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(54) **PACK FOR SMOKING ARTICLES**

PACKUNG FÜR RAUCHARTIKEL

PAQUET D'ARTICLES À FUMER

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Description

TECHNICAL FIELD

[0001] The present invention relates to a cigarette pack containing a group of small-sized smoking articles.

[0002] The present invention is advantageously implemented in a pack of cigarettes to which explicit reference will be made in the following description without any consequent loss of generality.

[0003] In the present text, indeed, reference will be made in general to the specific example of *"cigarettes"* rather than to the more generic expression *"smoking articles"* without, however, relinquishing any generality with respect to other types of articles (such as cigars, cigarillos, cigarettes of an electronic type or *e-cigarettes,* auxiliary products such as filters, refills for *e-cigarettes* and other tobacco-based products or products based on alternative or substitute components for tobacco).

PRIOR ART

[0004] Rigid cigarette packs with a hinged lid are currently the most common packs for cigarettes on the market, since they are simple to produce, easy and practical to use and provide good mechanical protection for the cigarettes contained within. A rigid pack of cigarettes with a hinged lid comprises a group of cigarettes wrapped in a wrapper of metallized paper in order to form an inner wrap and a rigid outer container that houses the inner wrap; the outer container is cup-shaped, has an open upper end and is provided with a lid, which is also cup-shaped and is hinged to the container along a hinge so as to rotate, relative to said container, between an open position and a closed position of the open end. A collar is normally provided, which is folded and attached inside the container so as to partially project out of the open end and engage a corresponding inner surface of the lid when the lid is arranged in the closed position.

[0005] Typically, in packets that accommodate a group of cigarettes that is smaller relative to the internal volume of the outer container in terms of width and height, a filling element is inserted to make up for the difference in size between the group of cigarettes and said outer container. For instance, such a filling element is described, respectively, in the patent applications WO2016005949A1 and WO2018203287A1. In these disclosures, the filling element is inserted in the outer container and has a front wall which is arranged in contact with the inner wrap, a rear wall which is parallel to and opposite the front wall, an upper wall which is perpendicular to the front wall, and two side walls which are opposite one another, are perpendicular to the front wall and to the upper wall and rest against the side walls of the outer container. However, the filling element described in WO2016005949A1 and WO2018203287A1 has a plurality of disadvantages. The main disadvantage of both is that the filling element is not rigid enough to maintain the correct position throughout the use of the cigarette pack. In WO2016005949A1, the lower portion of the front wall of the filling element is accordingly not able to adequately support the group of cigarettes accommodated within, inasmuch as it tends to bend toward the rear wall of said filling element, as it does not provide an adequate resistance to the pressure exerted by the group of cigarettes on the same. In WO2018203287A1, on the other hand, the rear wall of the filling element simply rests against two pairs of supporting wings which are obtained in the side walls and in the front wall and folded toward the rear wall. However, the two pairs of supporting wings tend to not maintain the correct position throughout the use of the cigarette pack. Consequently, without the proper support of the supporting wings, the rear wall does not maintain its position in contact with the rear wall of the cup-shaped body. Moreover, in both patent applications, the filling element tends to collapse onto itself so that the group of cigarettes ends up moving around inside the outer container.

DESCRIPTION OF THE INVENTION

[0006] The object of the present invention is to provide a cigarette pack containing a group of small-sized smoking articles which does not possess the drawbacks of the state of the art and which is easy and economical to produce.

[0007] In accordance with the present invention, a pack is provided as claimed in the attached claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The present invention will now be described with reference to the attached drawings which illustrate some non-limiting embodiments, wherein:

- Figure 1 is a front perspective view of a rigid cigarette pack in a closed configuration and realized in accordance with the present invention;
- Figure 2 is a rear perspective view of the cigarette pack shown in Figure 1 in the closed configuration;
- Figure 3 is a front perspective view from above of the cigarette pack shown in Figure 1 in an open configuration;
- Figure 4 is a front perspective view of the cigarette pack shown in Figure 1 in the open configuration, wherein the group of cigarettes has been removed;
- Figure 5 is a schematic view in longitudinal cross-section of the cigarette pack shown in Figure 1;
- Figure 6 is a schematic view of a collar and of a filling element of the pack shown in Figure 1;
- Figure 7 is a perspective view of an inner wrap of the cigarette pack shown in Figures 1-4;
- Figure 8 is a perspective view of a group of cigarettes housed in the inner wrap shown in Figure 5;
- Figure 9 is a rear perspective view of the filling element of the pack shown in Figure 1 and realized in accordance with a first embodiment;

- Figure 10 is a rear perspective view of the filling element of the pack shown in Figure 1 and realized in accordance with a second embodiment;
- Figure 11 is a rear perspective view of the filling element of the pack shown in Figure 1 and realized in accordance with a third embodiment;
- Figure 12 is a rear perspective view of the filling element of the pack shown in Figure 1 and realized in accordance with a fourth embodiment;
- Figure 13 is a rear perspective view of the filling element of the pack shown in Figure 1 and realized in accordance with a fifth embodiment;
- Figure 14 is a plan view of a blank used to form a collar of the pack shown in Figure 1;
- Figure 15 is a plan view of a blank used to form an outer container with a hinged lid of the pack shown in Figure 1;
- Figure 16 is a plan view of a blank used to form the filling element in accordance with a possible alternative embodiment;
- Figure 17 is a plan view of a blank used to form the filling element shown in Figure 9;
- Figure 18 is a plan view of a blank used to form the filling element shown in Figure 10;
- Figure 19 is a plan view of a blank used to form the filling element shown in Figure 11;
- Figure 20 is a plan view of a blank used to form the filling element shown in Figure 12; and
- Figure 21 is a plan view of a blank used to form the filling element shown in Figure 13.

PREFERRED EMBODIMENTS OF THE INVENTION

[0009] In Figures 1-5, the number 1 indicates a rigid cigarette pack as a whole. The cigarette pack 1 comprises a rigid outer container 2 (namely made of cardboard or rigid paperboard), which is cup-shaped, has an open upper end 3 (visible in Figures 3 and 4) and is provided with a lid 4. The lid 4 is cup-shaped and is hinged to the outer container 2 along a hinge 5 (illustrated in Figure 2) so as to rotate, relative to said outer container 2, between an open position (illustrated in Figures 3 and 4) and a closed position (illustrated in Figures 1 and 2).

[0010] The outer container 2 has a substantially rectangular parallelepipedal shape oriented in a predominantly vertical direction of development, is cup-shaped and has the open upper end 3, a lower wall 6 opposite the open upper end 3, a front wall 7 and a rear wall 8 (in which the hinge 5 is arranged) which are parallel to and opposite one another, and two side walls 9 which are parallel to and opposite one another. Four longitudinal corners are defined between the front wall 7, the rear wall 8 and the side walls 9 of the outer container 2, while four transverse corners are defined between the walls 7, 8 and 9 and the lower wall 6 of the outer container 2.

[0011] The lid 4 has a substantially rectangular parallelepipedal shape, is cup-shaped and has an open lower end (facing the open upper end 3 of the outer container 2 when the lid 4 is in the closed position), an upper wall 10 (which is parallel to and opposite the lower wall 6 of the outer container 2 when the lid 4 is in the closed position), a front wall 11 (which is parallel to and aligned with the front wall 7 of the outer container 2 when the lid 4 is in the closed position), a rear wall 12 (which is parallel to and aligned with the rear wall 8 of the outer container 2 when the lid 4 is in the closed position and is hinged to the rear wall 8 of the outer container 2 along the hinge 5) and two side walls 13 parallel to and opposite one another (which are parallel to and aligned with, in particular co-planar with and adjacent to, the side walls 9 of the outer container 2 when the lid 4 is in the closed position). Four longitudinal corners are defined between the front wall 11, the rear wall 12 and the side walls 13 of the lid 4, while four transverse corners are defined between the walls 11, 12 and 13 and the upper wall 10 of the lid 4. The longitudinal corners and the transverse corners of the lid 4 are parallel to and aligned with the corresponding longitudinal and transverse corners of the outer container 2 when the lid 4 is in the closed position.

[0012] As illustrated in Figures 3 and 4, the cigarette pack 1 further comprises a rigid collar 14, which is folded into a "U" shape and attached (by gluing) inside the outer container 2 so as to partially project out of the open upper end 3 of the outer container 2 and engage a corresponding inner surface of the lid 4 when said lid 4 is arranged in the closed position. The collar 14 comprises a front wall 15, which is attached to the front wall 7 of the outer container 2 and is arranged in contact with the front wall 11 of the lid 4 when the lid 4 is in the closed position, and two side walls 16, which are attached to the side walls 9 of the outer container 2 and are arranged in contact with the side walls 13 of the lid 4 when the lid 4 is in the closed position.

[0013] The front wall 15 of the collar 14 is provided with an extraction opening 20 (illustrated in Figures 3 and 4) through which access to the contents of the pack 1 of cigarettes is facilitated.

[0014] According to the embodiment illustrated in the attached Figures 3 and 4, the front wall 15 of the collar 14 is provided with a pair 17 of flaps which protrude laterally so as to engage the side walls 13 of the lid 4 by interference when the latter is in the closed position so as to keep the lid 4 in the closed position.

[0015] According to a different embodiment, not illustrated, the front wall 15 of the collar 14 has no pair of flaps 17.

[0016] As illustrated in Figures 7 and 8, the pack 1 of cigarettes comprises an inner wrap 18 which is arranged (accommodated) in the outer container 2 so as to partially project out of the open upper end 3 and encloses a group 19 of cigarettes. In the embodiment illustrated in the attached figures, the inner wrap 18 is of a traditional type (i.e. not sealed) and has a removable pull-out upper portion which must be removed when the pack 1 of cigarettes is first opened in order to gain access to the cigarettes. According to an alternative embodiment, the inner wrap

18 is of the sealed type and has an extraction opening engaged by a reusable closing label (i.e. provided with a repositionable glue).

[0017] In particular, as illustrated in Figures 3-8, the inner wrap 18 housed in the outer container 2 has a smaller width than a width of the outer container 2 (Figure 5). In other words, the term width indicates a dimension measured transversely relative to the direction of longitudinal extension of the pack 1 of cigarettes and parallel to the side walls 9 of the outer container 2. Consequently, in order to make up for the difference in width between the outer container 2 and the inner wrap 18, a filling element 21 is arranged in said outer container 2. The filling element 21 is completely independent of the collar 14. In other words, the collar 14 and the filling element 21 are not formed from a single element.

[0018] The filling element 21 has a front wall 22, which is arranged in contact with the inner wrap 18, an upper wall 23, which is perpendicular to the front wall 22, and two side walls 24, which are opposite one another, are perpendicular to the front wall 22 and to the upper wall 23 and rest against the side walls 9 of the outer container 2. Figure 6 illustrates the arrangement of the collar 14 relative to the filling element 21. In particular, parts of the filling element 21 which are not in view in the figure are indicated by the dashed line. As illustrated in Figure 6, the side walls 24 of the filling element 21 rest against the side walls 16 of the collar 14 which, in turn, are in contact with the respective side walls 9 of the outer container 2. In particular, the side walls 16 of the collar 14 are glued to the side walls 24 of the filling element 21. Advantageously, the filling element 21 also comprises a rear wall 25 parallel to and opposite the front wall 22 and which has a smaller longitudinal dimension (i.e. the dimension measured parallel to the longitudinal extension of the filling element 21) relative to the front wall 22 of the filling element 21.

[0019] As illustrated in Figures 9 and 11-13, the side walls 24 of the filling element 21 have a greater longitudinal extension relative to the front wall 22. In other words, the side walls 24 continue (i.e. project out) beyond the front wall 22 at the bottom. According to an alternative embodiment, illustrated, for instance, in Figure 10, at least one end portion 26 of the protruding side walls 24 is folded by 90° so that that portion is arranged parallel to the lower wall 6 of the outer container 2. In other words, according to this embodiment, the end portion 26 of each side wall 24 of the filling element 21 is folded substantially by 90° relative to said side wall 24 and is placed in contact with the lower wall 6. According to a possible embodiment, the folded end portion 26 is glued to the lower wall 6 of the outer container 2; alternatively, the folded end portion 26 rests (i.e. without gluing) against the lower wall 6 of the outer container 2.

[0020] As illustrated in the attached figures, the filling element 21 comprises two support members 27, each arranged in contact with the rear wall 8 of the outer container 2 and consisting of a panel 28 and of a panel 29 which are hinged to one another along a (preferably pre-weakened) central folding line 30 defining a, in particular longitudinal, corner 31 of the support member 27. Each panel 28 is hinged at one end to the corresponding panel 29 along the central folding line 30 and hinged at the opposite end to the front wall 22 (in particular along a, preferably pre-weakened, side folding line 32). Each panel 29, on the other hand, is hinged at one end to the corresponding panel 28 along the central folding line 30 and hinged at the opposite end to a corresponding side wall 24 (in particular along a further, preferably pre-weakened, side folding line 32). In other words, the support member 27 is substantially formed in the shape of a "V" and comprises the two panels 28 and 29 which are separated by the central folding line 30 and which are respectively hinged to the front wall 22 or to the corresponding side wall 24 along the respective side folding line 32. In particular, as illustrated in the figures, the folding lines 30 and 32 preferably extend parallel to the direction of longitudinal extension of the filling element 21. According to an alternative embodiment, not illustrated, at least one of the folding lines 30 and/or 32 extends transversely (i.e. at an incline) relative to the direction of longitudinal extension of the filling element 21.

[0021] As illustrated in Figures 15-19, each support member 27 is delimited longitudinally by two cutting lines 33 which are made partly in the front wall 22 of the filling element 21 and partly in the corresponding side wall 24 of the filling element 21. In other words, each support member 27 is delimited along a longitudinal direction, which is substantially parallel to the side walls 9, by the cutting lines 33 which are made partly in the front wall 22 of the filling element 21 and partly in the corresponding side wall 24 of the filling element 21. Further, each support member 27 is delimited transversely by the two side folding lines 32 which are arranged longitudinally, are parallel to the central folding line 30, are arranged on opposite sides of said central folding line 30 and extend between the two cutting lines 33. In other words, each support member 27 is delimited along a transverse direction, which is substantially parallel to the lower wall 6, by the two side folding lines 32 which are arranged longitudinally, are parallel to the central folding line 30, are arranged on opposite sides of said central folding line 30 and extend between the two cutting lines 33.

[0022] According to a possible embodiment, not illustrated, both the cutting line 33A closer to the upper wall 23 of the filling element 21 and the cutting line 33B farther from the upper wall 23 of the filling element 21 are straight.

[0023] According to the possible embodiment illustrated in Figure 15, the cutting line 33A which is closer to the upper wall 23 of the filling element 21 is straight, while the cutting line 33B which is farther from the upper wall 23 of the filling element 21 is a broken line.

[0024] According to a further possible embodiment, illustrated, for instance, in Figures 16-19, both the cutting line 33A closer to the upper wall 23 of the filling element

21 and the cutting line 33B farther from the upper wall 23 of the filling element 21 are broken lines.

[0025] In particular, as illustrated in the attached figures, the support members 27 are separated from one another by at least one partition 34 which is part of the front wall 22 of the filling element 21. In other words, in order to guarantee the required stability and rigidity of the support members 27, at least one partition 34 is arranged between the latter.

[0026] According to the illustration shown in Figures 9, 10 and 13, the support members 27 are respectively separated by a single partition 34. According to the illustration shown in Figures 11 and 12, the support members 27 are respectively separated by two partitions 34 which are aligned longitudinally.

[0027] The partition 34 is delimited laterally by the two side folding lines 32 of the support members 27.

[0028] According to the embodiment illustrated in Figures 9-13, each support member 27 has the panel 28 which forms an acute angle α with the front wall 22 of the filling element 21. In particular, the acute angle α ranges from 30 to 50°. The panel 29, on the other hand, forms an obtuse angle β with the corresponding side wall 24 of the filling element 21. In particular, the obtuse angle β ranges from 95 to 120°.

[0029] As illustrated in Figure 9, each support member 27 forms a quadrilateral, in particular a convex quadrilateral, at the cutting lines 33. In other words, at the cutting lines 33, the transverse end of the panel 28, the transverse end of the panel 29, a portion of the side wall 24 of the filling element 21 and a portion of the front wall 22 of the filling element 21 define the quadrilateral. Due to its shape, the thus delimited convex quadrilateral renders possible the realization of an improved support of the group 19 of cigarettes, as the corner 31 is able to rest against the rear wall 8 of the outer container 2. Moreover, the corner 31 also supports the rear wall 25 of the filling element 21 and is arranged against the same.

[0030] According to the illustration shown in particular in Figures 9-13, at least one support member 27 comprises at least one supporting wing 35, which prolongs the panel 29 beyond the central folding line 30, is arranged in contact with the rear wall 8 of the outer container 2 and is obtained by making, on the panel 28, a cutting line 36, which is "U"-shaped and extends from the central folding line 30. When the supporting wing 35 is in contact with the rear wall 8 of the outer container 2, it bends so as to adopt a co-planar position relative to the rear wall 8. In other words, the thus shaped supporting wing 35 is deformable in a manner such that it adopts a position in contact with or without a connection to the rear wall 8.

[0031] According to a possible embodiment, the supporting wing 35 is arranged in contact, without a connection, to the rear wall 8 of the outer container 2. Alternatively, the supporting wing 35 is attached, preferably glued, to the rear wall 8 of the outer container 2, further increasing the stability of the filling element 21. The supporting wing 35 can have different dimensions and geometries (as, for instance, illustrated in the embodiments shown in Figures 9-13) to increase the contact surface between the supporting wing 35 of each support member 27 and the rear wall 8 so as to increase its deformation and thus its flexion.

[0032] According to a possible embodiment, not illustrated, at least one support member 27 comprises at least one supporting wing 35, which prolongs the panel 28 beyond the central folding line 30, is arranged in contact with the rear wall 8 of the outer container 2 and is obtained by making, on the panel 29, a cutting line 36, which is "U"-shaped and extends from the central folding line 30. In other words, the supporting wing 35 is formed as an extension of the panel 28 or of the panel 29. Accordingly, according to this embodiment, the supporting wing 35 has an opposite orientation relative to the one illustrated in Figures 9-13.

[0033] According to the illustration shown in Figures 9, 10 and 12, each support member 27 has at least one supporting wing 35 of its own and the supporting wings 35 of the two support members 27 are transversely aligned with one another. In other words, the two supporting wings 35 are arranged at the same distance from the upper wall 23. Moreover, in this case, the two supporting wings 35 can overlap one another or not.

[0034] Alternatively, according to the illustration shown in Figure 13, each support member 27 has at least one supporting wing 35 of its own and the supporting wings 35 of the two support members 27 are not transversely aligned with one another. In other words, the two supporting wings 35 are arranged at two different distances from the upper wall 23.

[0035] As indicated in Figures 9, 10 and 12, the support members 27 have an identical number of supporting wings 35. Alternatively, as illustrated in Figures 11 and 13, the support members 27 have a different number of supporting wings 35. In particular, as illustrated in Figure 11, a support member 27 has a single supporting wing 35, while the other support member 27 has no supporting wing 35. In this case, the single supporting wing can extend between the two central folding lines 30 of the two support members 27. Alternatively, as illustrated in Figure 13, one support member 27 has a single supporting wing 35, while the other support member 27 has two supporting wings 35. In other words, one support member 27 has two supporting wings 35 and the other support member 27 has a single supporting wing 35 arranged between the two supporting wings 35 of the other support member 27.

[0036] According to the embodiment illustrated in Figures 11 and 12, the supporting wing 35 of one support member 27 extends up to the other support member 27. According to the embodiment illustrated in Figures 9-12, the front wall 22 of the filling element 21 has a straight lower edge 37.

[0037] Alternatively, as illustrated in Figure 13, the front wall 22 of the filling element 21 has a lower edge 37

formed in the shape of a circumferential arc.

[0038] As illustrated in Figure 15, the outer container 2 and the lid 4 are formed by folding a rigid blank 38 of a conventional type provided with a plurality of (pre-weakened) folding lines 39 and 40. The blank 38 comprises two (pre-weakened) longitudinal folding lines 39 and a plurality of (pre-weakened) transverse folding lines 40 which define, between the two longitudinal folding lines 39, a panel 7' which constitutes the front wall 7 of the outer container 2, a panel 6' which constitutes the lower wall 6 of the outer container 2, a panel 8' which constitutes the rear wall 8 of the outer container 2, a panel 12' which constitutes the rear wall 12 of the lid 4, a panel 10' which constitutes the upper wall 10 of the lid 4, a panel 11' which constitutes the front wall 11 of the lid 4, and a reinforcement flap 11". The reinforcement flap 11" is attached to the front wall 11 of the lid 4 along a transverse folding line 40, is folded by 180° (into the cigarette pack 1) relative to the front wall 11 of the lid 4 (i.e. relative to the panel 11') and is placed and glued against an inner surface of the front wall 11 of the lid 4 (i.e. against the panel 11'). The blank 38 comprises a pair of wings 9', which are arranged on opposite sides of the panel 7', are attached to the panel 7' along the two longitudinal folding lines 39 and constitute a part of the side walls 9 of the outer container 2. The blank 38 comprises a pair of wings 9", which are arranged on opposite sides of the panel 8', are attached to the panel 8' along the two longitudinal folding lines 39, constitute a part of the side walls 9 of the outer container 2 and are placed in an overlapping arrangement and glued to the corresponding wings 9' so as to constitute the side walls 9 of the outer container 2.

[0039] The blank 38 comprises a pair of wings 13', which are arranged on opposite sides of the panel 11', are attached to the panel 11' along the two longitudinal folding lines 39 and constitute a part of the side walls 13 of the lid 4. The blank 38 comprises a pair of wings 13", which are arranged on opposite sides of the panel 12', are attached to the panel 12' along the two longitudinal folding lines 39, constitute a part of the side walls 13 of the lid 4 and are placed in an overlapping arrangement and glued to the corresponding wings 13' so as to constitute the side walls 13 of the lid 4.

[0040] The blank 38 comprises two tabs 41, which are attached to the wings 9" along a transverse folding line 40, folded by 90° and placed against an inner surface of the panel 6'.

[0041] The blank 38 comprises two tabs 42, which are attached to the wings 13" along a transverse folding line 40, folded by 90° and placed against an inner surface of the panel 10'.

[0042] According to the illustration shown in Figure 14, the collar 14 is formed by folding a rigid blank 43 of a conventional type provided with two (pre-weakened) longitudinal folding lines 44. The blank 43 comprises a panel 15', which constitutes the front wall 15 of the collar 14, and two panels 16', which respectively constitute the side walls 16 of the collar 14 and which are adjacent to the panel 15'. The panel 15' and the adjacent panels 16' are separated by the longitudinal folding lines 44.

[0043] According to the illustration shown in Figures 16-21, the filling element 21 is formed by folding a rigid blank 45 provided with a plurality of (pre-weakened) folding lines 46 and 47 defining a substantially hollow internal volume 48. The blank 45 comprises two (pre-weakened) longitudinal folding lines 46 and a plurality of (pre-weakened) transverse folding lines 47 which define, between the two longitudinal folding lines 46, a panel 22' which constitutes the front wall 22 of the filling element 21, a panel 23' which constitutes the upper wall 23 of the filling element 21, and a panel 25' which constitutes the rear wall 25 of the filling element 21. The blank 45 also comprises two panels 24', which respectively constitute the side wall 24 of the filling element 21 and are arranged on opposite sides of the panels 22' and 23'. The blank 45 comprises two tabs 49, which are attached to the respective panel 24' along a transverse folding line 47, folded by 90° and placed against an inner surface of the panel 23'.

[0044] The blank 45 further comprises the panels 28 and 29, which constitute the support member 27. The panels 28 and 29 are separated from one another by the respective central folding lines 30. The panels 28 and 29 are further separated from the panels 22' or 24' by means of the respective side folding lines 32. Moreover, the supporting wings 35 are separated from the panel 28 by the cutting line 36, which exhibits a substantially "C" shape, so that they project out of the support member 27.

[0045] The blank 45 illustrated in Figure 18 further comprises the two panels 26', which constitute the end portion 26 of the side walls 24, which are adjacent to the respective panels 24', are separated from the same by a (pre-weakened) transverse folding line 47 and which are folded by 90° relative to the side wall 24. Advantageously, the end portion 26 is folded into the filling elements 21 which have support members 27 that are larger in size.

[0046] In the embodiments illustrated in the attached figures, the longitudinal and transverse corners are straight; alternatively, the longitudinal and/or transverse corners may be rounded or bevelled.

[0047] Moreover, in the embodiments illustrated in the attached figures, the cigarette pack 1 is of the type with a hinged lid 4 and, consequently, the filling element 21 is positioned between the rear wall 8 of the outer container 2 and the inner wrap 18. According to alternative embodiments, the cigarette pack 1 is of a different type, for instance comprising a sliding opening. In packs of a different type, the filling element 21 may be placed between the front wall 7 of the outer container 2 and the inner wrap 18.

[0048] The cigarette pack 1 described in the foregoing has numerous advantages.

[0049] First of all, the cigarette pack 1 exhibits greater stability inasmuch as said filling element 21 is stabler and renders possible an improved support of the inner wrap

18. In particular, the support members 27 increase the rigidity and thus the stability of the filling element 21, facilitating a support for the inner wrap 18 along the entire front wall 22 of the filling element 21 and avoiding, consequently, the undesired flexion of the front wall 22 of the filling element 21.

[0050] The internal volume 48 is substantially closed off from the outside (i.e. the inside of the filling element is not visible when the lid 4 is in the open position - Figure 3 - and the group 19 of cigarettes is inserted in the outer container 2), inasmuch as the rear wall 25 rests against the rear wall 8 of the outer container 2, thus preventing the upper wall 23 from rising, and consequently prevents access to the internal volume 48.

[0051] Moreover, the filling element 21 is more reliable compared with filling elements 21 of known types, as it can be glued to the inside of the outer container 2, thus preventing the filling element 21 from slipping out of the outer container 2.

[0052] The blank 45 allows a realization of the filling element 21 without the production of any scrap material. Indeed, the panel 25', which constitutes the rear wall 25 of the filling element 21, has a shape that is complementary to the shape of the lower edge 37 of the front wall 2 and of the lower end of the side walls 24.

[0053] Finally, the cigarette pack 1 described above can be produced in a packaging machine not too dissimilar from a standard packaging machine for rigid cigarette packs with a hinged lid; consequently, the costs involved in setting up a packaging machine for producing the cigarette pack 1 described above are not particularly high.

Claims

1. A pack (1) for smoking articles comprising:

a group (19) of smoking articles;
an inner wrap (18), which wraps the group (19) of smoking articles;
a rigid outer container (2), which is cup-shaped, houses the inner wrap (18), has larger width than a width of the inner wrap (2) and has: an open upper end (3), a lower wall (6) opposite the open upper end (3), a front wall (7) and a rear wall (8) opposite one another, and two side walls (9) opposite one another; and
a filling element (21), which is inserted in the outer container (2) to make up for a width difference between the outer container (2) and the inner wrap (18) and has a front wall (22), which is arranged in contact with the inner wrap (18), an upper wall (23), which is perpendicular to the front wall (22), and two side walls (24), which are opposite one another, are perpendicular to the front wall (22) and to the upper wall (23) and rest against the side walls (9) of the outer container (2); wherein the filling element (21) comprises two support members (27), each arranged in contact with the rear wall (8) of the outer container (2);
the pack (1) being **characterized in that:**

each support member (27) consists of a first panel (28) and of a second panel (29), which are hinged to one another along a central folding line (30) defining a corner (31) of the support member (27);
each first panel (28) is hinged, at one end, to the corresponding second panel (29) along the central folding line (30) and is hinged, at the opposite end, to the front wall (22); and
each second panel (29) is hinged, at one end, to the corresponding first panel (28) along the central folding line (30) and is hinged, at the opposite end, to a corresponding side wall (24).

2. A pack (1) according to claim 1, wherein, in each support member (27):

the first panel (28) forms, with the front wall (22) of the filling element (21), a first acute angle (α), in particular ranging from 30 to 50°; and
the second panel (29) forms, with the corresponding side wall (24) of the filling element (21), a second obtuse angle (β), in particular ranging from 95 to 120°.

3. A pack (1) according to claim 2, wherein:

each support member (27) is delimited, along a longitudinal direction, which is substantially parallel to the side walls (9), by two cutting lines (33, 33A, 33B), which are partly made in the front wall (22) of the filling element (21) and partly made in the corresponding side wall (24) of the filling element (21); and
each support member (27) is delimited, along a transverse direction, which is substantially parallel to the lower wall (6), by two side folding lines (32), which are arranged longitudinally, are parallel to the central folding line (30), are arranged on opposite sides of the central folding line (30) and extend between the two cutting lines (33).

4. A pack (1) according to claim 3, wherein a first cutting line (33, 33A) closer to the upper wall (23) of the filling element (21) is straight and a second cutting line (33, 33B) farther from the upper wall (23) of the filling element (21) is a broken line; or both the first cutting line (33, 33A) closer to the upper wall (23) of the filling element (21) and the second cutting line (33, 33B) farther from the upper wall (23) of the filling

element (21) are broken lines.

5. A pack (1) according to any one of the claims from 1 to 4, wherein the support members (27) are separated from one another by a partition (34), which is part of the front wall (22) of the filling element (21).

6. A pack (1) according to any one of the claims from 1 to 5, wherein at least one support member (27) comprises at least one supporting wing (35), which prolongs the second panel (29) beyond the central folding line (30), is arranged in contact with the rear wall (8) of the outer container (2) and is obtained by making, on the first panel (28), a cutting line (36), which is "U"-shaped and extends from the central folding line (30).

7. A pack (1) according to any one of the claims from 1 to 5, wherein at least one support member (27) comprises at least one supporting wing (35), which prolongs the first panel (28) beyond the central folding line (30), is arranged in contact with the rear wall (8) of the outer container (2) and is obtained by making, on the second panel (29), a cutting line (36), which is "U"-shaped and extends from the central folding line (30).

8. A pack (1) according to claim 6 or 7, wherein the supporting wing (35) is glued to the rear wall (8) of the outer container (2).

9. A pack (1) according to claim 6, 7 or 8, wherein:

each support member (27) has at least one supporting wing (35) of its own; and
the supporting wings (35) of the two support members (27) are transversally aligned with one another.

10. A pack (1) according to claim 9, wherein the supporting wings (35) of the support members (27) overlap one another.

11. A pack (1) according to claim 6, 7 or 8, wherein: each support member (27) has at least one supporting wing (35) of its own; and the supporting wings (35) of the two support members (27) are transversally not aligned with one another.

12. A pack (1) according to one of the claims from 6 to 11, wherein the support members (27) have a different number of supporting wings (35).

13. A pack (1) according to claim 12, wherein a support member (27) has two supporting wings (35) and the other support member (27) has one single supporting wing (35) arranged between the two supporting wings (35) of the other support member (27).

14. A pack (1) according to one of the claims from 6 to 13, wherein the supporting wing (35) of a support member (27) extends up to the other support member (27).

15. A pack (1) according to any one of the claims from 1 to 14 and comprising: a lid (4), which is cup-shaped, is hinged to the outer container (2) along a hinge (5) so as to rotate, relative to the outer container (2), between an open position and a closed position and has: an open lower end, an upper wall (10), a front wall (11) and a rear wall (12) opposite one another, and two side walls (13) opposite one another; and
a collar (14), which is completely independent of the filling element (21), is folded in a "U" shape, is inserted in the outer container (2) so as to partially project out of the open upper end (3) and has: a front wall (15) and two side walls (16) opposite one another; wherein each side wall (16) rests against, in particular is glued to, the corresponding side wall (24) of the filling element (21).

Patentansprüche

1. Verpackung (1) für Rauchartikel, die umfassend:

eine Gruppe (19) Rauchartikel;
eine Innenhülle (18), die die Gruppe (19) Rauchartikel umhüllt;
einen starren Außenbehälter (2), der becherförmig ist, die Innenhülle (18) aufnimmt, eine größere Breite als eine Breite der Innenhülle (2) aufweist und aufweist: ein offenes oberes Ende (3), eine untere Wand (6) gegenüber dem offenen oberen Ende (3), eine vordere Wand (7) und eine Rückwand (8), die einander gegenüberliegen, und zwei Seitenwände (9), die einander gegenüberliegen; und
ein Füllelement (21), das in den Außenbehälter (2) eingesetzt ist, um einen Breitenunterschied zwischen dem Außenbehälter (2) und der Innenhülle (18) auszugleichen, und das eine vordere Wand (22), die in Kontakt mit der Innenhülle (18) angeordnet ist, eine obere Wand (23), die senkrecht zur vorderen Wand (22) verläuft, und zwei Seitenwände (24), die einander gegenüberliegen, senkrecht zur vorderen Wand (22) und zur oberen Wand (23) verlaufen und an den Seitenwänden (9) des Außenbehälters (2) anliegen, aufweist;
wobei das Füllelement (21) zwei Tragelemente (27) umfasst, die jeweils in Kontakt mit der Rückwand (8) des Außenbehälters (2) angeordnet sind;
wobei die Verpackung (1) **dadurch gekennzeichnet ist, dass**:

jedes Tragelement (27) aus einer ersten Platte (28) und einer zweiten Platte (29) besteht, die längs einer zentralen Faltlinie (30) aneinander angelenkt sind, die eine Ecke (31) des Tragelements (27) definiert;
jede erste Platte (28) an einem Ende längs der zentralen Faltlinie (30) an der entsprechenden zweiten Platte (29) angelenkt ist und am gegenüberliegenden Ende an der vorderen Wand (22) angelenkt ist; und
jede zweite Platte (29) an einem Ende längs der zentralen Faltlinie (30) an der entsprechenden ersten Platte (28) angelenkt ist und am gegenüberliegenden Ende an einer entsprechenden Seitenwand (24) angelenkt ist.

2. Verpackung (1) nach Anspruch 1, wobei in jedem Tragelement (27):

die erste Platte (28) mit der vorderen Wand (22) des Füllelements (21) einen ersten spitzen Winkel (α) bildet, der insbesondere im Bereich von 30° bis 50° liegt; und
die zweite Platte (29) mit der entsprechenden Seitenwand (24) des Füllelements (21) einen zweiten stumpfen Winkel (β) bildet, der insbesondere im Bereich von 95° bis 120° liegt.

3. Verpackung (1) nach Anspruch 2, wobei

jedes Tragelement (27) längs einer Längsrichtung, die im Wesentlichen parallel zu den Seitenwänden (9) verläuft, durch zwei Schneidlinien (33, 33A, 33B) begrenzt ist, die teilweise in der vorderen Wand (22) des Füllelements (21) ausgebildet sind und teilweise in der entsprechenden Seitenwand (24) des Füllelements (21) ausgebildet sind; und
jedes Tragelement (27) längs einer Querrichtung, die im Wesentlichen parallel zur unteren Wand (6) verläuft, durch zwei seitliche Faltlinien (32) begrenzt ist, die in Längsrichtung angeordnet sind, parallel zur zentralen Faltlinie (30) verlaufen, an gegenüberliegenden Seiten der zentralen Faltlinie (30) angeordnet sind und sich zwischen den zwei Schneidlinien (33) erstrecken.

4. Verpackung (1) nach Anspruch 3, wobei eine erste Schneidlinie (33, 33A) näher an der oberen Wand (23) des Füllelements (21) gerade ist und eine zweite Schneidlinie (33, 33B) weiter weg von der oberen Wand (23) des Füllelements (21) eine unterbrochene Linie ist; oder wobei die erste Schneidlinie (33, 33A) näher an der oberen Wand (23) des Füllelements (21) und die zweite Schneidlinie (33, 33B) weiter weg von der oberen Wand (23) des Füllelements (21) unterbrochene Linien sind.

5. Verpackung (1) nach einem der Ansprüche 1 bis 4, wobei die Tragelemente (27) durch eine Unterteilung (34) voneinander getrennt sind, die Teil der vorderen Wand (22) des Füllelements (21) ist.

6. Verpackung (1) nach einem der Ansprüche 1 bis 5, wobei wenigstens ein Tragelement (27) wenigstens einen Tragflügel (35) umfasst, der die zweite Platte (29) über die zentrale Faltlinie (30) hinaus verlängert, in Kontakt mit der Rückwand (8) des Außenbehälters (2) angeordnet ist und erhalten wird, indem an der ersten Platte (28) eine Schneidlinie (36) ausgebildet wird, die "U"-förmig ist und sich von der zentralen Faltlinie (30) erstreckt.

7. Verpackung (1) nach einem der Ansprüche 1 bis 5, wobei wenigstens ein Tragelement (27) wenigstens einen Tragflügel (35) umfasst, der die erste Platte (28) über die zentrale Faltlinie (30) hinaus verlängert, in Kontakt mit der Rückwand (8) des Außenbehälters (2) angeordnet ist und erhalten wird, indem an der zweiten Platte (29) eine Schneidlinie (36) ausgebildet wird, die "U"-förmig ist und sich von der zentralen Faltlinie (30) erstreckt.

8. Verpackung (1) nach Anspruch 6 oder 7, wobei der Tragflügel (35) an die Rückwand (8) des Außenbehälters (2) geklebt ist.

9. Verpackung (1) nach Anspruch 6, 7 oder 8, wobei:

jedes Tragelement (27) wenigstens einen eigenen Tragflügel (35) aufweist; und
die Tragflügel (35) der zwei Tragelemente (27) transversal aufeinander ausgerichtet sind.

10. Verpackung (1) nach Anspruch 9, wobei die Tragflügel (35) der Tragelemente (27) einander überlappen.

11. Verpackung (1) nach Anspruch 6, 7 oder 8, wobei:

jedes Tragelement (27) wenigstens einen eigenen Tragflügel (35) aufweist; und
die Tragflügel (35) der zwei Tragelemente (27) transversal nicht aufeinander ausgerichtet sind.

12. Verpackung (1) nach einem der Ansprüche 6 bis 11, wobei die Tragelemente (27) eine unterschiedliche Anzahl an Tragflügeln (35) aufweisen.

13. Verpackung (1) nach Anspruch 12, wobei ein Tragelement (27) zwei Tragflügel (35) aufweist und das andere Tragelement (27) einen einzigen Tragflügel (35) aufweist, der zwischen den zwei Tragflügeln (35) des anderen Tragelements (27) angeordnet ist.

14. Verpackung (1) nach einem der Ansprüche 6 bis 13, wobei sich der Tragflügel (35) eines Tragelements (27) bis zum anderen Tragelement (27) erstreckt.

15. Verpackung (1) nach einem der Ansprüche 1 bis 14 und umfassend: einen Deckel (4), der becherförmig ist, am Außenbehälter (2) längs eines Gelenks (5) angelenkt ist, um sich relativ zum Außenbehälter (2) zwischen einer offenen Position und einer geschlossenen Position zu drehen, und ein offenes oberes Ende, eine obere Wand (10), eine vordere Wand (11) und eine Rückwand (12), die einander gegenüberliegen, und zwei Seitenwände (13), die einander gegenüberliegen, aufweist; und
eine Manschette (14), die völlig unabhängig vom Füllelement (21) ist, zu einer "U"-Form gefaltet ist, so in den Außenbehälter (2) eingesetzt ist, dass sie aus dem offenen oberen Ende (3) teilweise nach außen vorsteht, und eine vordere Wand (15) und zwei Seitenwände (16), die einander gegenüberliegen, aufweist; wobei jede Seitenwand (16) an der entsprechenden Seitenwand (24) des Füllelements (21) anliegt, insbesondere an dieser festgeklebt ist.

Revendications

1. Paquet (1) pour des articles à fumer comprenant :

un groupe (19) d'articles à fumer ;
une enveloppe intérieure (18), qui enveloppe le groupe (19) d'articles à fumer ;
un contenant extérieur (2) rigide, qui est cupuliforme, abrite l'enveloppe intérieure (18), a une plus grande largeur qu'une largeur de l'enveloppe intérieure (2) et a : une extrémité supérieure ouverte (3), une paroi inférieure (6) opposée à l'extrémité supérieure ouverte (3), une paroi avant (7) et une paroi arrière (8) opposées l'une à l'autre, et deux parois latérales (9) opposées l'une à l'autre ; et
un élément de remplissage (21), qui est inséré dans le contenant extérieur (2) pour compenser une différence de largeur entre le contenant extérieur (2) et l'enveloppe intérieure (18) et a une paroi avant (22), qui est agencée en contact avec l'enveloppe intérieure (18), une paroi supérieure (23), qui est perpendiculaire à la paroi avant (22), et deux parois latérales (24), qui sont opposées l'une à l'autre, sont perpendiculaires à la paroi avant (22) et à la paroi supérieure (23) et reposent sur les parois latérales (9) du contenant extérieur (2) ;
dans lequel l'élément de remplissage (21) comprend deux pièces de support (27), chacune agencée en contact avec la paroi arrière (8) du contenant extérieur (2) ;
le paquet (1) étant **caractérisé en ce que** :
chaque pièce de support (27) consiste en un premier panneau (28) et en un second panneau (29), qui sont articulés l'un sur l'autre le long d'une ligne de pliage centrale (30) définissant un coin (31) de la pièce de support (27) ;
chaque premier panneau (28) est articulé, à une extrémité, sur le second panneau (29) correspondant le long de la ligne de pliage centrale (30) et est articulé, à l'extrémité opposée, sur la paroi avant (22) ; et
chaque second panneau (29) est articulé, à une extrémité, sur le premier panneau (28) correspondant le long de la ligne de pliage centrale (30) et est articulé, à l'extrémité opposée, sur une paroi latérale (24) correspondante.

2. Paquet (1) selon la revendication 1, dans lequel, dans chaque pièce de support (27) :

le premier panneau (28) forme, avec la paroi avant (22) de l'élément de remplissage (21), un premier angle aigu (α), en particulier allant de 30 à 50° ; et
le second panneau (29) forme, avec la paroi latérale (24) correspondante de l'élément de remplissage (21), un second angle obtus (β), en particulier allant de 95 à 120°.

3. Paquet (1) selon la revendication 2, dans lequel :

chaque pièce de support (27) est délimitée, le long d'une direction longitudinale, qui est sensiblement parallèle aux parois latérales (9), par deux lignes de découpe (33, 33A, 33B), qui sont en partie réalisées dans la paroi avant (22) de l'élément de remplissage (21) et en partie réalisées dans la paroi latérale (24) correspondante de l'élément de remplissage (21) ; et
chaque pièce de support (27) est délimitée, le long d'une direction transversale, qui est sensiblement parallèle à la paroi inférieure (6), par deux lignes de pliage latérales (32), qui sont agencées de manière longitudinale, sont parallèles à la ligne de pliage centrale (30), sont agencées sur des côtés opposés de la ligne de pliage centrale (30) et s'étendent entre les deux lignes de découpe (33).

4. Paquet (1) selon la revendication 3, dans lequel une première ligne de découpe (33, 33A) plus proche de la paroi supérieure (23) de l'élément de remplissage (21) est droite et une seconde ligne de découpe (33, 33B) plus éloignée de la paroi supérieure (23) de l'élément de remplissage (21) est une ligne discontinue ; ou à la fois la première ligne de découpe (33, 33A) plus proche de la paroi supérieure (23)

de l'élément de remplissage (21) et la seconde ligne de découpe (33, 33B) plus éloignée de la paroi supérieure (23) de l'élément de remplissage (21) sont des lignes discontinues.

5. Paquet (1) selon l'une quelconque des revendications 1 à 4, dans lequel les pièces de support (27) sont séparées l'une de l'autre par une cloison (34), qui fait partie de la paroi avant (22) de l'élément de remplissage (21).

6. Paquet (1) selon l'une quelconque des revendications 1 à 5, dans lequel au moins une pièce de support (27) comprend au moins une ailette de support (35), qui prolonge le second panneau (29) au-delà de la ligne de pliage centrale (30), est agencée en contact avec la paroi arrière (8) du contenant extérieur (2) et est obtenue en réalisant, sur le premier panneau (28), une ligne de découpe (36), qui est en forme de « U » et s'étend à partir de la ligne de pliage centrale (30).

7. Paquet (1) selon l'une quelconque des revendications 1 à 5, dans lequel au moins une pièce de support (27) comprend au moins une ailette de support (35), qui prolonge le premier panneau (28) au-delà de la ligne de pliage centrale (30), est agencée en contact avec la paroi arrière (8) du contenant extérieur (2) et est obtenue en réalisant, sur le second panneau (29), une ligne de découpe (36), qui est en forme de « U » et s'étend à partir de la ligne de pliage centrale (30).

8. Paquet (1) selon la revendication 6 ou 7, dans lequel l'ailette de support (35) est collée à la paroi arrière (8) du contenant extérieur (2).

9. Paquet (1) selon la revendication 6, 7 ou 8, dans lequel :

chaque pièce de support (27) a au moins une ailette de support (35) qui lui est propre ; et
les ailettes de support (35) des deux pièces de support (27) sont transversalement alignées l'une sur l'autre.

10. Paquet (1) selon la revendication 9, dans lequel les ailettes de support (35) des pièces de support (27) se chevauchent l'une l'autre.

11. Paquet (1) selon la revendication 6, 7 ou 8, dans lequel :

chaque pièce de support (27) a au moins une ailette de support (35) qui lui est propre ; et
les ailettes de support (35) des deux pièces de support (27) sont transversalement non alignées l'une sur l'autre.

12. Paquet (1) selon l'une des revendications 6 à 11, dans lequel les pièces de support (27) ont un nombre différent d'ailettes de support (35).

13. Paquet (1) selon la revendication 12, dans lequel une pièce de support (27) a deux ailettes de support (35) et l'autre pièce de support (27) a une seule ailette de support (35) agencée entre les deux ailettes de support (35) de l'autre pièce de support (27).

14. Paquet (1) selon l'une des revendications 6 à 13, dans lequel l'ailette de support (35) d'une pièce de support (27) s'étend jusqu'à l'autre pièce de support (27) .

15. Paquet (1) selon l'une quelconque des revendications 1 à 14 et comprenant : un couvercle (4), qui est cupuliforme, est articulé sur le contenant extérieur (2) le long d'une articulation (5) de façon à tourner, par rapport au contenant extérieur (2), entre une position ouverte et une position fermée et a : une extrémité inférieure ouverte, une paroi supérieure (10), une paroi avant (11) et une paroi arrière (12) opposées l'une à l'autre, et deux parois latérales (13) opposées l'une à l'autre ; et
une collerette (14), qui est complètement indépendante de l'élément de remplissage (21), est pliée en une forme de « U », est insérée dans le contenant extérieur (2) de façon à faire saillie partiellement hors de l'extrémité supérieure ouverte (3) et a : une paroi avant (15) et deux parois latérales (16) opposées l'une à l'autre ; dans lequel chaque paroi latérale (16) repose sur, en particulier est collée à, la paroi latérale (24) correspondante de l'élément de remplissage (21) .

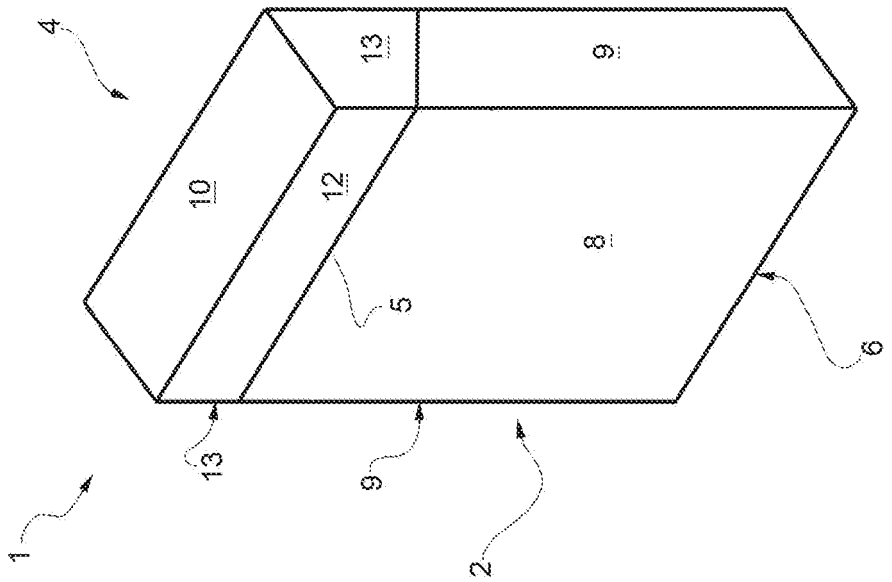


FIG. 2

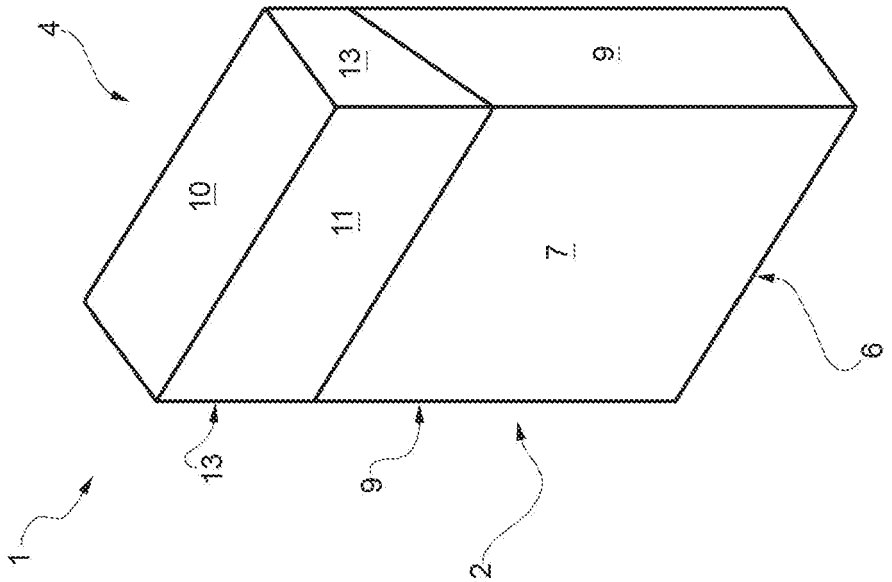
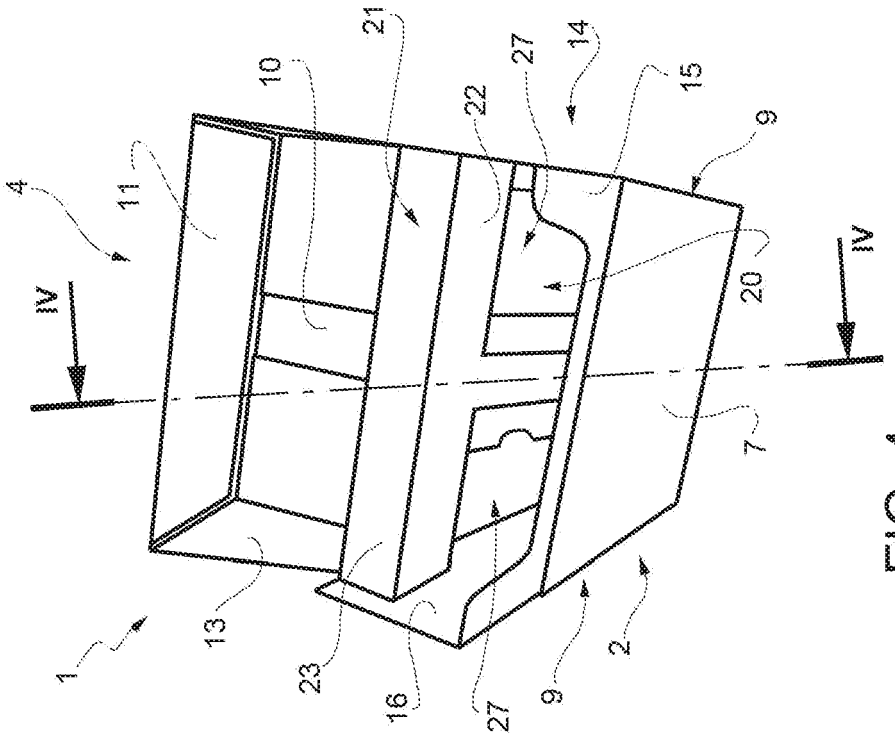


FIG. 1


IV
IV
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27

FIG. 4

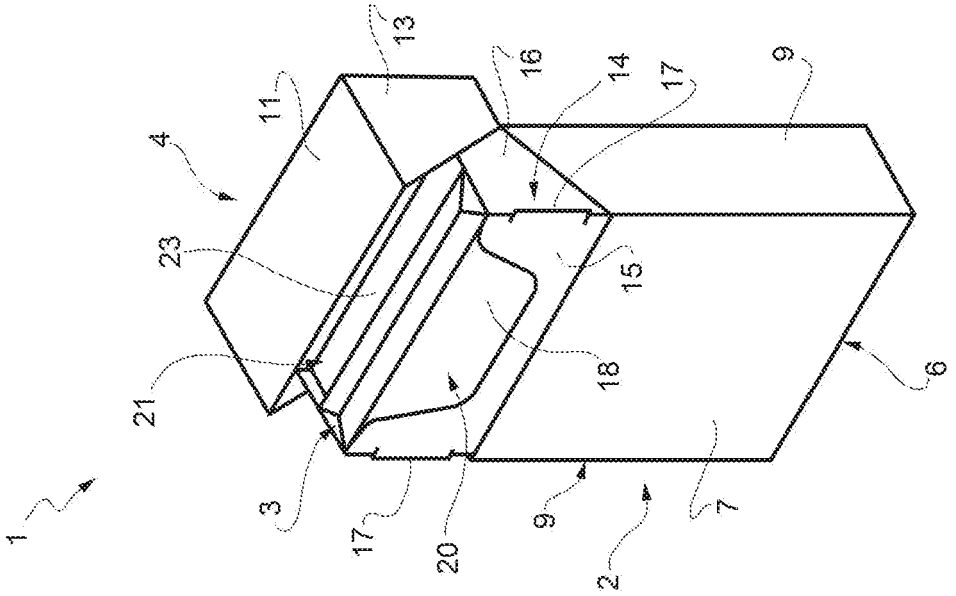
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FIG. 3

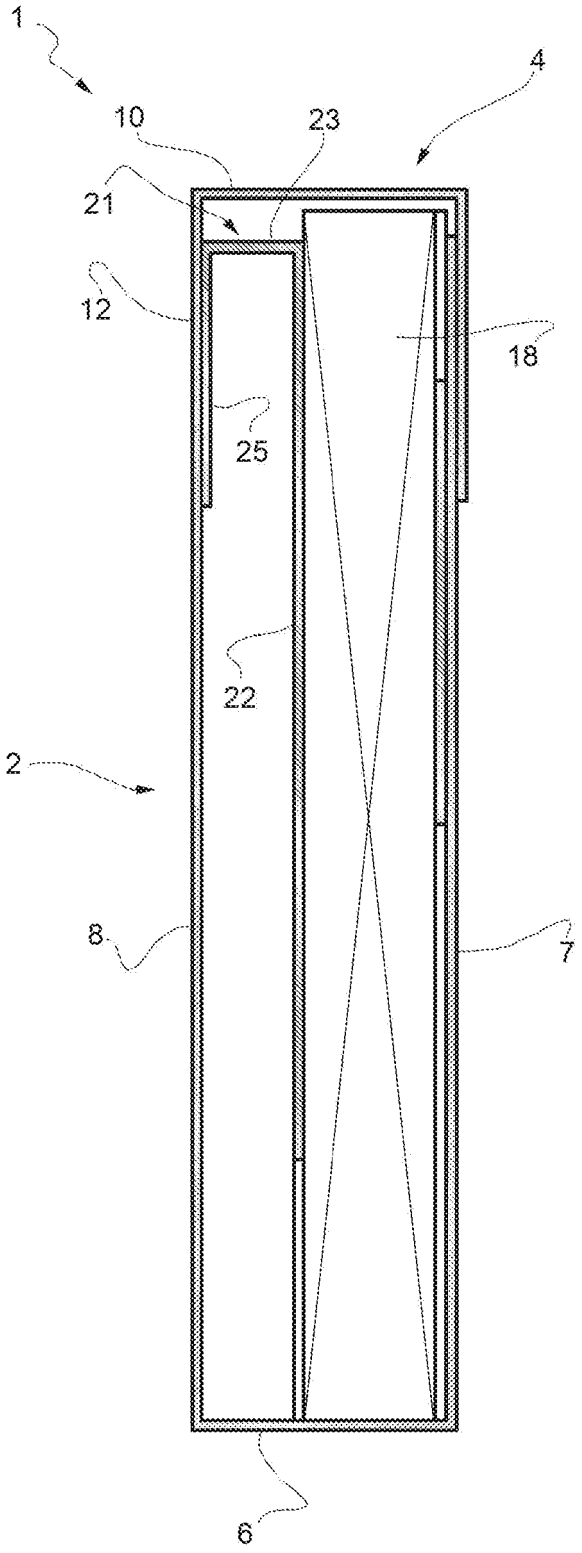


FIG. 5

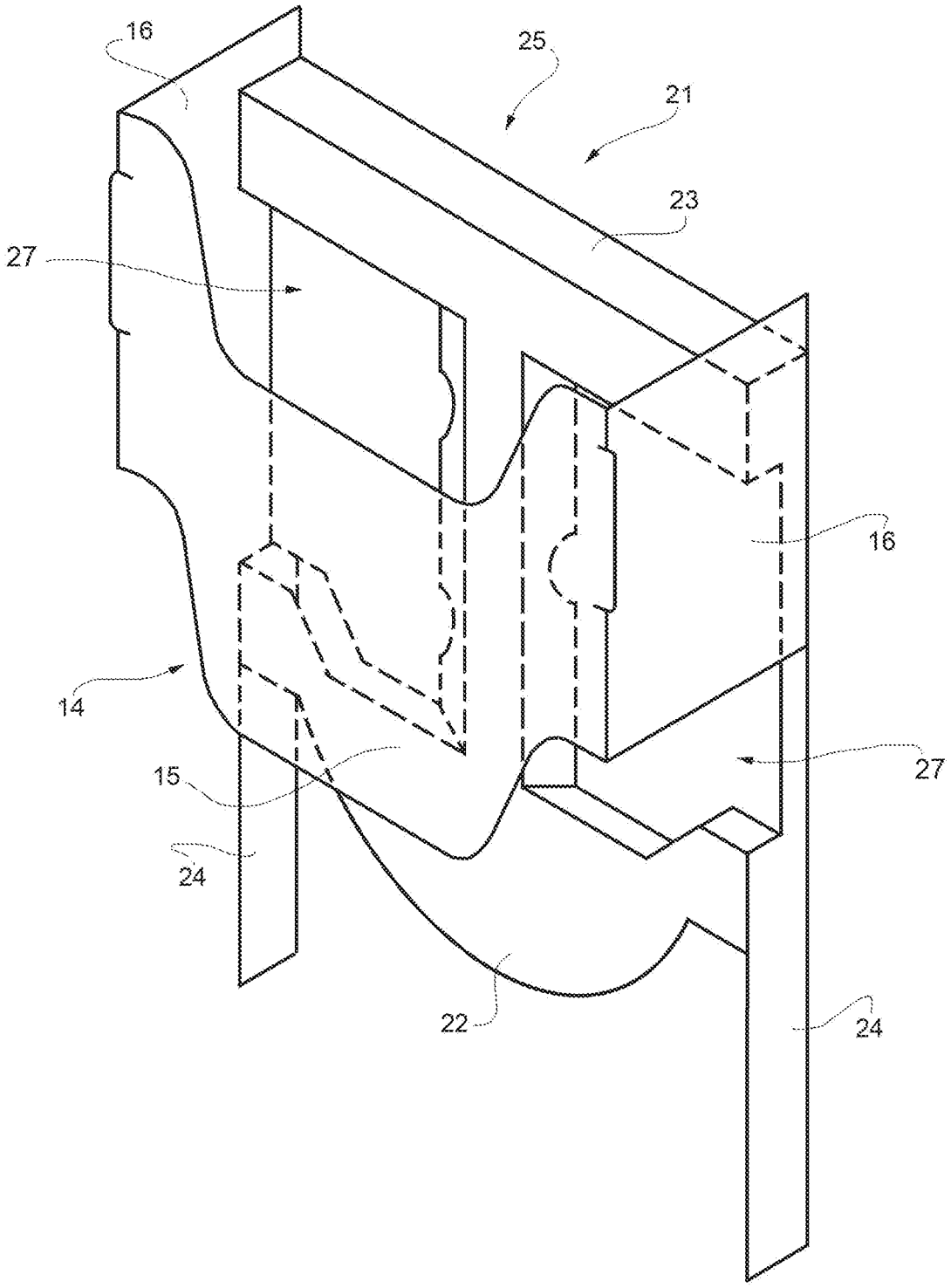


FIG. 6

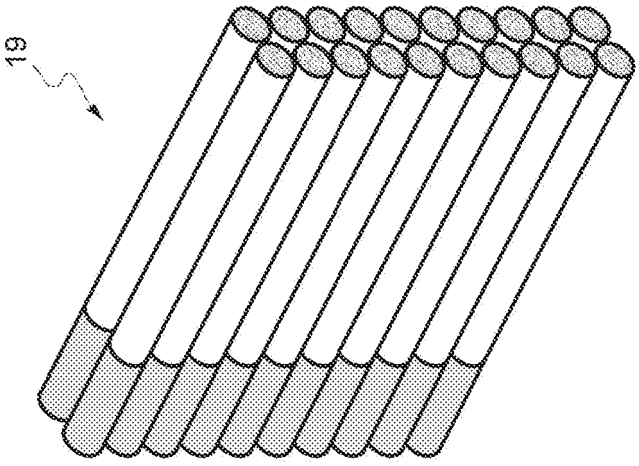


FIG. 8

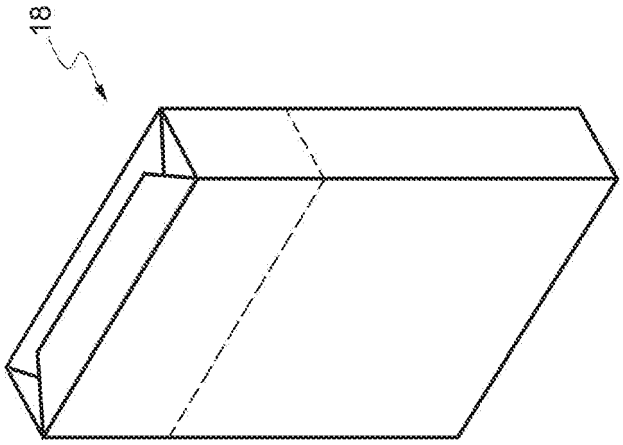
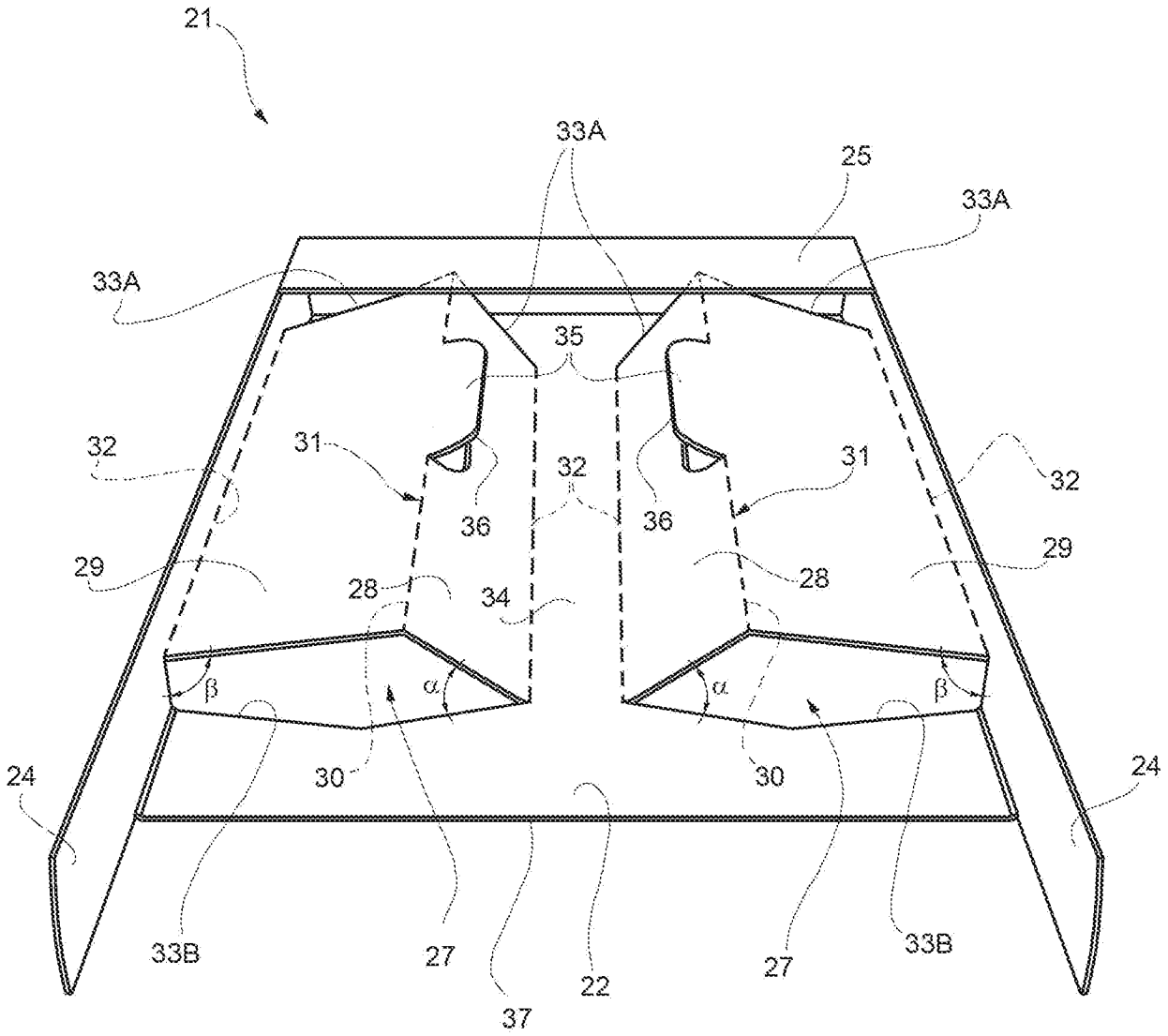


FIG. 7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36
31
32
29
28
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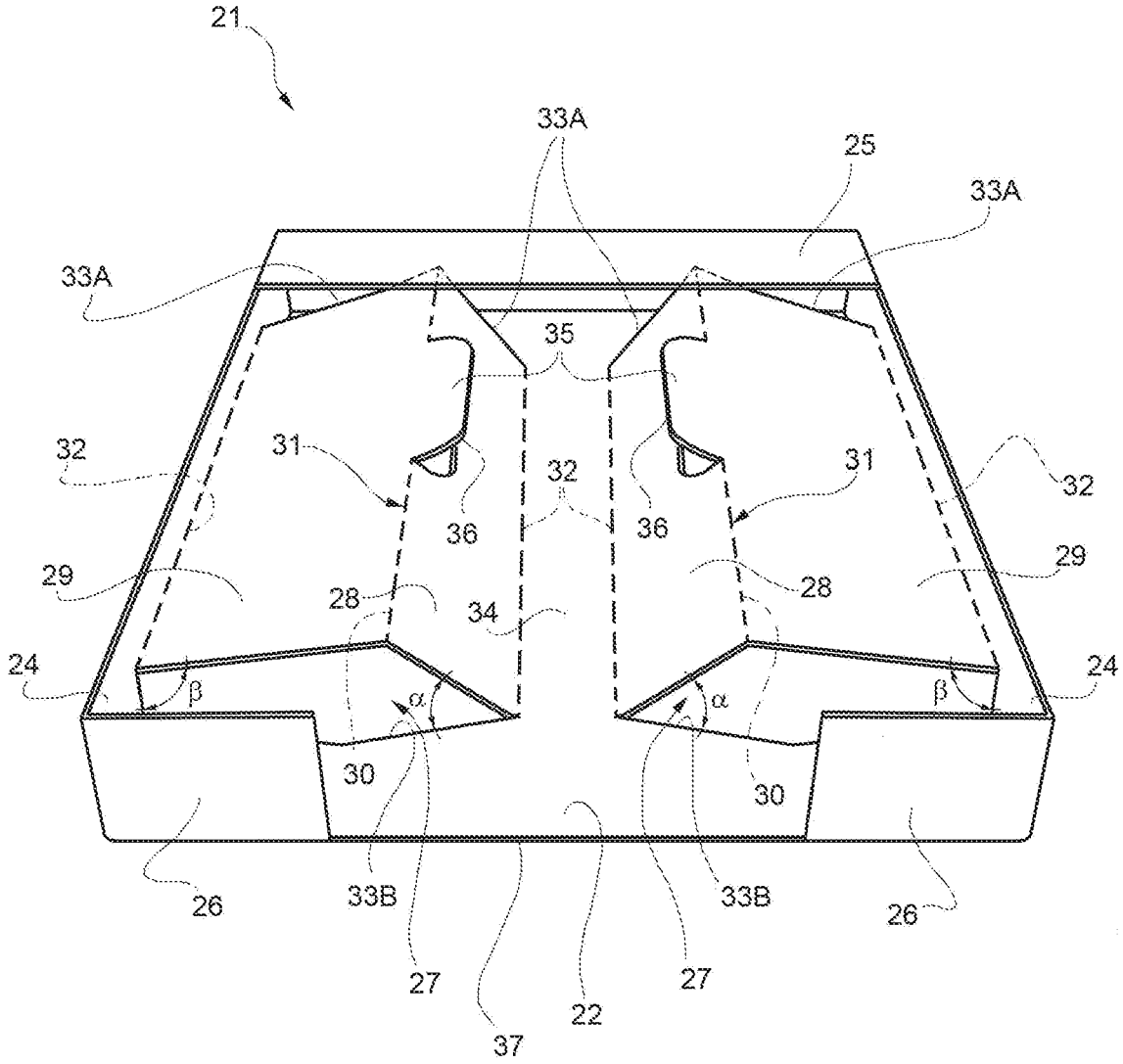
β
α
α
β
30
30
24
24
33B
27
22
27
33B
37

FIG. 9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31
32
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34
28
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α
α
β
24
30
30
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33B
33B
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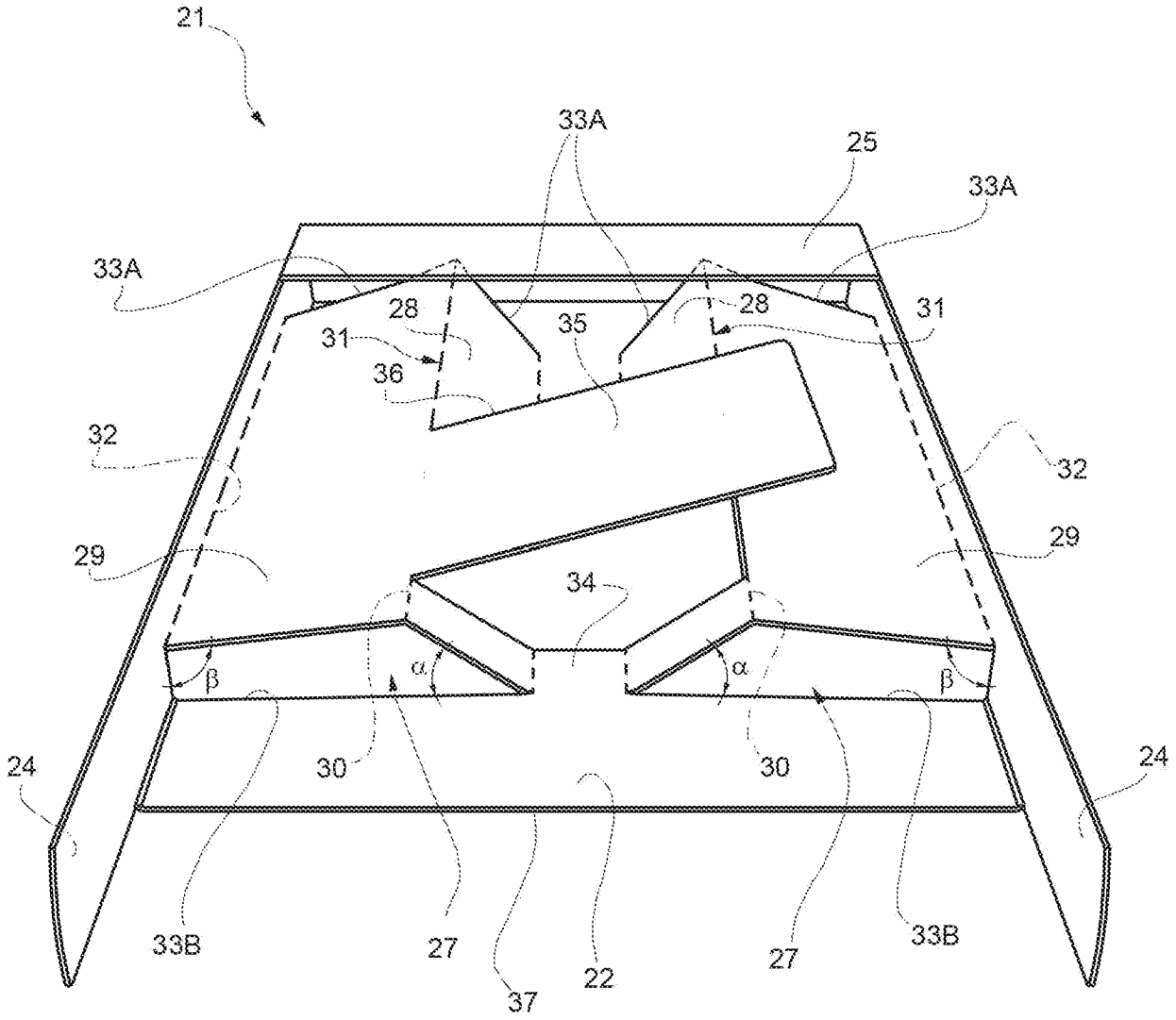
37

FIG. 10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33A
28
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35
36
32
32
29
29
34
β
α
α
β
30
30
24
24
33B
27
37
22
27
33B

FIG. 11

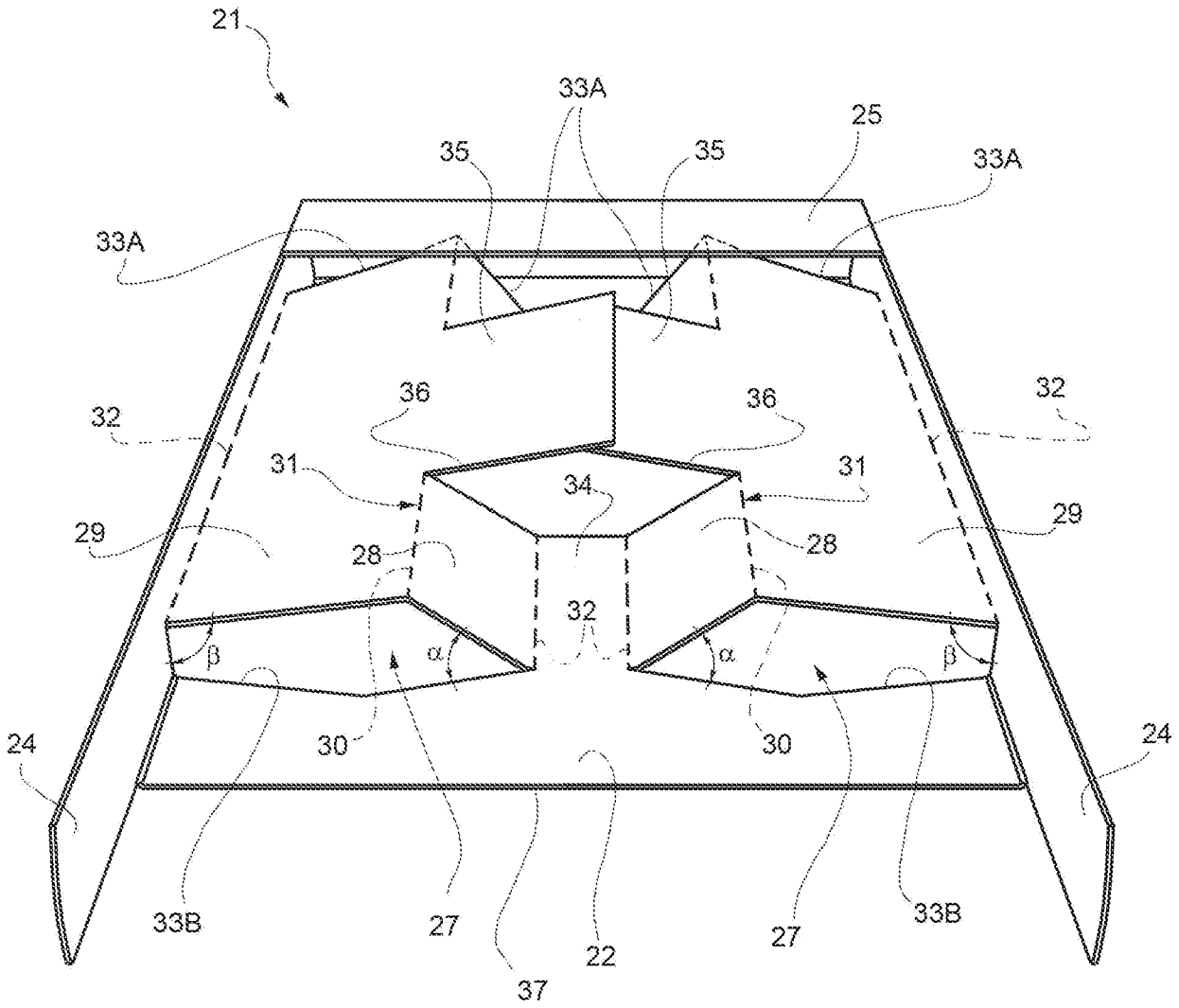
21
33A
25
35
35
33A
33A
32
36
36
32
31
34
31
29
28
28
29
32
β
α
α
β
30
30
24
24
33B
27
22
27
33B
37

FIG. 12

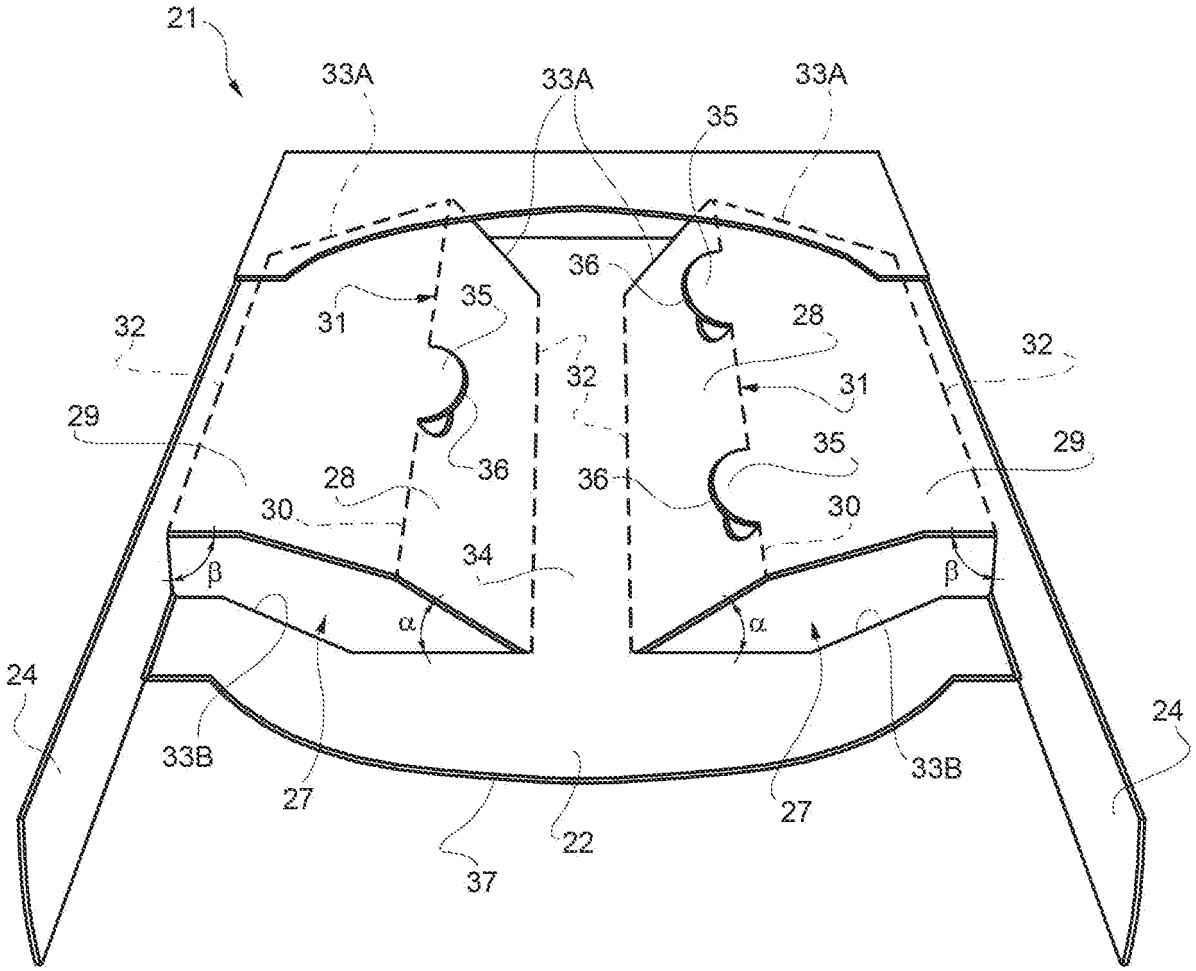
21
33A
33A
33A
35
36
35
31
28
32
32
32
31
29
29
35
36
36
28
30
30
34
β
β
α
α
24
24
33B
33B
27
27
22
37

FIG. 13

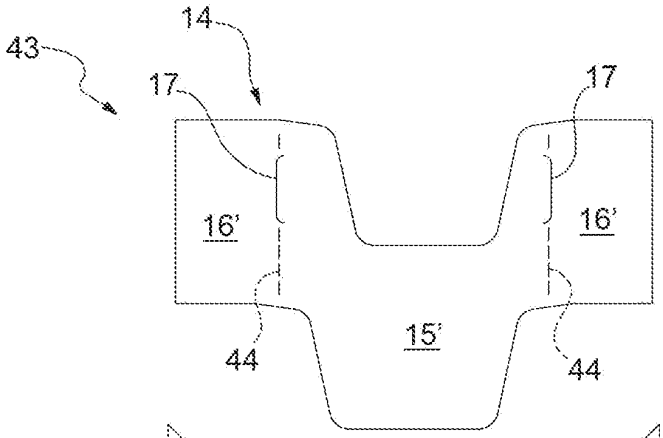
43
14
17
17
16'
16'
15'
44
44

FIG. 14

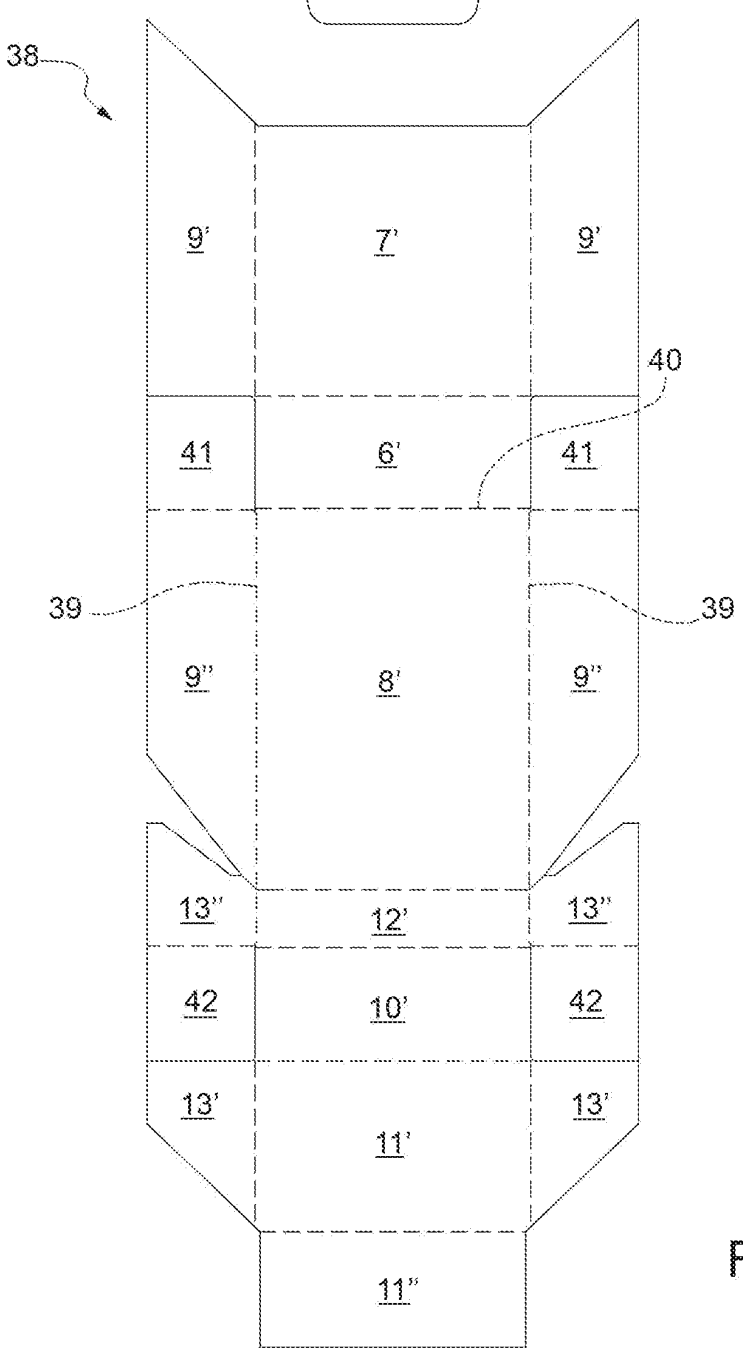
38
9'
7'
9'
40
41
6'
41
39
39
9''
8'
9''
13''
12'
13''
42
10'
42
13'
13'
11'
11''

FIG. 15

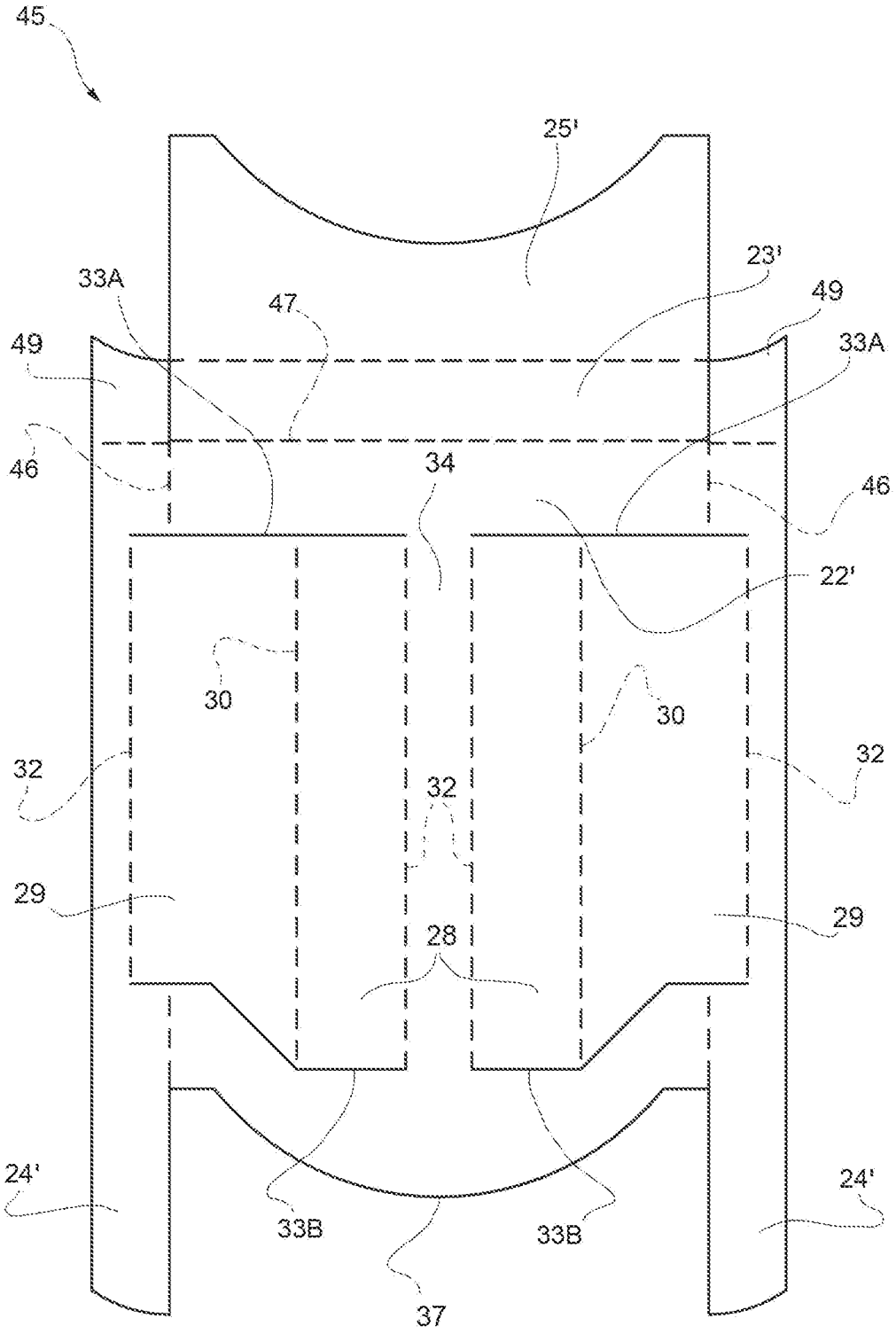
45
25'
23'
33A
47
49
49
33A
46
34
46
22'
30
30
32
32
32
29
29
28
24'
24'
33B
33B
37

FIG. 16

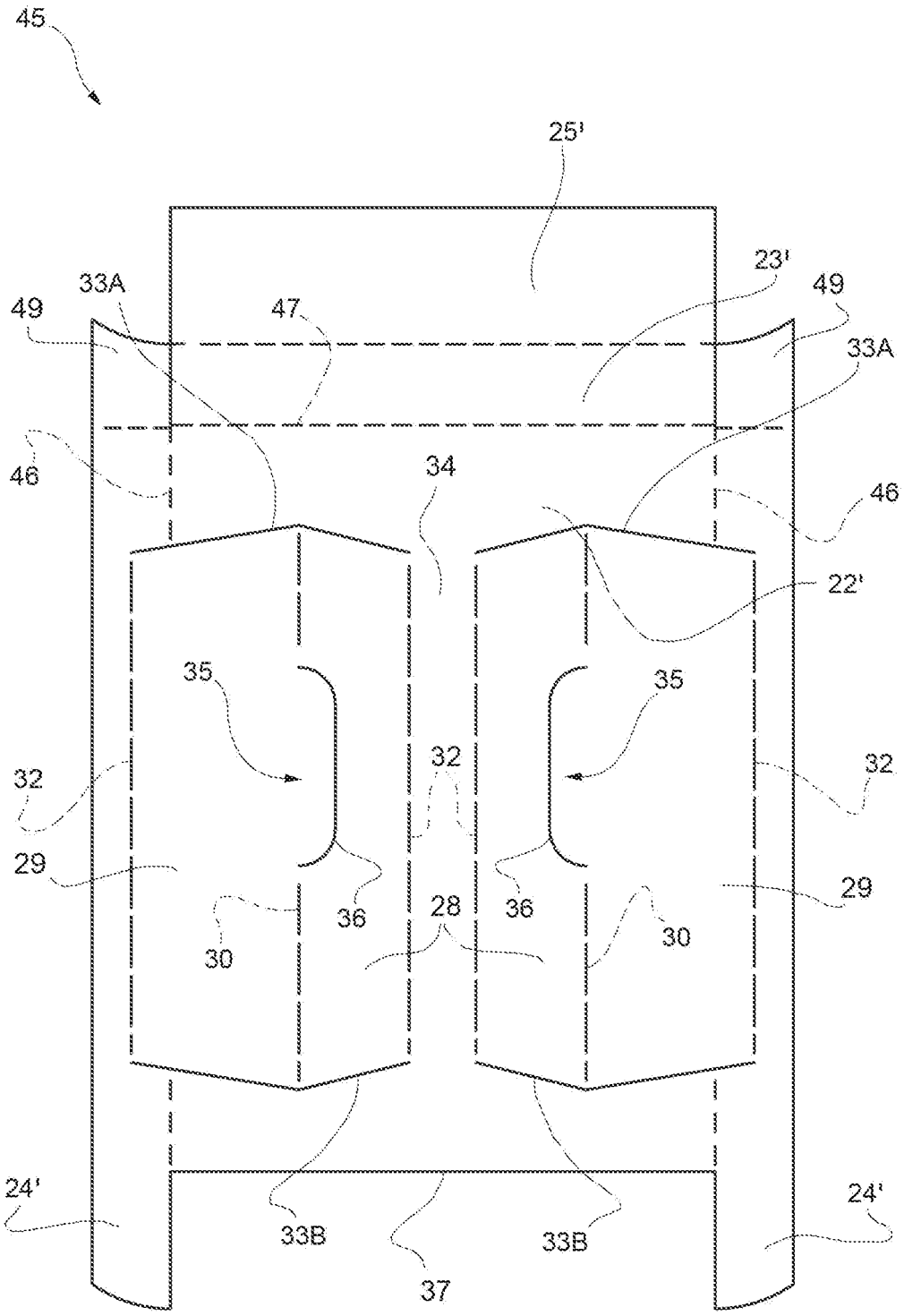
45
25'
23'
49
33A
49
47
33A
46
34
46
22'
35
35
32
32
32
29
29
36
28
36
30
30
24'
24'
33B
33B
37

FIG. 17

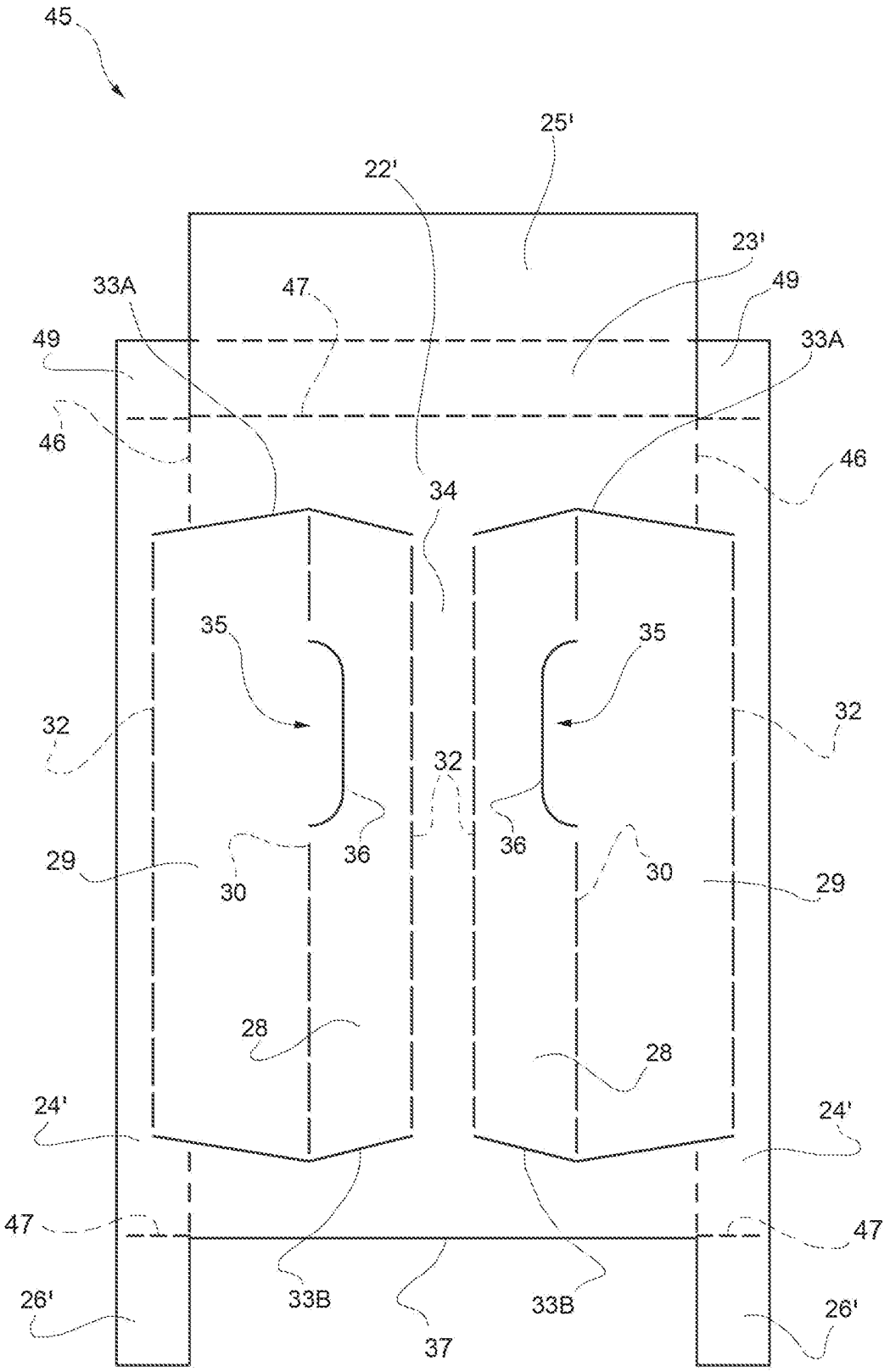
45
25'
22'
23'
49
33A
47
49
33A
46
46
34
35
35
32
32
32
36
36
29
30
30
29
28
28
24'
24'
47
47
26'
33B
33B
26'
37

FIG. 18

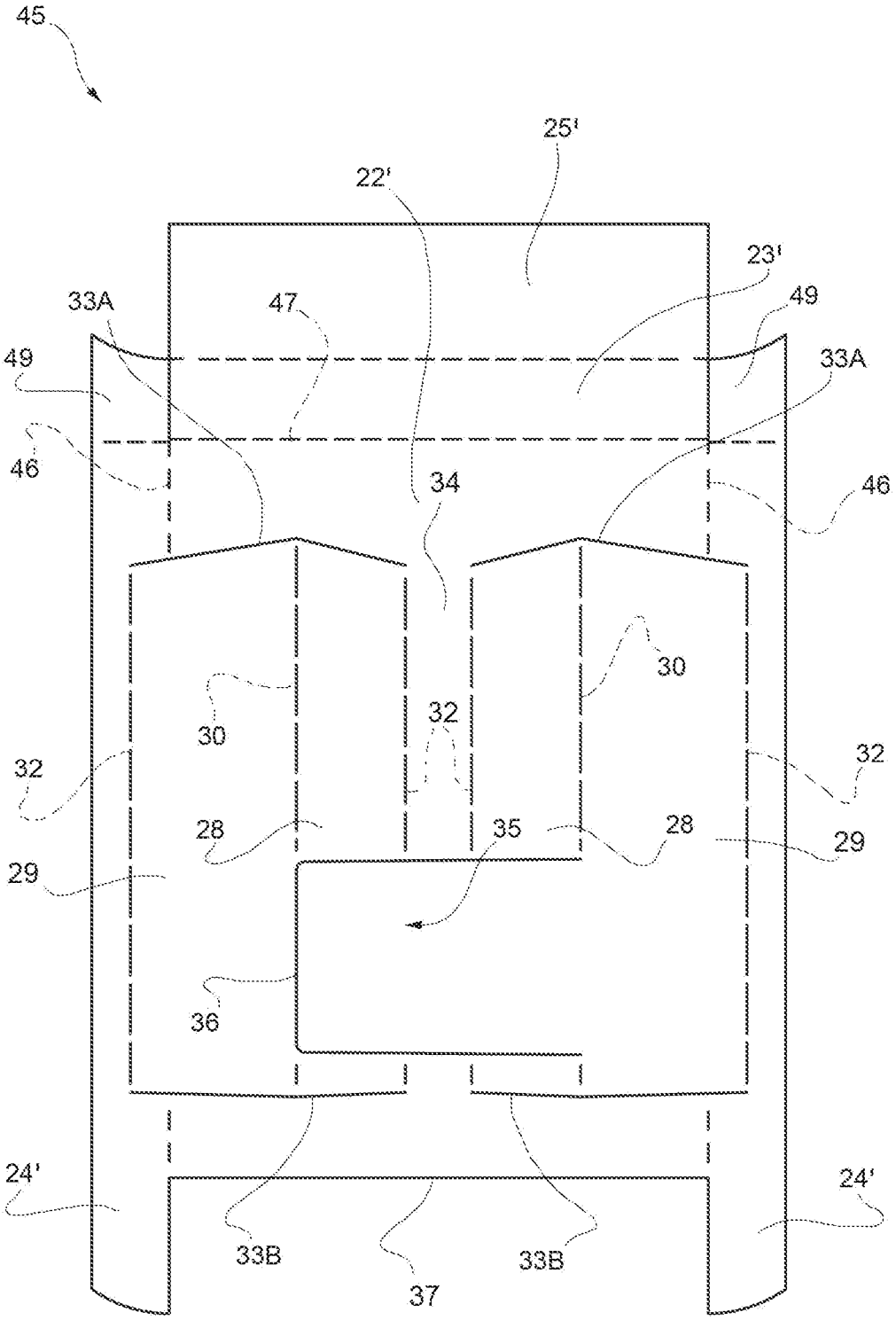
45
25'
22'
23'
33A
47
49
49
33A
46
34
46
30
30
32
32
32
28
35
28
29
29
36
24'
24'
33B
33B
37

FIG. 19

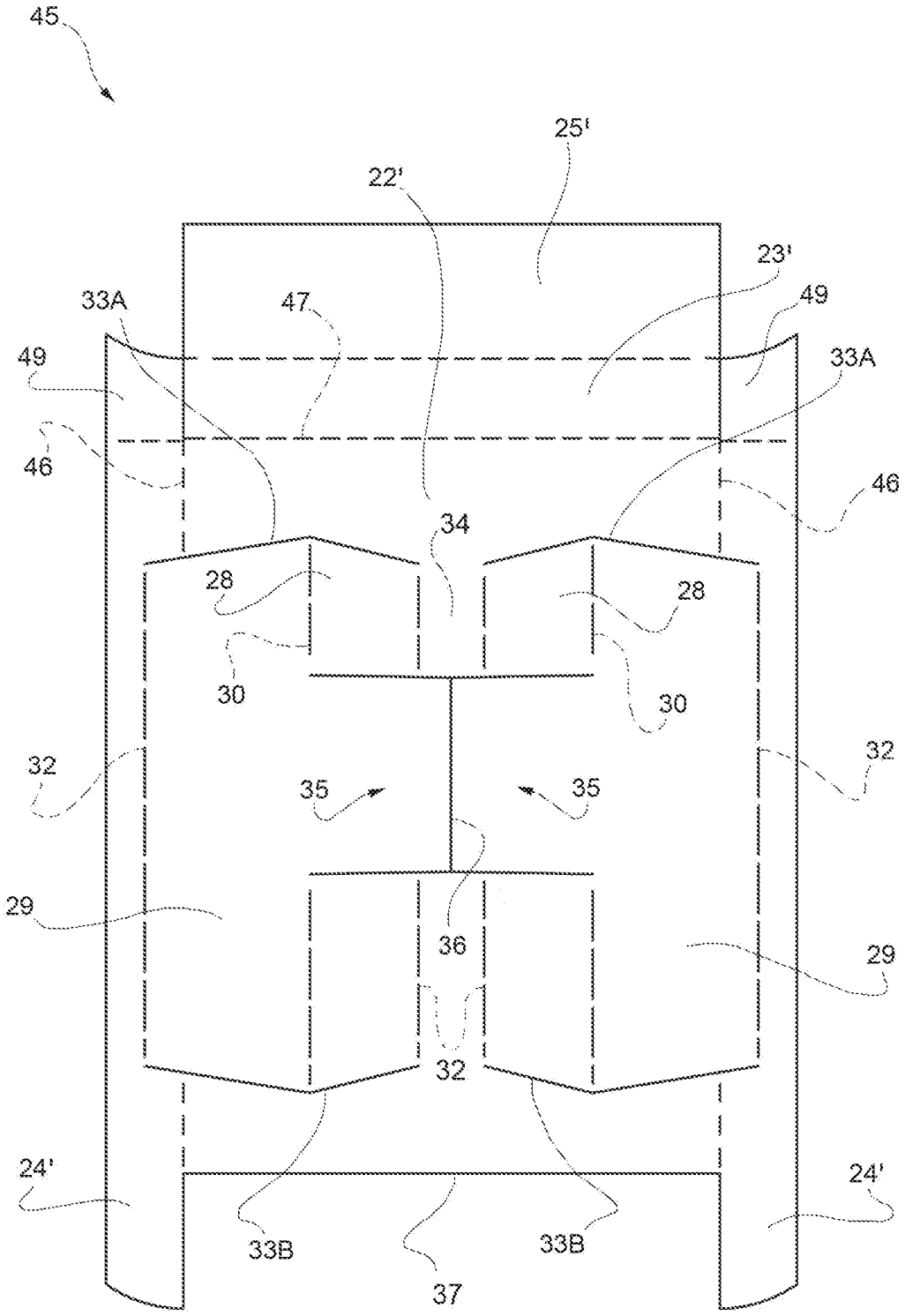
45
25'
22'
23'
33A
47
49
49
33A
46
46
34
28
28
30
30
32
32
35
35
29
36
29
32
24'
24'
33B
33B
37

FIG. 20

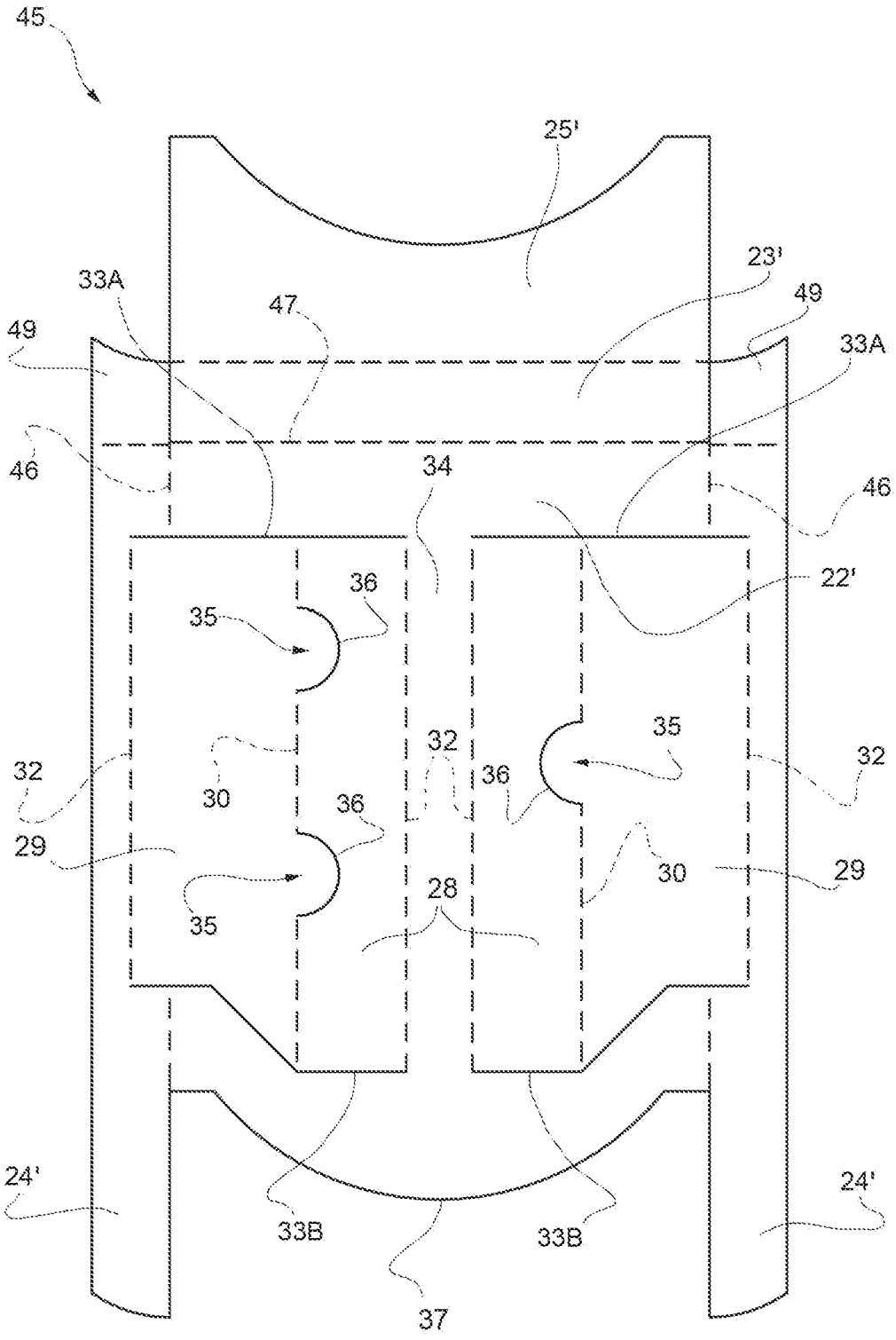
45
25'
23'
33A
47
49
49
33A
46
34
46
22'
36
35
35
32
32
30
36
36
32
29
30
29
35
28
24'
24'
33B
33B
37

FIG. 21

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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- WO 2018203287 A1 **[0005]**