancing direction of the articles in the second store 125 is parallel to the advancing direction of

the articles in the first store 55.

**[0091]** The second store 125 comprises a resting support 140, for example horizontal, adapted to support the articles at the bottom.

**[0092]** The bearing surface 140 of the second store 125 is superposed in plan to the bearing surface 70 of the first store 55.

**[0093]** In particular, the bearing surface 140 of the second store 125 has a greater extension in the advancing direction of the product than the extension in the same direction of the bearing surface 70 of the first store 55.

**[0094]** For example, the bearing surface 140 of the second store 125 projects with respect to the bearing surface 70 of the first store 55.

**[0095]** The bearing surface 140 extends along the entire extension of the second store 125 along the advancing direction of the articles between a first edge and a second edge, which is at the unloading area 135.

**[0096]** The bearing surface 140 is substantially flat.

**[0097]** The second store 125 comprises a pair of guide surfaces 145 adapted to guide the articles so as to prevent a rotation of said articles with respect to an axis parallel to the advancing direction.

**[0098]** The guide surfaces 145 are positioned at opposite sides of the bearing surface 140 and extend in a parallel direction to the advancing direction, for example they are perpendicular to the bearing surface 140.

**[0099]** The guide surfaces 145 are distanced from each other so as to receive with reduced play the articles present in the second store 125.

**[0100]** The distribution group 10 comprises a second thrusting element 150 adapted to move the articles above the bearing surface 140 of the second store 125, along the advancing direction from the storage area 130 to the unloading area 135.

**[0101]** For example, the second thrusting element 150 is configured to move the articles maintaining them substantially standing, i.e. with the longitudinal axis of the article inclined with respect to the bearing surface 140.

**[0102]** The second thrusting element 150 comprises a helical body 155 arranged with the central axis X2 parallel to the advancing direction, for example also parallel to the bearing surface 140.

**[0103]** In particular, the central axis X2 defines the advancing direction of the articles in the second store 125.

**[0104]** The central axis X2 of the helical body 155 is parallel to the central axis X1 of the helical body 85.

**[0105]** The helical body 155 is shaped in such a way that the space between the two consecutive coils of the helix defines the volume in which the article is at least partially housed, for example housed with longitudinal axis inclined with respect to the bearing surface 140.

**[0106]** In particular, the helical body 155 has such a helical pitch that the packet P is housed in the space between a coil and the consecutive one of the helical body 155 and rotation is prevented with respect to an axis perpendicular to the central axis X2 of the helical body 155.

**[0107]** Or, the faces of the packet P rest on two consecutive coils of the helical body 155.

**[0108]** The second thrusting element 150 further comprises an actuating means, for example a motor 160, adapted to set in rotation the helical body 155 around its own central axis X2 to move the articles from the storage area 130 to the unloading area 135.

**[0109]** The distribution group 10 comprises a second channel 165, which is provided with an inlet mouth 170, for example with rectangular shape, positioned in the unloading area 135 of the second store 125 and with an opposite outlet mouth 175, for example with rectangular shape.

**[0110]** The inlet mouth 170 and the outlet mouth 175 are the only accesses to an inner volume of the second channel 165.

**[0111]** The second channel 165 is so shaped as to prevent the rotation of the article, during the traversing of the second channel itself, with respect to any axis of the article.

**[0112]** The second channel 165 has a substantially vertical longitudinal axis.

**[0113]** The inlet mouth 170 of the second channel 165 is positioned immediately downstream of the unloading area 135 and its length in the direction perpendicular to the advancing direction of the articles is substantially equal to the distance between the guide surfaces of the second store 125.

**[0114]** The inlet mouth 170 is substantially co-planar to the bearing surface 140 of the second store 125.

**[0115]** The inlet mouth 170 of the second channel 165 has its width in the direction of the axis X2 between 1.05 and 1.2 times the helical pitch of the respective helical body 155.

**[0116]** The outlet mouth 175 of the second channel 165 is substantially shaped like the inlet mouth 170 of the respective channel.

**[0117]** The second channel 165 further comprises a conveying surface 180, which projects cantilevered from an end of the bearing surface 140 of the second store 125 in the opposite direction with respect to the second thrusting element 150.

**[0118]** In particular, the conveying surface 180 projects cantilevered from the second end of the bearing surface 140 of the second store 125.

**[0119]** The conveying surface 180 extends from the inlet mouth 170 to the outlet mouth 175.

**[0120]** The second channel 165 comprises an additional conveying surface 185, which is positioned at an opposite side of the inlet mouth 170 with respect to the conveying surface 180 and it faces it.

**[0121]** Said additional conveying surface 185 extends to an elevation at least equal to the maximum elevation of the second thrusting element 150 and, in the opposite direction, to the outlet mouth 175.

**[0122]** The conveying surfaces are substantially parallel to each other, and they are positioned at such a distance as to allow the downwards sliding of the article

through the second conveying channel 165 precluding the rotation of the article.

**[0123]** The second channel 165 comprises a pair of lateral conveying surfaces 190 that are substantially parallel, for example co-planar, to the guide surfaces 145 of the second store 125.

**[0124]** The conveying surface 180, the additional conveying surface 185 and the pair of lateral conveying surfaces 190 define, respectively in an upper portion of the second channel 165, the inlet mouth 170 and, in a lower portion of the second channel 165 and the perimeter of the outlet mouth 175.

**[0125]** The second channel 165 is distinct from the first channel 95, i.e. they are so shaped as to prevent the passage of an article from one channel to the other. The second channel 165 is set side by side to the first channel 95 along the advancing direction of the articles in the first store 55 and in the second store 125.

**[0126]** For example, the distribution group 10 has a dividing wall interposed between the first channel 95 and the second channel 165, which defines the conveying surface 180 of the second channel 165 and the additional conveying surface 110 of the first channel 95.

**[0127]** The inlet mouth 170 of the second channel 165 is at a higher elevation with respect to the inlet mouth 100 of the first channel 95.

**[0128]** The outlet mouth 175 of the second channel 165 is substantially at the same elevation as the outlet mouth 105 of the first channel 95.

**[0129]** The distribution group 10 comprises a third store 195 superposed in plan to the first store 55 and to the second store 125, and defining an advancing direction that is substantially parallel to the advancing direction of the articles in the first store 55 and in the second store 125.

**[0130]** The distribution group 10 comprises a third thrusting element 200 housed in the third store 195.

**[0131]** Moreover, the distribution group 10 comprises a third channel 205 positioned downstream of the third store 195.

**[0132]** The third store 195, the third thrusting element 200 and the third channel 205 are substantially shaped respectively like the first store 55, the first thrusting element 80 and the first channel 95.

**[0133]** In particular, the third store 195 comprises a bearing surface 210 adapted to support the articles at the bottom, superposed to the bearing surface 140 of the second store 125.

**[0134]** The thrusting element 200 is superposed to the bearing surface 210 and conveys the products from a storage area to an unloading area of the third store 195.

**[0135]** The third conveying channel 205 of the articles present in the third store 195 is provided with an inlet mouth 215 positioned immediately downstream of an unloading area of the third store 195.

**[0136]** In the preferred embodiment, the distribution group comprises a pair of lateral panels 220 adapted to define the guide surfaces 75,145 of the first store 55 and

of the second store 125 and the lateral conveying surfaces 120,190 of the first channel 95 and of the second channel 165.

**[0137]** However, in other embodiments, there may be multiple panels or other elements adapted to provide said guide surfaces and said conveying surfaces.

**[0138]** The lateral panels 220 also define guide surfaces for the third store 195.

**[0139]** The distribution group 10 comprises a conveyor, which is able to receive the articles from the conveying channels and bring them to the pick-up mouth 45. The conveyor comprises, for example, a chute 225 able to make the articles slide from an upper portion of the chute, where the articles fall from the conveying channels, to a lower portion of the chute 225 proximal to the pick-up mouth 45.

**[0140]** In additional embodiments, the conveyor may comprise a conveyor belt, or else a combination of a chute and a conveyor belt.

**[0141]** The maximum distance between each outlet mouth of the respective channel and the conveyor is less than twice the distance between the bearing surface 70 of the first store 55 and the bearing surface 140 of the second store 125. Or, said minimum distance is less than twice the extension in the direction of the longitudinal axis of each packet P.

**[0142]** The conveyor group 10 comprises a fourth store 230, positioned below the first store 55, and a fourth thrusting element 235 housed in the fourth store and able to move the articles contained in the fourth store towards an outlet mouth 240 obtained in the fourth store itself and directly facing the conveyor. The lateral panels 220 also define guide surfaces for the fourth store 230.

**[0143]** In light of the above description, the operation of the distributor 1 is as follows: a user selects the article P and makes the payment by means of the interface devices present on the door of the case.

**[0144]** At this point, the thrusting element relating to the store where the selected article is located is activated, and in particular the motor of the respective thrusting element sets in rotation the helical body which by rotating moves the article on the bearing surface of the store to reach the unloading area. The guide surfaces of the store guide the article during the driving, so that it cannot rotate with respect to an axis parallel to the advancing direction of the article.

**[0145]** Moreover, the pitch of the helical body defines the space in which the article is located so that it is housed with reduced play between a coil and the other of the helical body, for example the article is located between the two coils with substantially inclined axis with respect to an axis perpendicular to the bearing surface.

**[0146]** In this way, during the movement the article is prevented from rotating with respect to an axis perpendicular to the central axis of the helical body, said article is then moved from a storage area to an unloading area situated immediately downstream of the bearing surface along the direction of movement of the article keeping

substantially the same position in space that it had during the storage phase.

**[0147]** At this point the article falls by gravity through the inlet mouth and then through the conveying channel from which it exits through the outlet mouth ending directly on the conveyor.

**[0148]** The conveying channel has such dimensions that when the article passes inside it, the article maintains substantially always the same position in space that it had during the storage phase.

**[0149]** At this point the conveyor conveys the article to a pick-up area which the user can access through the pick-up mouth obtained on the door of the case and hence pick-up the desired article.

**[0150]** The invention thus conceived is susceptible to several modifications and variations, all falling within the scope of the inventive concept.

**[0151]** Moreover, all the details can be replaced by other technically equivalent elements.

**[0152]** Practically, any materials and also any contingent shapes and sizes may be used, depending on the needs, without departing from the scope of protection of the following claims.

## Claims

1. Automatic distributor (1) of a plurality of articles (P), equipped with a distribution group (10) comprising:

- a first store (55) for housing the articles (P) equipped with a bearing surface (70) adapted for supporting said articles (P) at the bottom,
- a first thrusting element (80) housed in the first store (55), adapted for moving the articles (P) present in the first store (55) on the bearing surface (70) of the first store (55) along an advancing direction (X1) between a storage area (60) of the first store (55) and an unloading area (65) of the first store (55),
- a second store (125) for housing the articles (P) at least partially juxtaposed in plan over the first store (55) and equipped with a bearing surface (140) adapted for supporting the articles (P) housed in the second store (125) at the bottom, and
- a second thrusting element (150) housed in the second store (125), adapted for moving the products (P) present in the second store (125) on the bearing surface (140) of the second store (125) along an advancing direction (X2) between a storage area (130) of the second store (125) and an unloading area (135) of the second store (125),

said distribution group (10) being **characterised in that** it comprises:

- a first channel (95) for conveying the articles (P) present in the first store (55), which is equipped with an inlet mouth (100) arranged immediately downstream of the unloading area (65) of the first store itself, and
- a second channel (165) for conveying the articles (P) present in the second store (125), which is distinct from the first channel (95) and is equipped with an inlet mouth (170) arranged immediately downstream of the unloading area (135) of the second store (125).

2. Distributor (10) according to claim 1, wherein each channel (95,165) comprises a conveying surface (110,180) projecting cantilevered from an end of the respective bearing surface (70,140) in the opposite direction with respect to the thrusting element (80,150).

3. Distributor (10) according to claim 2, wherein each channel (95,165) comprises a further conveying surface (115,185), opposite to the respective conveying surface (110,180) and facing onto it, which extends in the sliding direction of the articles (P) through the channel (95,165) at a height at least equal to the maximum height of the thrusting element (80,150).

4. Distributor (10) according to claim 1, wherein each store (55,125) comprises a pair of guide surfaces (75,145) laterally arranged to the respective thrusting element (80,150), and wherein the length in the direction perpendicular to the axis (X1) of the inlet mouth (100,170) of every channel (95,165) is substantially equal to the distance between the respective guide surfaces (75,145).

5. Distributor (10) according to claim 4, wherein every transversal section of each channel (95,165) has a length substantially equal to the distance between the respective guide surfaces (75,145).

6. Distributor (10) according to claim 1, wherein every thrusting element (80,150) comprises a helical body (85,155) wound along the respective axis (X1,X2) and adapted for moving the products (P) present in the corresponding store (55,125) towards the unloading area (65,135).

7. Distributor (10) according to claim 6, wherein the inlet mouth (100,170) of every channel (95,165) has a width in the direction of the respective axis (X1,X2) of the helical body (85,155) comprised between 1.05 and 1.2 times the helix pitch of the respective helical body.

8. Distributor (10) according to claim 1, wherein every transversal section of each channel (95,165) is shaped substantially like the inlet mouth (100,170).

9. Distributor (10) according to claim 1, wherein each channel (95,165) comprises an outlet mouth (105,175), and wherein the distribution group (10) comprises a chute (225), arranged below the outlet mouths (105,175) of the channels (95,165) and having a width in the direction transversal to the sliding direction of the articles P comprised between 100mm and 300mm.

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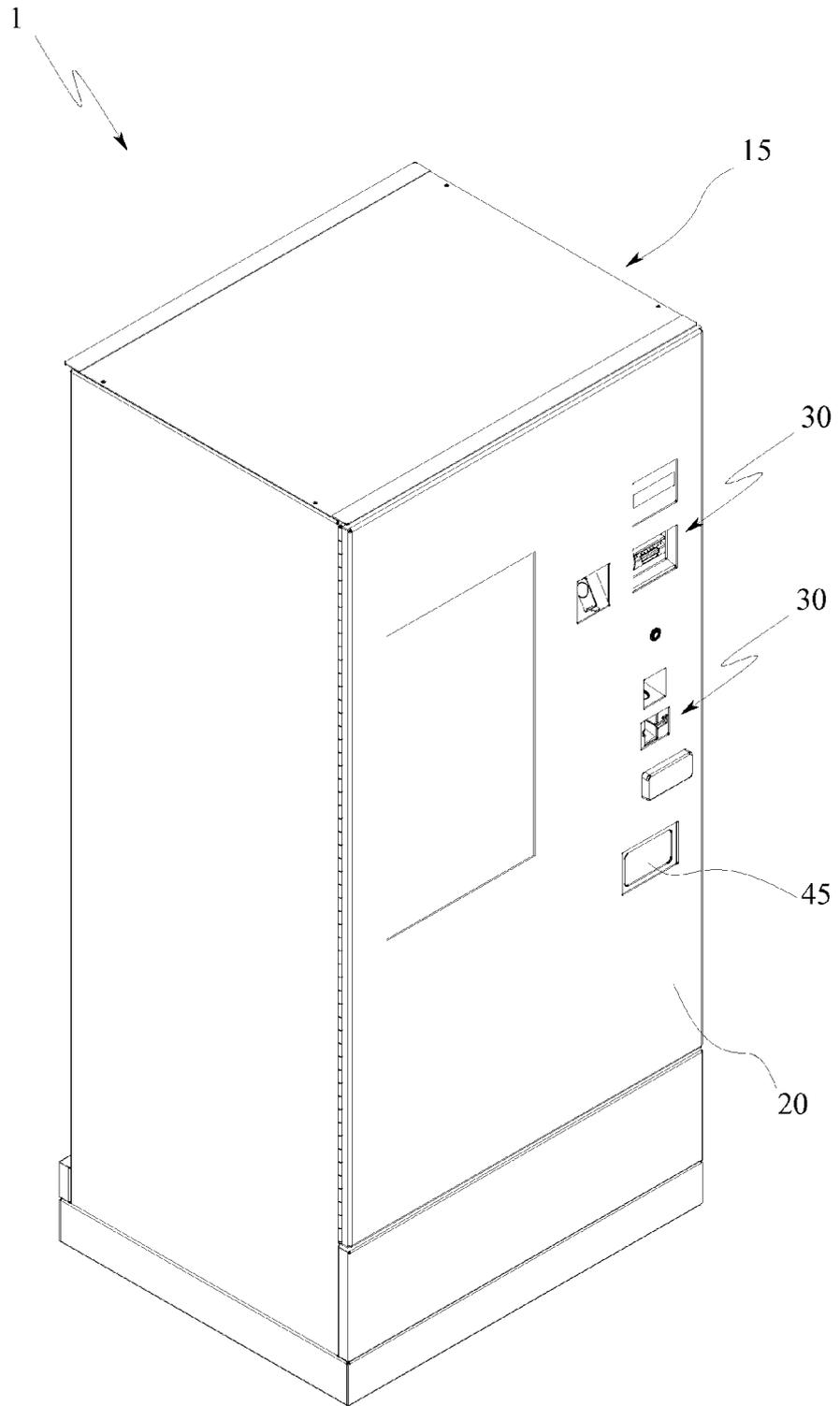


FIG.1

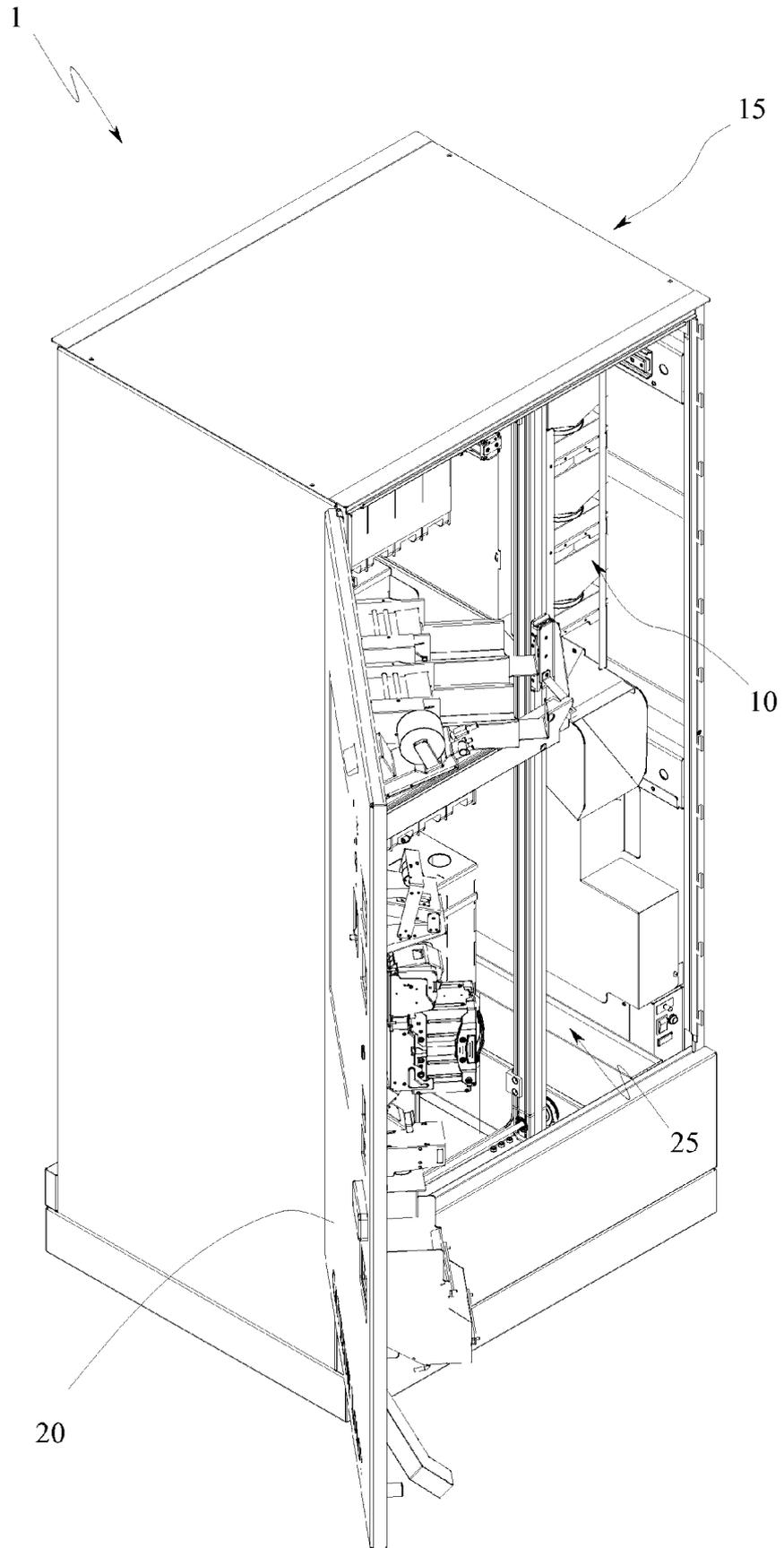


FIG.2

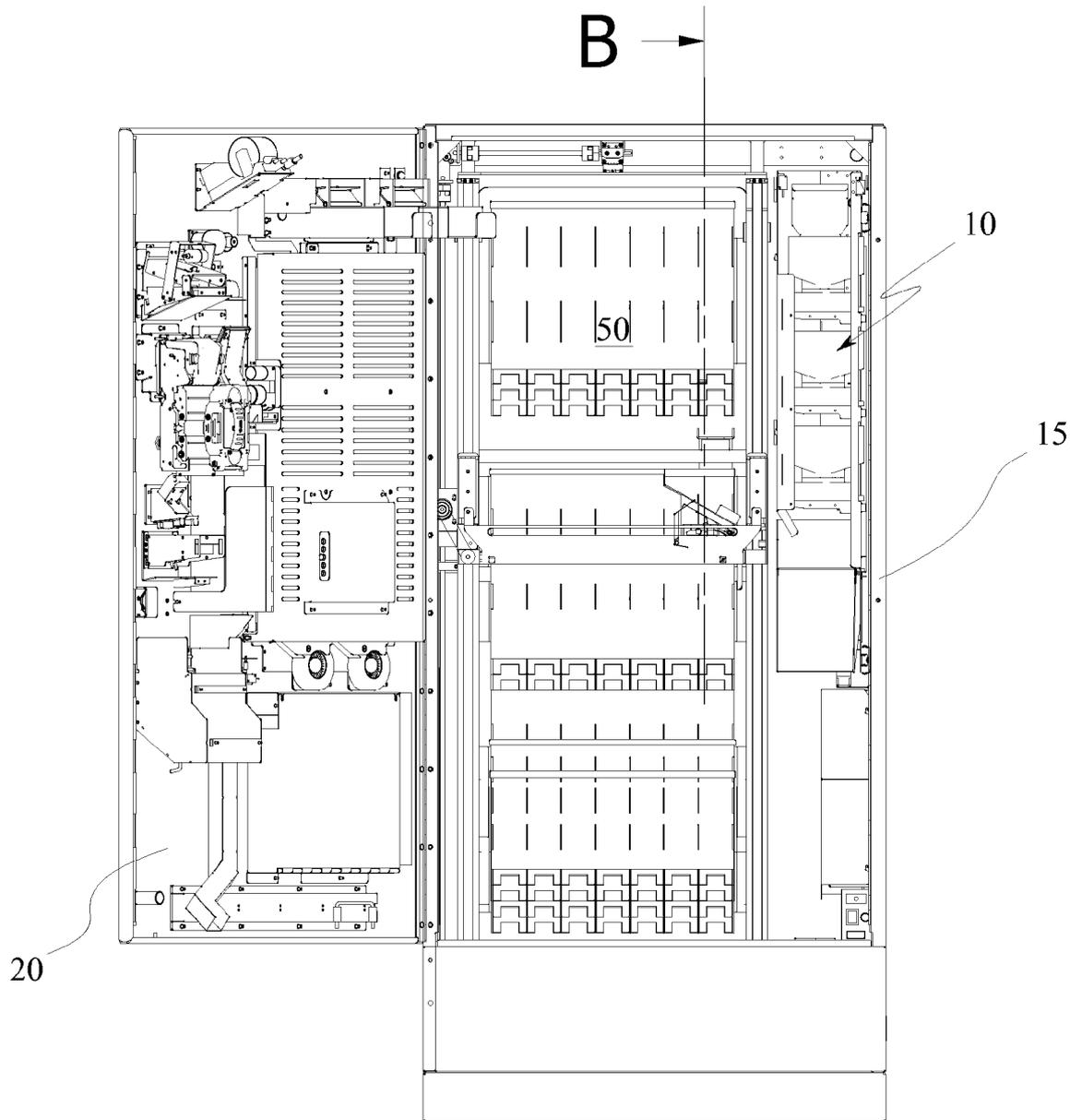


FIG.3

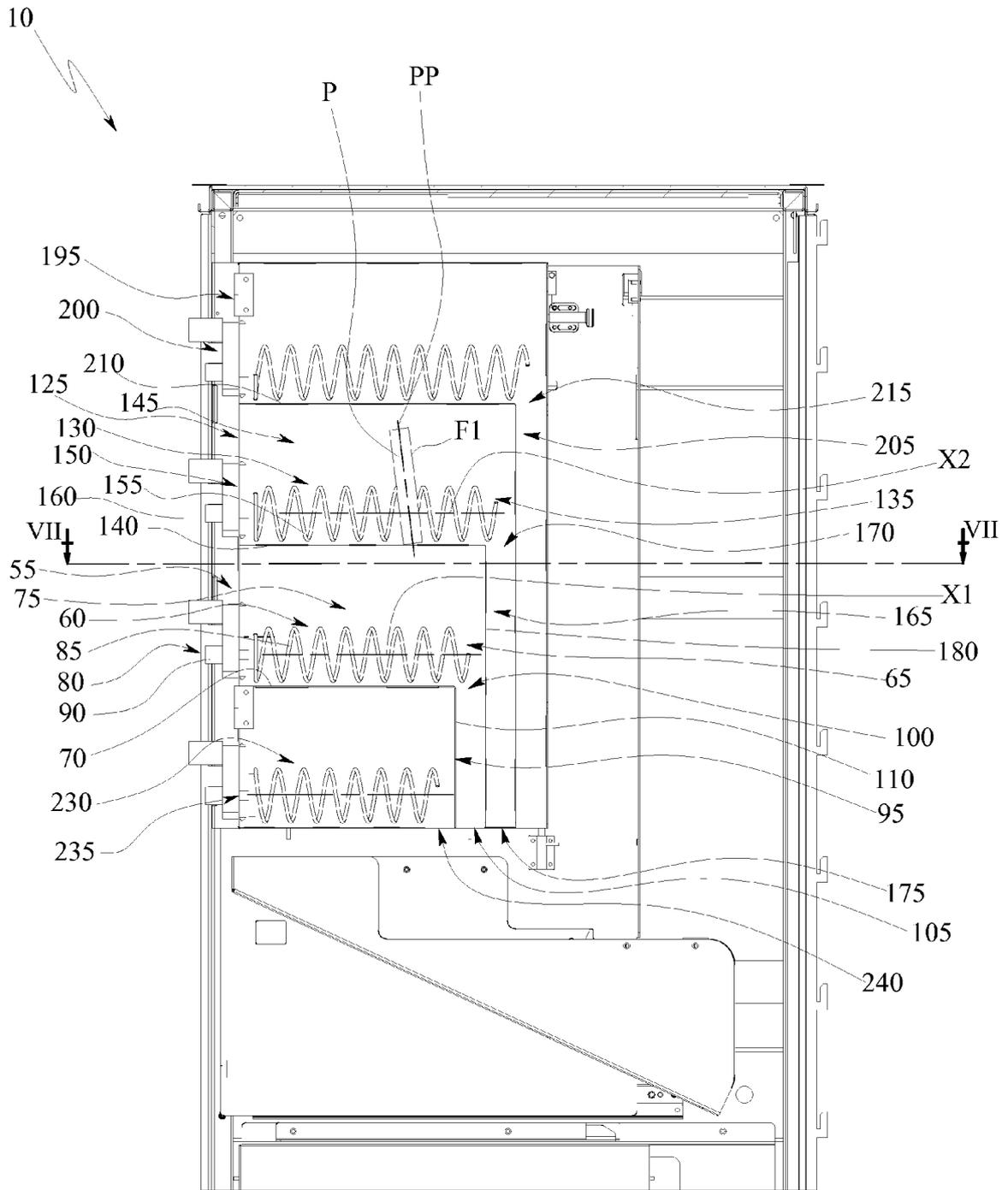


FIG.4

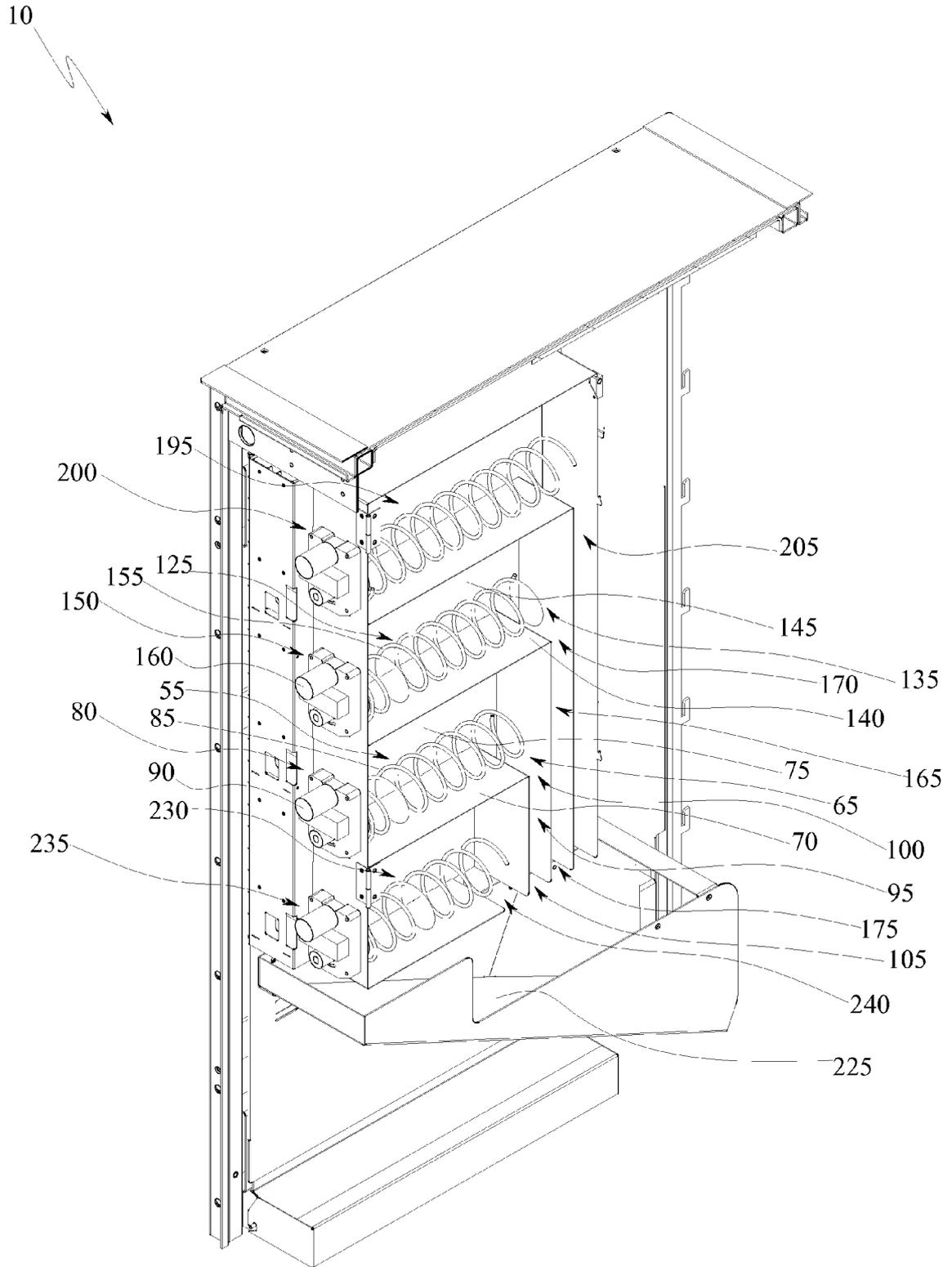


FIG.5

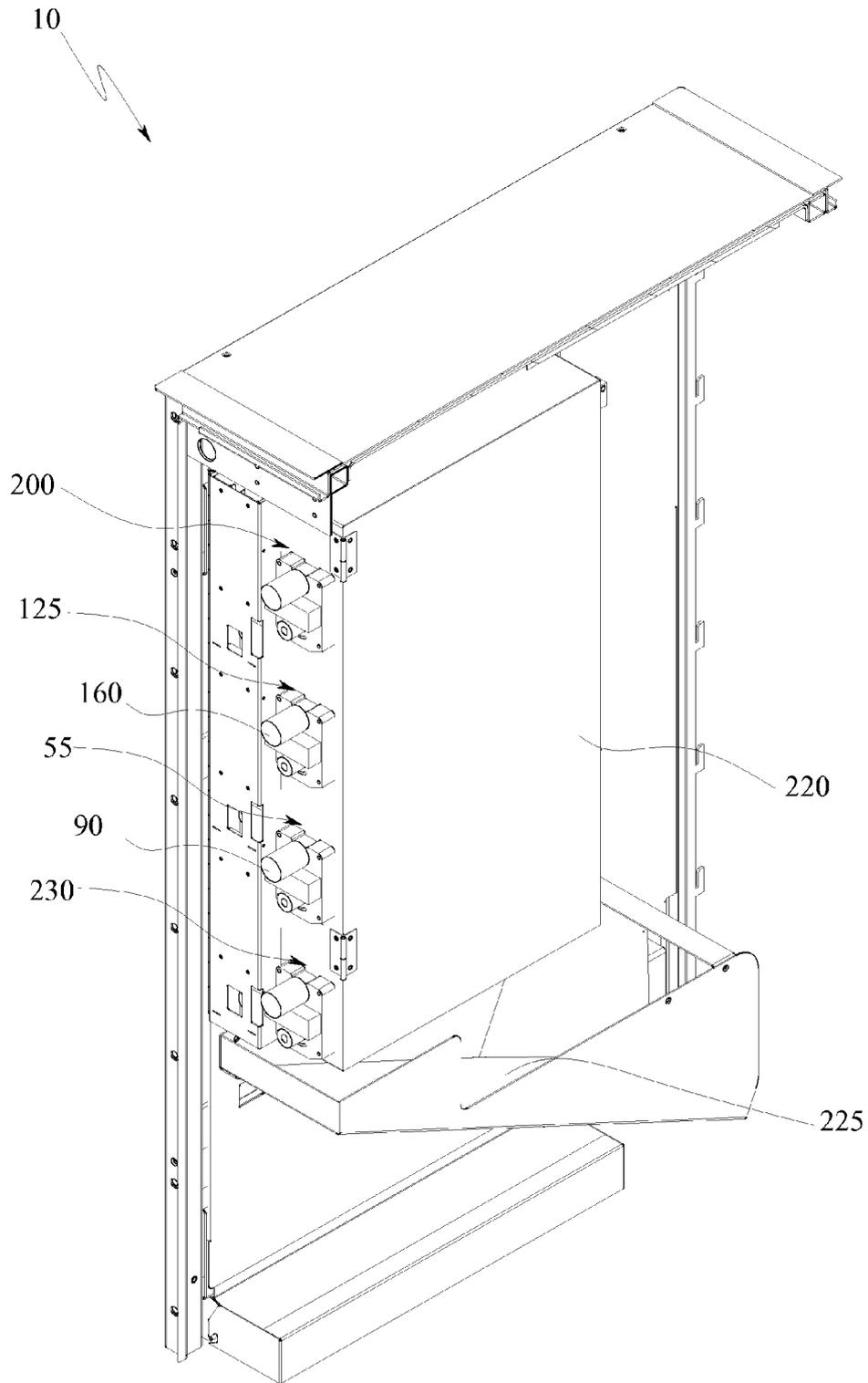


FIG.6

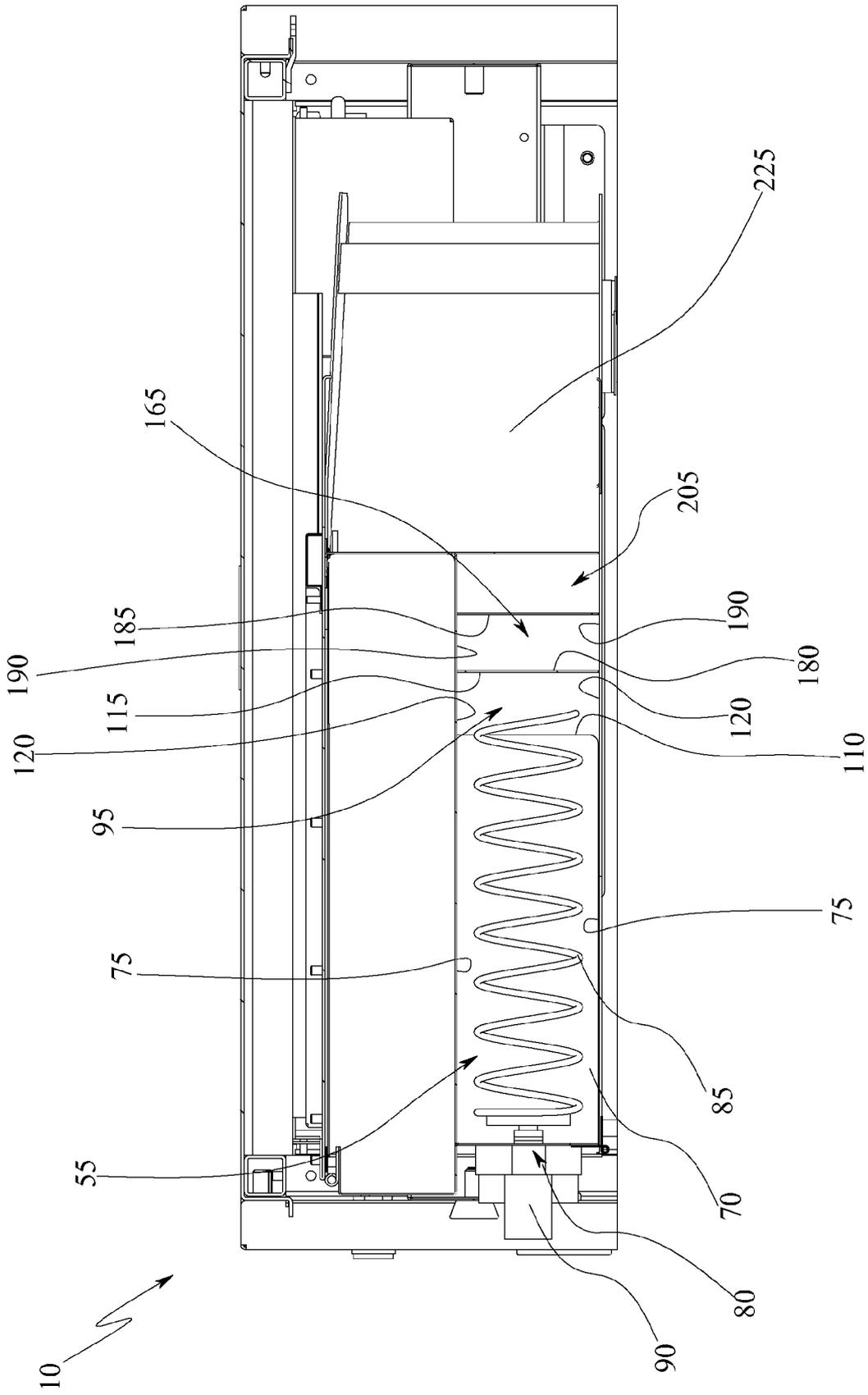


FIG. 7

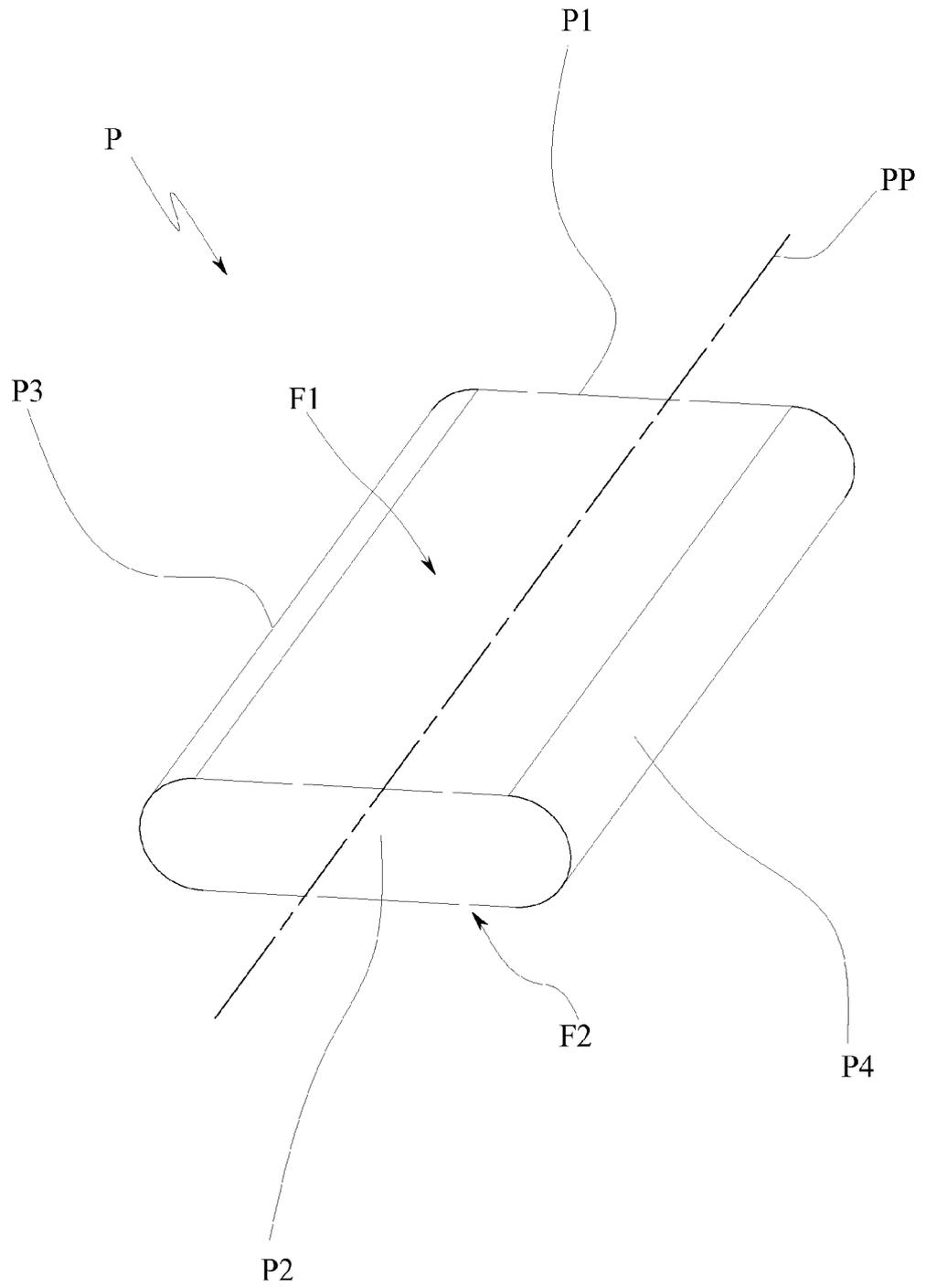


FIG.8



EUROPEAN SEARCH REPORT

Application Number  
EP 19 15 1333

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Place of search The Hague		Date of completion of the search 4 February 2019	Examiner Horat, David
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			

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

04-02-2019

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