



(11) **EP 2 982 607 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention
of the grant of the patent:
28.12.2016 Bulletin 2016/52

(51) Int Cl.:
B65B 19/10 ^(2006.01) **B65B 61/20** ^(2006.01)
B65D 85/10 ^(2006.01)

(21) Application number: **15179478.1**

(22) Date of filing: **03.08.2015**

(54) **PACKING MACHINE AND PACKING METHOD FOR PRODUCING A PACKET OF SMOKING ARTICLES PROVIDED WITH AT LEAST ONE SPACER ARRANGED INSIDE THE GROUP OF SMOKING ARTICLES**

VERPACKUNGSMASCHINE UND VERPACKUNGSVERFAHREN ZUR HERSTELLUNG EINER
PACKUNG VON RAUCHARTIKELN MIT MINDESTENS EINEM PLATZHALTER IN DER GRUPPE
VON RAUCHARTIKELN

MACHINE D'EMBALLAGE ET PROCÉDÉ D'EMBALLAGE DE PRODUCTION D'UN PAQUET
D'ARTICLES À FUMER POURVU D'AU MOINS UN ÉLÉMENT D'ESPACEMENT DISPOSÉ À
L'INTÉRIEUR DU GROUPE D'ARTICLES À FUMER

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

(30) Priority: **04.08.2014 IT BO20140443**

(43) Date of publication of application:
10.02.2016 Bulletin 2016/06

(73) Proprietor: **G.D Societa' per Azioni
40133 Bologna (IT)**

(72) Inventors:
• **MADERA, Giovanni**
40126 Bologna (IT)
• **NEGRINI, Stefano**
40012 Calderara di Reno (IT)

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

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Description

TECHNICAL FIELD

[0001] The present invention relates to a packing machine and to a packing method for producing a packet of smoking articles provided with at least one spacer arranged inside the group of cigarettes.

[0002] In the following description reference will be made, for the sake of brevity, to a rigid packet of cigarettes with hinged-lid without thereby losing generality.

PRIOR ART

[0003] Normally, a rigid packet of cigarettes with hinged-lid comprises an inner package enclosing a group of cigarettes and a rigid outer casing which internally houses the inner package. The inner package is initially fully closed and has a top portion that can be eliminated by tearing (called "pull") that is removed the first time the packet of cigarettes is opened to allow the extraction of the cigarettes enclosed inside the inner package.

[0004] In some cases, the group of cigarettes has a reduced size, or the group of cigarettes is significantly smaller than the volume of the outer casing; in these situations at least one filler element (i.e. a filler) is used, which is dimensioned to occupy part of the volume of the outer casing left free from the group of cigarettes. The function of the filler element is to prevent gaps inside the packet of cigarettes and thus preventing the group of cigarettes from "shaking" inside the packet of cigarettes; in fact, if the group of cigarettes were free to "shake" inside the packet of cigarettes, the movements of the group of cigarettes during handling of the packet of cigarettes (either in the production step and during the distribution and sales step) would subject the cigarettes to mechanical stress that could easily determine an emptying of the tips (i.e. loss of tobacco fibers from the free ends of the cigarettes).

[0005] According to a possible embodiment, such as described in patent US4771882A1, the filler element is arranged outside the inner package and next to the inner package itself. According to an alternative embodiment, as described for example in patent application WO2014170829A1, the filler element is arranged inside the inner package in direct contact with the cigarettes forming the group of cigarettes. In the latter case, i.e. when the filler element is arranged inside the inner package, forming the group of cigarettes provided with the filler element is quite complex especially because of the need to keep both the cigarettes, and the filler element in the correct position until a corresponding sheet of wrapping material is wound about the group of cigarettes. Furthermore, when the filler element is arranged inside the inner package, extracting the cigarettes can be complicated due to the filler element between the cigarettes which hinders gripping the cigarettes themselves. Finally, when the filler element is arranged inside the inner

package, the appearance of the opened packet of cigarettes is generally unpleasant (due to the presence of the filler element between cigarettes) and therefore little appreciated by smokers.

[0006] The patent application EP1052192A1 describes a packing machine for producing a packet of cigarettes comprising a rigid container and a soft inner package housed inside the rigid container and enclosing the group of cigarettes; inside the inner package and next to the group of cigarettes an elastically deformable pressure element is arranged which pushes the group of cigarettes towards a lateral wall of the inner package. The packaging machine comprises a belt group-forming conveyor supporting a plurality of group-forming pockets, each of which is suited to contain a group of cigarettes and is coupled to an auxiliary pocket which is arranged next to the group-forming pocket, is suited to house the pressure element, and is made by a L-shaped plate. In particular, each pressure element is inserted inside the corresponding auxiliary pocket before the group of cigarettes is inserted in the corresponding group-forming pocket; subsequently, the pressure member and the group of cigarettes are extracted together to be fed to a pocket of a packing wheel.

DESCRIPTION OF THE INVENTION

[0007] The object of the present invention, according to the subject matter of claims 1 and 11, is to provide a packing machine and a packing method for producing a packet of smoking articles provided with at least one spacer arranged inside the group of smoking articles, wherein said packing method and packing machine allow the forming of the group of smoking articles in an effective and efficient manner and are, at the same time, easy and inexpensive to manufacture.

[0008] According to the present invention a packing machine and a packing method for producing a packet of smoking articles provided with at least one spacer arranged inside the group of smoking articles, as claimed in the attached claims, are provided.

BRIEF DESCRIPTION OF THE DRAWINGS

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

Figure 1 is a front perspective view of a rigid packet of cigarettes in a closed configuration obtained according to the present invention;

- Figure 2 is a front perspective view of the packet of cigarettes of Figure 1 in an open configuration;

- Figure 3 is a rear perspective view of the packet of cigarettes of Figure 1 in a closed configuration;

- Figure 4 is a front perspective view of an inner package of the packet of cigarettes of Figure 1;

- Figure 5 is a front perspective view of the inner

package of figure 4 after the removal of a tearable portion;

- Figure 6 is a perspective view of a group of cigarettes and two filler elements contained inside the inner package of Figure 4;

- Figure 7 is a perspective view of the group of cigarettes of Figure 6 and of an alternative of the filler elements of Figure 6;

- Figure 8 is a cross-sectional view of the inner package of figure 4;

- Figure 9 is a front perspective view of a different embodiment of an inner package of the packet of cigarettes of Figure 1;

- Figure 10 is a front perspective view of the inner package of figure 9 after the removal of a tearable portion;

- Figure 11 is a perspective view of a group of cigarettes and of a filler element contained inside the inner package of Figure 9;

- Figure 12 is a perspective view of the group of cigarettes of Figure 11 and of an alternative of the filler elements of Figure 11;

- Figure 13 is a cross-sectional view of the inner package of figure 9;

- Figure 14 is a perspective and schematic view of the packing machine for producing the packet of cigarettes of Figure 1;

- Figure 15 is a perspective and schematic view of a group-forming unit of the packing machine of Figure 14;

- Figures 16 and 17 are two front views of a group-forming pocket of the group-forming unit of Figure 15 before and after feeding a group of cigarettes;

- Figures 18 and 19 are two front views of an alternative embodiment of the group-forming pocket of Figures 16 and 17 before and after feeding a group of cigarettes; and

- Figures 20, 21 and 22 are respective cross-sectional views of three further alternatives of an inner package of the packet of cigarettes of Figure 1.

PREFERRED EMBODIMENTS OF THE INVENTION

[0010] In Figures 1, 2 and 3 number 1 indicates as a whole a rigid packet of cigarettes. The packet 1 of cigarettes comprises a cup-shaped outer container 2 which is made of cardboard or rigid paperboard has a hinged lid and houses inside an inner package 3 (partially visible in Figure 2).

[0011] As illustrated in Figures 4, 5 and 6, the inner package 3 encloses a group 4 of cigarettes having a parallelepiped shape and a pair of spacers 5 (i.e. the spacers 5 are arranged inside the inner package 3 next to the group 4 of cigarettes). According to a preferred, but not limiting, embodiment illustrated in the accompanying figures, each spacer 5 is made by a full body (i.e. internally full) of low density plastic material (and therefore of modest overall mass), for example expanded polystyrene or

spongy material; alternatively, each spacer 5 could also be made by a box-like body (i.e. internally empty) formed by folding and stabilizing a flat blank of cardboard by means of glue.

[0012] As illustrated in Figures 4 and 5, the inner package 3 has a parallelepiped shape and has a top wall 6 and a bottom wall 7 opposite and parallel to each other, a front wall 8 and a rear wall 9 opposite and parallel to each other, and two lateral walls 10 opposite and parallel to each other. Furthermore, the inner package 3 has a tearable portion 11, which is separated from the remaining part of the inner package 3 by a pre-weakened line 12 and is suited to be eliminated by tearing the first time the packet 1 of cigarettes is opened so as to form an extraction opening which allows access to the group 4 of cigarettes contained inside the inner package 3.

[0013] In the preferred embodiment illustrated in the attached figures, the tearable portion 11 of the inner package 3 involves a limited portion of the top wall 6 (i.e. only a part of the top wall 6) and a limited portion of the front wall 8 (i.e. only a part of the front wall 8). In particular, as illustrated in Figure 6, the group 4 of cigarettes has a top wall 13 which is arranged in contact with an inner surface of the top wall 6 of the inner package 3 and is completely uncovered (i.e. completely exposed) when the tearable portion 11 of the inner package 3 is removed (as shown in Figure 5); furthermore, each spacer 5 has a top wall 14 which is arranged in contact with an inner surface of the top wall 6 of the inner package 3 and is not exposed (i.e. completely hidden) when the tearable portion 11 of the inner package 3 is removed (as shown in Figure 5). In other words, the tearable portion 11 of the inner package 3 involves a limited part of the top wall 6 of the inner package 3, is arranged corresponding only to the top wall 13 of group 4 of cigarettes, and not corresponding to the top wall 14 of each spacer 5. Then, as shown in Figure 5, when the tearable portion 11 of the inner package 3 is removed, the corresponding extraction opening extends only at the top wall 13 of the group 4 of cigarettes (exposing all and only the top wall 13 of the group 4 of cigarettes) and does not affect in any manner the top walls 14 of the spacers 5.

[0014] According to a preferred embodiment, the top wall 14 of each spacer 5 is glued to an inner surface of the top wall 6 of the inner package 3. In other words, glue is interposed between the top wall 14 of each spacer 5 and the inner surface of the top wall 6 of the inner package 3 thus establishing a permanent and stable gluing. In this way, the top wall 6 of the inner package 3 adheres stably to the top wall 14 of each spacer 5 by "coating" the top wall 14 itself (i.e. covering in a complete and permanent manner the top wall 14).

[0015] According to the embodiment illustrated in Figure 6, each spacer 5 has the same height (i.e. the same longitudinal dimension) of the group 4 of cigarettes; consequently, the top wall 14 of each spacer 5 is arranged in contact with the inner surface of the top wall 6 of the inner package 3. In this embodiment, the top portion (i.

e. arranged near the top wall 6 of the inner package 3) of each spacer 5 tapers from the side of the top wall 14 (i.e. upwards) so as to have the minimum transverse dimension at its top wall 14; in particular, the top portion of each spacer 5 has two inclined surfaces 15 opposite to each other that progressively reduce the cross-section of the spacer 5 itself. In this way, the top portion of each spacer 5 is separated from the group 4 of cigarettes leaving empty space between the same and the group 4 of cigarettes thus facilitating the gripping of the cigarettes (particularly when the group 4 of cigarettes is complete or nearly complete i.e. when the packet 1 of cigarettes is still full or almost full).

[0016] In the alternative embodiment illustrated in Figure 7, each spacer 5 has a height (i.e. longitudinal dimension) lower than the group 4 of cigarettes; consequently, the top wall 14 of each spacer 5 is arranged at a certain distance from the inner surface of the top wall 6 of the inner package 3 (obviously in this embodiment the top wall 14 of each spacer 5 cannot be glued to the top wall 6 of the inner package 3). In this embodiment, the top portion (i.e. arranged near the top wall 6 of the inner package 3) of each spacer 5 does not taper from the side of the top wall 14 (i.e. upwards), as the lower height of the spacers 5 is already widely sufficient for allowing an easy gripping of the cigarettes.

[0017] In the embodiments illustrated in Figures 6, 7 and 8, each spacer 5 has a rectangular shape in cross-section and is provided with two grooves 16 which extend longitudinally (i.e. vertically, parallel to the cigarettes of the group 4 of cigarettes) and are symmetrically arranged opposed one to the other; the grooves 16 may have a rectangular shape in cross section (as shown in Figures 6, 7 and 8), or any other shape. The function of the grooves 16 is both to lighten the spacers 5, and to facilitate retaining the spacers 5 during the formation of group 4 of cigarettes (as will be better explained below). In order to further lighten the spacers 5, the spacers 5 may have further grooves 16 (also arranged on the other two lateral surfaces of the spacers 5 themselves) and/or also through holes that are internally arranged and extend longitudinally (i.e. vertically, parallel to the cigarettes of the group 4 of cigarettes).

[0018] Note that the spacers 5 may facilitate the production of rigid type packets 1 of cigarettes with rounded corners and rounded edges (commonly known as "round corner" packets and "bevel edge" packets, respectively) in the case where at least one pair of adjacent longitudinal edges of the spacer 5 has a rounded or chamfered section and the spacer 5 is placed inside the inner package 3 with said pair of edges arranged at the longitudinal edges of the outer container 2. As a consequence of this, the longitudinal edges of said packets 1 of cigarettes have a more regular shape being supported by spacers 5 provided with a significantly greater mechanical rigidity than the abutment that a cigarette can offer.

[0019] In the embodiments illustrated in Figures 4-8, the inner package 3 contains a single group 4 of ciga-

rettes arranged centrally and two twin spacers 5 laterally arranged at the opposite sides of the group 4 of cigarettes so as to enclose between them the said group 4 of cigarettes. Consequently, the inner package 3 has a single tearable portion 11 arranged centrally (i.e. in correspondence of the only group 4 of cigarettes).

[0020] In the alternative embodiments illustrated in Figures 9-13, the inner package 3 contains a single spacer 5 arranged centrally and two twin groups 4 of cigarettes and laterally arranged at the opposite sides of the spacer 5 so as to enclose between them the spacer 5 itself. Preferably, in the embodiments illustrated in Figures 9-13 the spacer 5 has a circular or elliptical shape in cross-section. According to a possible embodiment illustrated in dashed lines in Figure 13, the side surface of the spacer 5 may have longitudinal cavities 17, each of which has an arc-shaped cross section of a circle which reproduces in negative the shape of the side wall of a cigarette and is arranged corresponding to a cigarette of the group 4 of cigarettes; the function of the longitudinal cavity 17 is to increase the space available for the cigarettes of the groups 4 of cigarettes so as to reduce the compression on the groups 4 of cigarettes and thus facilitate both the coupling of the groups 4 of cigarettes with the spacer 5 during the production of the packet 1 of cigarettes, and the extraction of the cigarettes of the groups 4 of cigarettes during the use of the packet 1 of cigarettes. In the embodiments illustrated in Figures 9-13, the inner package 3 has two tearable portions 11, each of which is arranged laterally at a respective group 4 of cigarettes and forms a respective extraction opening. The two tearable portions 11 can be completely separated and independent, and therefore can be individually and independently removable one from the other; alternatively, the two tearable portions 11 can be connected to each other to be removed at the same time. Except for the differences highlighted above, the alternative embodiments illustrated in Figures 9-13 are entirely analogous to the embodiments illustrated in Figures 4-8.

[0021] According to further embodiments not illustrated, the shape, the number and/or arrangement of the groups 4 of cigarettes and of the spacers 5 may be different. By way of example, Figures 20, 21 and 22 illustrate three possible configurations that provide a single group 4 of cigarettes and a single spacer 5: in the embodiment illustrated in Figure 20, the group 4 of cigarettes is arranged in a central position and is surrounded on three sides by the U-shaped spacer 5, in the embodiment illustrated in Figure 21, the group 4 of cigarettes is arranged in a central position and is supported on one "long" side only by the spacer 5, and in the embodiment illustrated in Figure 22, the group 4 of cigarettes is arranged in a lateral position and is supported on one "short" side only by the spacer 5.

[0022] The packet 1 of cigarettes described above has numerous advantages.

[0023] In the first place, the packet 1 of cigarettes described above always allows an easy extraction of the

cigarettes through the extraction opening of the inner package 3.

[0024] Furthermore, the packet 1 of cigarettes described above also has an extremely pleasant aspect in the open configuration, as the filler elements 5 (which look "raw" and therefore not very aesthetic) are for the most part hidden; in particular the top walls 14 of the filler elements 5 is completely hidden from view.

[0025] Also, the packet 1 of cigarettes described above can be easily produced in a substantially standard packing machine (which only requires a few minor modifications, as better described hereinafter), and therefore does not require the use of an expensive special packing machine (i.e. specially designed for this type of packet 1 of cigarettes) for the production thereof.

[0026] In Figure 14 a packing machine 18 which produces the packet 1 of cigarettes described above and illustrated in Figures 1-8 (with trivial changes the packing machine 18 could also produce the packet 1 of cigarettes shown in Figures 9-13) is illustrated schematically.

[0027] As shown in Figure 14, the packing machine 18 comprises a group-forming unit 19 in which the groups 4 of cigarettes together with the corresponding spacers 5 are formed, a packing unit 20 in which a sheet 21 of packing material is folded about each group 4 of cigarettes and the corresponding spacers 5 to form an inner package 3, and a packing unit 22 in which a collar 23 and a blank 24 are folded around each inner package 3 to form an outer container 2, and then complete the production of a packet 1 of cigarettes.

[0028] As shown in Figure 15, the group-forming unit 19 comprises a belt group-forming conveyor 25 supporting a plurality of group-forming pockets 26, each of which is suited to receive and feed a corresponding group 4 of cigarettes and two corresponding spacers 5. The group-forming conveyor 25 moves step-by-step counterclockwise to feed each group-forming pocket 26 along a straight group-forming path P.

[0029] Along the group-forming path P a feed station S1 is arranged, in which two spacers 5 at a time are inserted in each group-forming pocket 26 along a feed direction D perpendicular to the group-forming path P; also along the group-forming path P downstream from the feed station S1, a feed station S2 is arranged, in which a group 4 of cigarettes is inserted into each group-forming pocket 26 (between the two spacers 5 previously inserted in the feed station S1) along the feed direction D perpendicular to the group-forming path P. It is important to note that in each group-forming pocket 26 the two spacers 5 delimit the inner volume of the group-forming pocket 26 itself so that the group 4 of cigarettes will find exactly the space needed for their own containment (i.e. without excess or shortage of space); in this way, each group 4 of cigarettes can be inserted easily in the corresponding group-forming pocket 26 and at the same time each group 4 of cigarettes remains stable and well confined inside the corresponding group-forming pocket 26 (i.e. the group 4 of cigarettes will not break formation once

inserted into the corresponding group-forming pocket 26 as properly restrained laterally by the two spacers 5 previously entered in the feed station S1).

[0030] Along the group-forming path P a transfer station S3 is arranged, in which each group-forming pocket 26 of the corresponding group 4 of cigarettes together with the corresponding spacers 5 is extracted axially to be transferred to an outlet of the packing unit 20.

[0031] The feed station S1 comprises two twin hoppers 27, each containing a vertical stack of spacers 5 and having a bottom outlet through which one spacer 5 at a time is extracted from the hopper 27 and inserted in a corresponding group-forming pocket 26 arrested facing the outlet. Each hopper 27 has a corresponding pusher 28 which moves linearly back and forth in the feed direction D to move cyclically through the outlet of the hopper 27 and axially pushes a spacer 5 towards a corresponding group-forming pocket 26 arrested facing the outlet.

[0032] Note that the spacers 5 of the type tapered towards the top (i.e. according to the embodiment illustrated in Figure 6 and described above) are stacked in the hopper 27 with the taper orientated towards the side of the outlet, which faces the group-forming pocket 26 at the moment of extraction, so that the insertion of the spacer 5 inside the group-forming pocket 26 itself is facilitated.

[0033] The feed station S2 comprises a hopper 29, containing a mass of cigarettes, and having a bottom outlet through which one group 4 of cigarettes at a time is extracted from the hopper 29 and inserted in a corresponding group-forming pocket 26 arrested facing the outlet. A corresponding pusher 30 is associated to the hopper 29 which moves linearly back and forth in the feed direction D to move cyclically through the outlet of the hopper 29 and to axially push a group 4 of cigarettes to a corresponding group-forming pocket 26 arrested facing the outlet.

[0034] The transfer station S3 comprises a pusher 31, which moves linearly back and forth to cyclically pass through a corresponding arrested group-forming pocket 26 so as to axially push the corresponding group 4 of cigarettes together with the corresponding spacers 5 out of the group-forming pocket 26 itself.

[0035] As illustrated in Figures 16 and 17, each group-forming pocket 26 has guides 32, which project internally (i.e. towards the inside of the pocket 26) from corresponding walls 33 of the group-forming pocket 26, are arranged axially (longitudinally, i.e. parallel to the feed direction D), and engage the spacers 5 so as to prevent a transverse displacement (relative to the feed direction D) of the spacers 5 inside the group-forming pocket 26. In other words, each spacer 5 is maintained by the corresponding guides 32 in a precise and predetermined position inside the group-forming pocket 26 thus preventing the spacer 5 from moving transversely. The guides 32 are substantially projections (ribs, abutments, protrusions) that rise cantilevered from the walls 33 of the group-forming pocket 26 to project inside the group-forming pocket 26 itself.

[0036] In the embodiment illustrated in Figures 16 and

17, each guide 32 engages a corresponding groove 16 of a spacer 5 (thus each guide 32 reproduces in positive the shape of a corresponding groove 16 of a spacer 5); consequently, each guide 32 "enters" inside a spacer 5 by entering the corresponding groove 16. Alternatively, the spacers 5 have no grooves 16 and each guide 32 is supported by a portion of the outer perimeter of a corresponding spacer 5 (as is the case in the embodiment illustrated in Figures 18 and 19).

[0037] The embodiment of the group-forming unit 19 illustrated in Figures 15, 16 and 17 produces the packet 1 of cigarettes shown in Figures 1-8; the embodiment of the group-forming unit 19 illustrated in Figures 18 and 19 produces the packet 1 of cigarettes shown in Figures 9-13. It is important to note that for producing the packet 1 of cigarettes shown in Figures 1-8, or for producing the packet 1 of cigarettes shown in Figures 9-13 the rest of the packing machine 1 (i.e. the two packing units 20 or 22) does not undergo any type of modification (if only just for making format adaptations).

[0038] In particular, in the embodiment of the group-forming unit 19 illustrated in Figures 18 and 19 the shape and arrangement of the hoppers 27 and 29 is changed since two hoppers 29 in the feed station S2 are of course necessary to insert two groups 4 of cigarettes at a time in each arrested group-forming pocket 26 and since just a single hopper 27 in the feed station S1 is sufficient for inserting a single spacer 5 in each arrested group-forming pocket 26. Furthermore, in the embodiment of the group-forming unit 19 illustrated in Figures 18 and 19 the position and the conformation of the guides 32 of each group-forming pocket 26 are changed, in fact the number (one instead of two), the cross section (circular instead of rectangular), and the position (central instead of lateral) of the spacers 5 of each group-forming pocket 26 are different. Also in this embodiment, the function of the guides 32 is always the same, namely to keep the spacer 5 in a precise and predetermined position inside the group-forming pocket 26 before inserting the two groups 4 of cigarettes into the group-forming pocket 26 itself.

[0039] In the embodiments described above, the hopper 29 forms each group 4 of cigarettes in one solution (i.e. all layers of each group 4 of cigarettes are extracted simultaneously from the hopper 29); according to alternative and equivalent embodiments, the hopper 29 forms each group 4 of cigarettes by layers (i.e. each layer of the group 4 of cigarettes is extracted individually from a corresponding outlet of the hopper 29).

[0040] According to a possible embodiment, each hopper 27 receives in succession the spacers 5 from its own feed line that is independent and separate from the feed line of the other hopper 27 and comprises a horizontal vibrating plate (cup) on which an irregular array of spacers 5 arranged in bulk is cyclically deposited; the vibrating plate directs (orients) the spacers 5 towards vertical paths ending in a top portion of the hopper 27.

[0041] According to a possible embodiment, each hopper 27 comprises more than one outlet (typically two or

three outlets) that are used cyclically alternated; in other words, if two outlet of the same hopper 27 are provided, the spacers 5 are alternately extracted from the two outlets themselves. In this way, more time is given to the spacers 5 to descend by gravity towards the corresponding outlet (in this regard it should be remembered that the spacers 5 have a low density and therefore a small mass and consequently do not reach high speeds when descending by gravity).

[0042] As shown in Figure 14, the packing unit 20 comprises a gumming device 34, which applies glue on the inner surface of each sheet 21 of packing material at the top wall 6 of the inner package 3 so as to determine the subsequent gluing of the top wall 6 of the inner package 3 to the top wall 14 of each spacer 5.

[0043] The group-forming unit 19 described above has numerous advantages.

[0044] First, the group-forming unit 19 described above allows to produce in a simple and highly precise manner the contents of each inner package 3 or enables to couple together the group/groups 4 of cigarettes with the spacer/spacers 5. This result is achieved particularly thanks to the guides 32 inside each group-forming pocket 26; in fact, the guides 32 maintain the spacers 5 in a precise and predetermined position inside the group-forming pocket 26 before inserting the group 4 of cigarettes into the group-forming pocket 26 itself. In this way, it is possible to feed the spacers 5 and the groups 4 of cigarettes in two distinct and well separated feed stations S1 and S2, to the benefit of the simplicity of forming the two feed stations S1 and S2 themselves (particularly regarding the conveying of the spacers 5 and the groups 4 of cigarettes to the hoppers 27 and 29).

[0045] In addition, the group-forming unit 19 described above is simply and inexpensively produced since compared to a similar known group-forming unit it requires easily implementable modifications.

[0046] Finally, the group-forming unit 19 described above is very flexible, as with a quick and inexpensive replacement of the group-forming pockets 26 it is quickly adaptable to treat spacers 5, and therefore groups 4 of cigarettes having different shapes/positions/numbers.

Claims

1. A packing machine (18) for producing a packet (1) of smoking articles, which comprises an inner package (3) enclosing at least one group (4) of smoking articles and at least one spacer (5); the packing machine (18) comprising:

a group-forming unit (19) comprising a group-forming pocket (26) for housing the group (4) of smoking articles and the spacer (5), a group-forming conveyor (25) which feeds the group-forming pocket (26) along a group-forming path (P), a first feed station (S1) located along the

group-forming path (P) to insert the spacer (5) inside the group-forming pocket (26) in a feed direction (D), and a second feed station (S2) located along the group-forming path (P) to insert the group (4) of smoking articles inside the group-forming pocket (26) along the feed direction (D); and

a packing unit (20) which receives the group (4) of smoking articles together with the spacer (5) from the group-forming unit (19), and wraps a sheet (21) of packing material about the group (4) of smoking articles and the spacer (5) to form the inner package (3);

the packing machine (18) being **characterized in that:**

the group-forming pocket (26) houses the spacer (5) in direct contact with the group (4) of smoking articles; and

the group-forming pocket (26) comprises at least one guide (32), which projects towards the inside from a wall (33) of the group-forming pocket (26) so as to be arranged in the space suited to receive the smoking articles, is oriented parallel to the feed direction (D), and engages the spacer (5) to prevent transverse movement of the spacer (5) inside the group-forming pocket (26).

2. The packing machine (18) according to Claim 1, wherein the guide (32) keeps the spacer (5) in a precise given position inside the group-forming pocket (26), to prevent transverse movement of the spacer (5).

3. The packing machine (18) according to Claim 1 or 2, wherein the guide (32) is designed to engage a cavity (16) in the spacer (5).

4. The packing machine (18) according to Claim 1, 2 or 3, wherein the guide (32) negatively reproduces the outer shape of part of the spacer (5).

5. The packing machine (18) according to one of Claims 1 to 4, wherein the first feed station (S1) is located upstream from the second feed station (S2) along the group-forming path (P).

6. The packing machine (18) according to Claim 5, wherein:

the first feed station (S1) inserts two spacers (5) at a time into the group-forming pocket (26), so the two spacers (5) are located on opposite sides of the group-forming pocket (26); and the second feed station (S2) inserts a group (4) of smoking articles into the group-forming pocket (26) between the two previously inserted spacers (5).

et (26) between the two previously inserted spacers (5).

7. The packing machine (18) according to Claim 5, wherein:

the first feed station (S1) inserts one spacer (5) into the group-forming pocket (26), so the spacer (5) is located centrally inside the group-forming pocket (26); and the second feed station (S2) inserts two groups (4) of smoking articles at a time into the group-forming pocket (26), on opposite sides of the spacer (5).

8. The packing machine (18) according to one of Claims 1 to 7, wherein the first station (S1) comprises:

a first hopper (27) containing a vertical stack of spacers (5) and having a bottom outlet through which a spacer (5) is expelled from the first hopper (27) into the group-forming pocket (26) arrested facing the outlet; and a first pusher (28) which moves linearly back and forth in the feed direction (D) to move cyclically through the outlet of the first hopper (27) and push the spacer (5) axially into the group-forming pocket (26) arrested facing the outlet.

9. The packing machine (18) according to one of Claims 1 to 8, wherein the second feed station (S2) comprises:

a second hopper (29), containing a mass of smoking articles and having a bottom outlet through which the group (4) of smoking articles is expelled from the second hopper (29) into the group-forming pocket (26) arrested facing the outlet; and a second pusher (30) which moves linearly back and forth in the feed direction (D) to move cyclically through the outlet of the second hopper (29) and pushes the group (4) of smoking articles axially into the group-forming pocket (26) arrested facing the outlet.

10. The packing machine (18) according to one of Claims 1 to 9, wherein the group-forming pocket (26) has a parallelepiped shape, comprises four walls (33) which are oriented parallel to the feed direction (D), and delimits a single chamber which is suited to house both the group (4) of smoking articles, and the spacer (5) in direct contact with the group (4) of smoking articles.

11. A packing method for producing a packet (1) of smoking articles comprising an inner package (3) enclosing

ing at least one group (4) of smoking articles and at least one spacer (5); the packing method comprising the steps of:

feeding a group-forming pocket (26) for housing the group (4) of smoking articles and the spacer (5) by means of a group-forming conveyor (25) and along a group-forming path (P);
inserting the spacer (5) inside the group-forming pocket (26) in a feed direction (D), at a first feed station (S1) located along the group-forming path (P),
inserting the group (4) of smoking articles inside the group-forming pocket (26) in direct contact with the spacer (5) and
in the feed direction (D), at a second feed station (S2) located along the group-forming path (P);
transferring the group (4) of smoking articles together with the spacer (5) from the group-forming pocket (26) to a packing unit (20); and
wrapping a sheet (21) of packing material about the group (4) of smoking articles and the spacer (5) on the packing unit (20), to form the inner package (3);

the packing method being **characterized in that:**

the group-forming pocket (26) houses the spacer (5) in direct contact with the group (4) of smoking articles; and
the group-forming pocket (26) comprises at least one guide (32), which projects towards the inside from a wall (33) of the group-forming pocket (26) so as to be arranged in the space suited to receive the smoking articles, is oriented parallel to the feed direction (D) and engages the spacer (5) to prevent transverse movement of the spacer (5) inside the group-forming pocket (26).

Patentansprüche

1. Verpackungsmaschine (18) zum Herstellen eines Pakets (1) von Rauchartikeln, das eine innere Verpackung (3), die wenigstens eine Gruppe (4) von Rauchartikeln und wenigstens einen Abstandshalter (5) umschließt, umfasst; wobei die Verpackungsmaschine (18) Folgendes umfasst:

eine Gruppenbildungseinheit (19), die eine Gruppenbildungstasche (26) zum Unterbringen der Gruppe (4) von Rauchartikeln und des Abstandshalters (5), eine Gruppenbildungsförderanlage (25), die die Gruppenbildungstasche (26) entlang einem Gruppenbildungsweg (P) zu- führt, eine erste Zufuhrstation (S1), die sich entlang dem Gruppenbildungsweg (P) befindet, um

den Abstandshalter (5) in einer Zufuhrrichtung (D) in das Innere der Gruppenbildungstasche (26) einzusetzen, und eine zweite Zufuhrstation (S2), die sich entlang dem Gruppenbildungsweg (P) befindet, um die Gruppe (4) von Rauchartikeln entlang der Zufuhrrichtung (D) in das Innere der Gruppenbildungstasche (26) einzusetzen; und

eine Verpackungseinheit (20), die die Gruppe (4) von Rauchartikeln zusammen mit dem Abstandshalter (5) von der Gruppenbildungseinheit (19) empfängt und ein Blatt (21) des Verpackungsmaterials um die Gruppe (4) von Rauchartikeln und den Abstandshalter (5) wickelt, um die innere Verpackung (3) zu bilden;

wobei die Verpackungsmaschine (18) **dadurch gekennzeichnet ist, dass:**

die Gruppenbildungstasche (26) den Abstandshalter (5) in direktem Kontakt mit der Gruppe (4) von Rauchartikeln unterbringt; und
die Gruppenbildungstasche (26) wenigstens eine Führung (32) umfasst, die von einer Wand (33) der Gruppenbildungstasche (26) in das Innere vorsteht, so dass sie in dem Raum angeordnet ist, der geeignet ist, um die Rauchartikel aufzunehmen, parallel zu der Zufuhrrichtung (D) orientiert ist und sich mit dem Abstandshalter (5) in Eingriff befindet, um eine Querbewegung des Abstandshalters (5) im Inneren der Gruppenbildungstasche (26) zu verhindern.

2. Verpackungsmaschine (18) nach Anspruch 1, wobei die Führung (32) den Abstandshalter (5) in einer genauen gegebenen Position innerhalb der Gruppenbildungstasche (26) hält, um eine Querbewegung des Abstandshalters (5) zu verhindern.

3. Verpackungsmaschine (18) nach Anspruch 1 oder 2, wobei die Führung (32) entworfen ist, um sich mit einem Hohlraum (16) in dem Abstandshalter (5) in Eingriff zu befinden.

4. Verpackungsmaschine (18) nach Anspruch 1, 2 oder 3, wobei die Führung (32) die äußere Form eines Abschnitts des Abstandshalters (5) negativ reproduziert.

5. Verpackungsmaschine (18) nach einem der Ansprüche 1 bis 4, wobei sich die erste Zufuhrstation (S1) entlang dem Gruppenbildungsweg (P) stromaufwärts der zweiten Zufuhrstation (S2) befindet.

6. Verpackungsmaschine (18) nach Anspruch 5, wobei:

die erste Zufuhrstation (S1) zwei Abstandshalter

- (5) auf einmal in die Gruppenbildungstasche (26) einsetzt, so dass sich die beiden Abstandshalter (5) auf gegenüberliegenden Seiten der Gruppenbildungstasche (26) befinden; und die zweite Zufuhrstation (S2) eine Gruppe (4) von Rauchartikeln zwischen den beiden vorher eingesetzten Abstandshaltern (5) in die Gruppenbildungstasche (26) einsetzt.
7. Verpackungsmaschine (18) nach Anspruch 5, wobei:
- die erste Zufuhrstation (S1) einen Abstandshalter (5) in die Gruppenbildungstasche (26) einsetzt, so dass sich der Abstandshalter (5) zentral innerhalb der Gruppenbildungstasche (26) befindet; und
- die zweite Zufuhrstation (S2) zwei Gruppen (4) von Rauchartikeln auf einmal auf gegenüberliegenden Seiten des Abstandshalters (5) in die Gruppenbildungstasche (26) einsetzt.
8. Verpackungsmaschine (18) nach einem der Ansprüche 1 bis 7, wobei die erste Station (S1) umfasst:
- ein erstes Magazin (27), das einen vertikalen Stapel von Abstandshaltern (5) enthält und einen unteren Auslass aufweist, aus dem ein Abstandshalter (5) aus dem ersten Magazin (27) in die Gruppenbildungstasche (26), die dem Auslass zugewandt arretiert ist, ausgestoßen wird; und
- eine erste Schubvorrichtung (28), die sich in der Zufuhrrichtung (D) linear hin und her bewegt, so dass sie sich zyklisch durch den Auslass des ersten Magazins (27) bewegt und den Abstandshalter (5) axial in die Gruppenbildungstasche (26), die dem Auslass zugewandt arretiert ist, schiebt.
9. Verpackungsmaschine (18) nach einem der Ansprüche 1 bis 8, wobei die zweite Zufuhrstation (S2) umfasst:
- ein zweites Magazin (29), das eine Masse von Rauchartikeln enthält und einen unteren Auslass aufweist, durch den die Gruppe (4) von Rauchartikeln aus dem zweiten Magazin (29) in die Gruppenbildungstasche (26), die dem Auslass zugewandt arretiert ist, ausgestoßen wird; und
- eine zweite Schubvorrichtung (30), die sich in der Zufuhrrichtung (D) linear hin und her bewegt, um sich zyklisch durch den Auslass des zweiten Magazins (29) zu bewegen, und die Gruppe (4) von Rauchartikeln axial in die Gruppenbildungstasche (26), die dem Auslass zugewandt arretiert ist, schiebt.
10. Verpackungsmaschine (18) nach einem der Ansprüche 1 bis 9, wobei die Gruppenbildungstasche (26) eine Parallelepipedform aufweist, vier Wände (33), die zu der Zufuhrrichtung (D) parallel orientiert sind, umfasst und eine einzige Kammer abgrenzt, die geeignet ist, um sowohl die Gruppe (4) von Rauchartikeln als auch den Abstandshalter (5) in direktem Kontakt mit der Gruppe (4) von Rauchartikeln unterzubringen.
11. Verpackungsverfahren zum Herstellen eines Pakets (1) von Rauchartikeln, das eine innere Verpackung (3), die wenigstens eine Gruppe (4) von Rauchartikeln und wenigstens einen Abstandshalter (5) umschließt, umfasst; wobei das Verpackungsverfahren die Schritte umfasst:
- Zuführen einer Gruppenbildungstasche (26) zum Unterbringen der Gruppe (4) von Rauchartikeln und des Abstandshalters (5) mittels einer Gruppenbildung-Förderanlage (25) und entlang einem Gruppenbildungsweg (P);
- Einsetzen des Abstandshalters (5) an einer ersten Zufuhrstation (S1), die sich entlang dem Gruppenbildungsweg (P) befindet, in einer Zufuhrrichtung (D) in das Innere der Gruppenbildungstasche (26),
- Einsetzen der Gruppe (4) von Rauchartikeln an einer zweiten Zufuhrstation (S2), die sich entlang dem Gruppenbildungsweg (P) befindet, in direktem Kontakt mit dem Abstandshalter (5) und in der Zufuhrrichtung (D) in das Innere der Gruppenbildungstasche (26);
- Transportieren der Gruppe (4) von Rauchartikeln zusammen mit dem Abstandshalter (5) von der Gruppenbildungstasche (26) zu einer Verpackungseinheit (20); und
- Wickeln eines Blattes (21) des Verpackungsmaterials um die Gruppe (4) von Rauchartikeln und den Abstandshalter (5) in der Verpackungseinheit (20), um die innere Verpackung (3) zu bilden;
- wobei das Verpackungsverfahren **dadurch gekennzeichnet ist, dass:**
- die Gruppenbildungstasche (26) den Abstandshalter (5) in direktem Kontakt mit der Gruppe (4) von Rauchartikeln unterbringt; und
- die Gruppenbildungstasche (26) wenigstens eine Führung (32) umfasst, die von einer Wand (33) der Gruppenbildungstasche (26) in das Innere vorsteht, so dass sie in dem Raum angeordnet ist, der geeignet ist, um die Rauchartikel aufzunehmen, parallel zu der Zufuhrrichtung (D) orientiert ist und sich mit dem Abstandshalter (5) in Eingriff befindet, um eine Querbewegung des Abstandshalters (5) im Inneren der Gruppe

penbildungstasche (26) zu verhindern.

Revendications

1. Machine d'emballage (18) pour produire un paquet (1) d'articles à fumer, qui comprend un emballage interne (3) enfermant au moins un groupe (4) d'articles à fumer et au moins un dispositif d'espacement (5) ; la machine d'emballage (18) comprenant :

une unité de formation de groupe (19) comprenant une poche de formation de groupe (26) pour loger le groupe (4) d'articles à fumer et le dispositif d'espacement (5), un transporteur de formation de groupe (25) qui amène la poche de formation de groupe (26) le long d'une trajectoire de formation de groupe (P), une première station d'alimentation (S1) positionnée le long de la trajectoire de formation de groupe (P) pour insérer le dispositif d'espacement (5) à l'intérieur de la poche de formation de groupe (26) dans une direction d'alimentation (D), et une seconde station d'alimentation (S2) positionnée le long de la trajectoire de formation de groupe (P) pour insérer le groupe (4) d'articles à fumer à l'intérieur de la poche de formation de groupe (26) le long de la direction d'alimentation (D) ; et une unité d'emballage (20) qui reçoit le groupe (4) d'articles à fumer conjointement avec le dispositif d'espacement (5) à partir de l'unité de formation de groupe (19) et enroule une feuille (21) de matériau d'emballage autour du groupe (4) d'articles à fumer et du dispositif d'espacement (5) pour former l'emballage interne (3) ;

la machine d'emballage (18) étant **caractérisée en ce que** :

la poche de formation de groupe (26) loge le dispositif d'espacement (5) en contact direct avec le groupe (4) d'articles à fumer ; et la poche de formation de groupe (26) comprend au moins un guide (32) qui fait saillie vers l'intérieur à partir d'une paroi (33) de la poche de formation de groupe (26) afin d'être agencé dans l'espace approprié pour recevoir les articles à fumer, est orienté parallèlement à la direction d'alimentation (D) et met en prise le dispositif d'espacement (5) pour empêcher le mouvement transversal du dispositif d'espacement (5) à l'intérieur de la poche de formation de groupe (26).

2. Machine d'emballage (18) selon la revendication 1, dans laquelle le guide (32) maintient le dispositif d'espacement (5) dans une position donnée précise à l'intérieur de la poche de formation de groupe (26),

pour empêcher le mouvement transversal du dispositif d'espacement (5).

3. Machine d'emballage (18) selon la revendication 1 ou 2, dans laquelle le guide (32) est conçu pour mettre en prise une cavité (16) dans le dispositif d'espacement (5).

4. Machine d'emballage (18) selon la revendication 1, 2 ou 3, dans laquelle le guide (32) reproduit négativement la forme externe de la partie du dispositif d'espacement (5).

5. Machine d'emballage (18) selon l'une des revendications 1 à 4, dans laquelle la première station d'alimentation (S1) est positionnée en amont de la seconde station d'alimentation (S2) le long de la trajectoire de formation de groupe (P).

6. Machine d'emballage (18) selon la revendication 5, dans laquelle :

la première station d'alimentation (S1) insère deux dispositifs d'espacement (5) à la fois dans la poche de formation de groupe (26), de sorte que les deux dispositifs d'espacement (5) sont positionnés sur les côtés opposés de la poche de formation de groupe (26) ; et la seconde station d'alimentation (S2) insère un groupe (4) d'articles à fumer dans la poche de formation de groupe (26) entre les deux dispositifs d'espacement (5) précédemment insérés.

7. Machine d'emballage (18) selon la revendication 5, dans laquelle :

la première station d'alimentation (S1) insère un dispositif d'espacement (5) dans la poche de formation de groupe (26), donc le dispositif d'espacement (5) est positionné de manière centrale à l'intérieur de la poche de formation de groupe (26) ; et la seconde station d'alimentation (S2) insère deux groupes (4) d'articles à fumer à la fois, dans la poche de formation de groupe (26), sur les côtés opposés du dispositif d'espacement (5).

8. Machine d'emballage (18) selon l'une quelconque des revendications 1 à 7, dans laquelle la première station (S1) comprend :

une première trémie (27) contenant une pile verticale de dispositifs d'espacement (5) et ayant une sortie inférieure à travers laquelle un dispositif d'espacement (5) est expulsé de la première trémie (27) dans la poche de formation de groupe (26) arrêtée en face de la sortie ; et un premier poussoir (28) qui se déplace de ma-

nière linéaire vers l'arrière et vers l'avant dans la direction d'alimentation (D) pour déplacer de manière cyclique à travers la sortie de la première trémie (27) et pousser le dispositif d'espacement (5) de manière axiale dans la poche de formation de groupe (26) arrêtée en face de la sortie.

9. Machine d'emballage (18) selon l'une des revendications 1 à 8, dans laquelle la seconde station d'alimentation (S2) comprend :

une seconde trémie (29) contenant une masse d'articles à fumer et ayant une sortie inférieure à travers laquelle le groupe (4) d'articles à fumer est expulsé de la seconde trémie (29) dans la poche de formation de groupe (26) arrêtée en face de la sortie ; et

un second poussoir (30) qui se déplace de manière linéaire vers l'arrière et vers l'avant dans la direction d'alimentation (D) pour se déplacer de manière cyclique à travers la sortie de la seconde trémie (29) et pousse le groupe (4) d'articles à fumer axialement dans la poche de formation de groupe (26) arrêtée en face de la sortie.

10. Machine d'emballage (18) selon l'une des revendications 1 à 9, dans laquelle la poche de formation de groupe (26) a une forme de parallélépipède, comprend quatre parois (33) qui sont orientées parallèlement à la direction d'alimentation (D) et délimite une chambre unique qui est appropriée pour loger à la fois le groupe (4) d'articles à fumer et le dispositif d'espacement (5) en contact direct avec le groupe (4) d'articles à fumer.

11. Procédé d'emballage pour produire un paquet (1) d'articles à fumer comprenant un emballage interne (3) enfermant au moins un groupe (4) d'articles à fumer et au moins un dispositif d'espacement (5) ; le procédé d'emballage comprenant les étapes consistant à :

amener une poche de formation de groupe (26) pour loger le groupe (4) d'articles à fumer et le dispositif d'espacement (5) au moyen d'un transporteur de formation de groupe (25) et le long d'une trajectoire de formation de groupe (P) ;

insérer le dispositif d'espacement (5) à l'intérieur de la poche de formation de groupe (26) dans une direction d'alimentation (D), au niveau d'une première station d'alimentation (S1) positionnée le long de la trajectoire de formation de groupe (P),

insérer le groupe (4) d'articles à fumer à l'intérieur de la poche de formation de groupe (26)

en contact direct avec le dispositif d'espacement (5) et dans la direction d'alimentation (D), au niveau d'une seconde station d'alimentation (S2) positionnée le long de la trajectoire de formation de groupe (P) ;

transférer le groupe (4) d'articles à fumer conjointement avec le dispositif d'espacement (5) de la poche de formation de groupe (26) à une unité d'emballage (20) ; et

enrouler une feuille (21) de matériau d'emballage autour du groupe (4) d'articles à fumer et du dispositif d'espacement (5) sur l'unité d'emballage (20) afin de former l'emballage interne (3) ;

le procédé d'emballage étant **caractérisé en ce que :**

la poche de formation de groupe (26) loge le dispositif d'espacement (5) en contact direct avec le groupe (4) d'articles à fumer ; et la poche de formation de groupe (26) comprend au moins un guide (32) qui fait saillie vers l'intérieur à partir d'une paroi (33) de la poche de formation de groupe (26) afin d'être agencé dans l'espace approprié pour recevoir les articles à fumer, est orienté parallèlement à la direction d'alimentation (D) et met en prise le dispositif d'espacement (5) pour empêcher le mouvement transversal du dispositif d'espacement (5) à l'intérieur de la poche de formation de groupe (26).

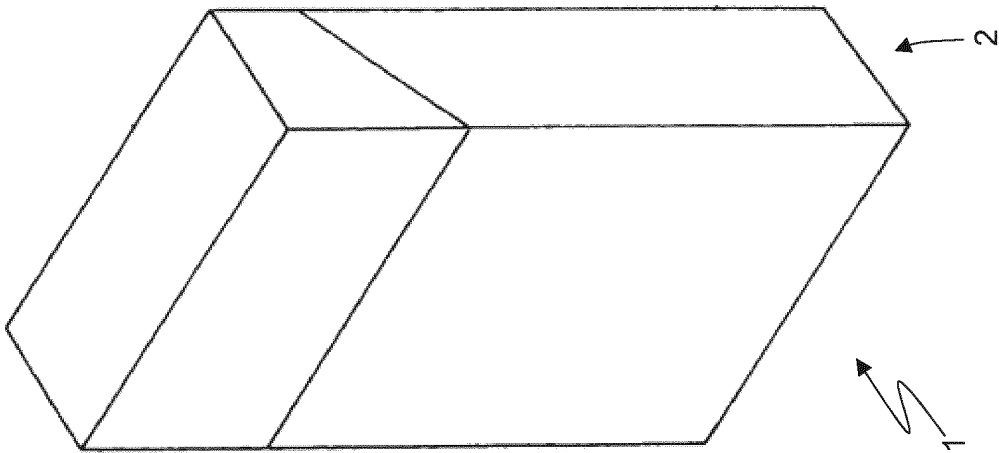


Fig.1

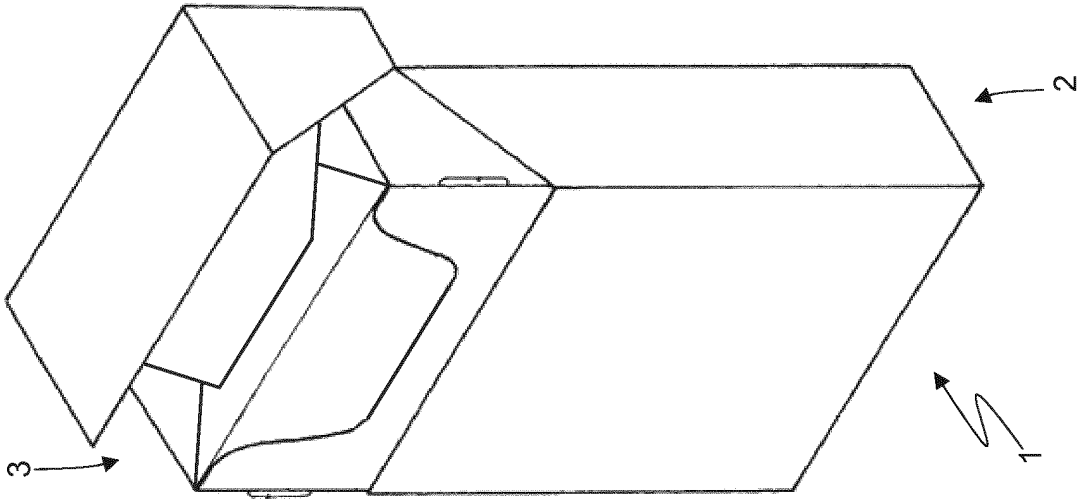


Fig.2

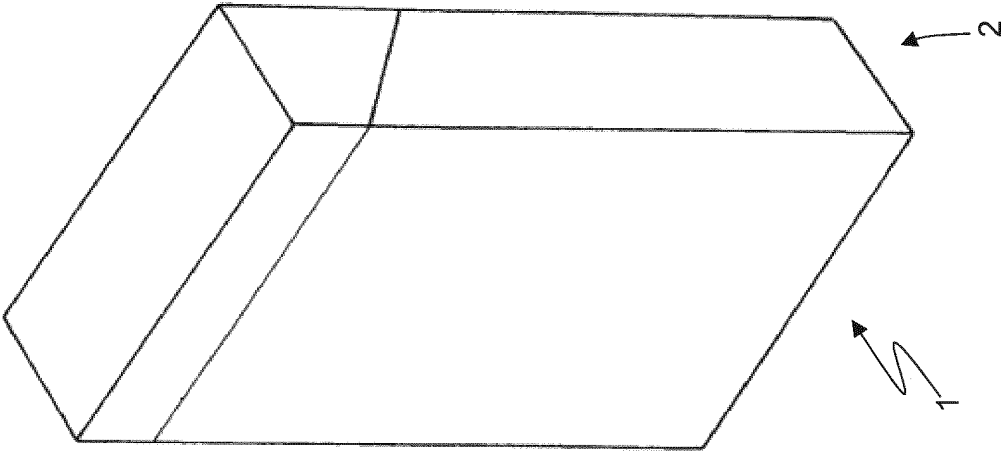
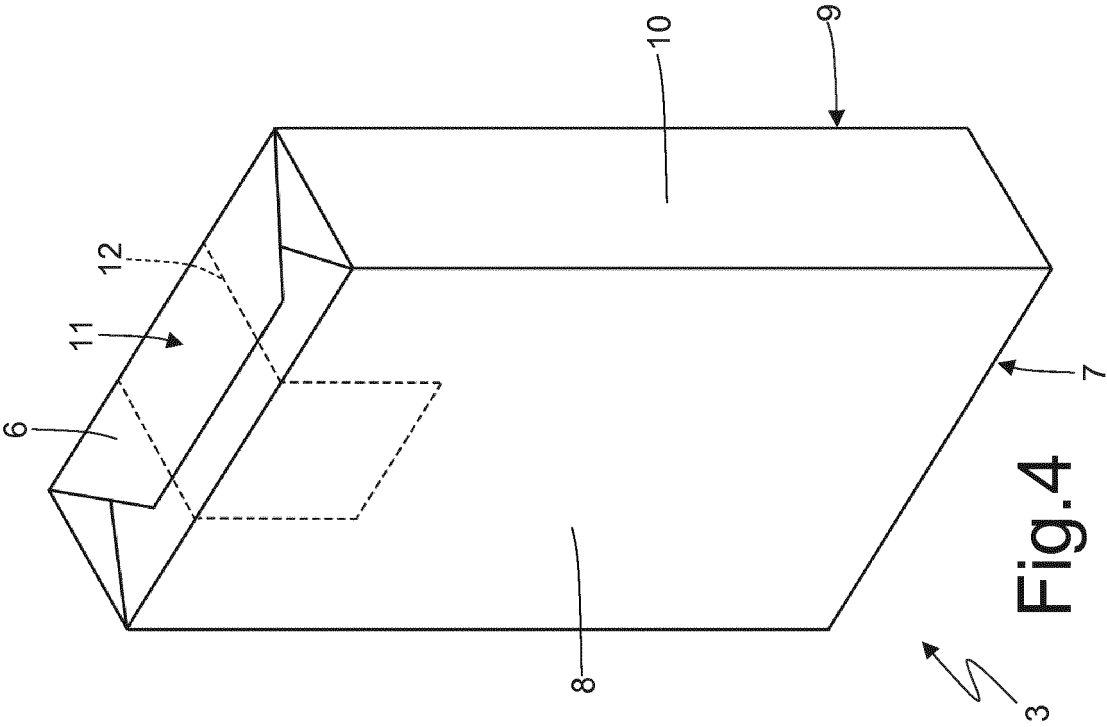
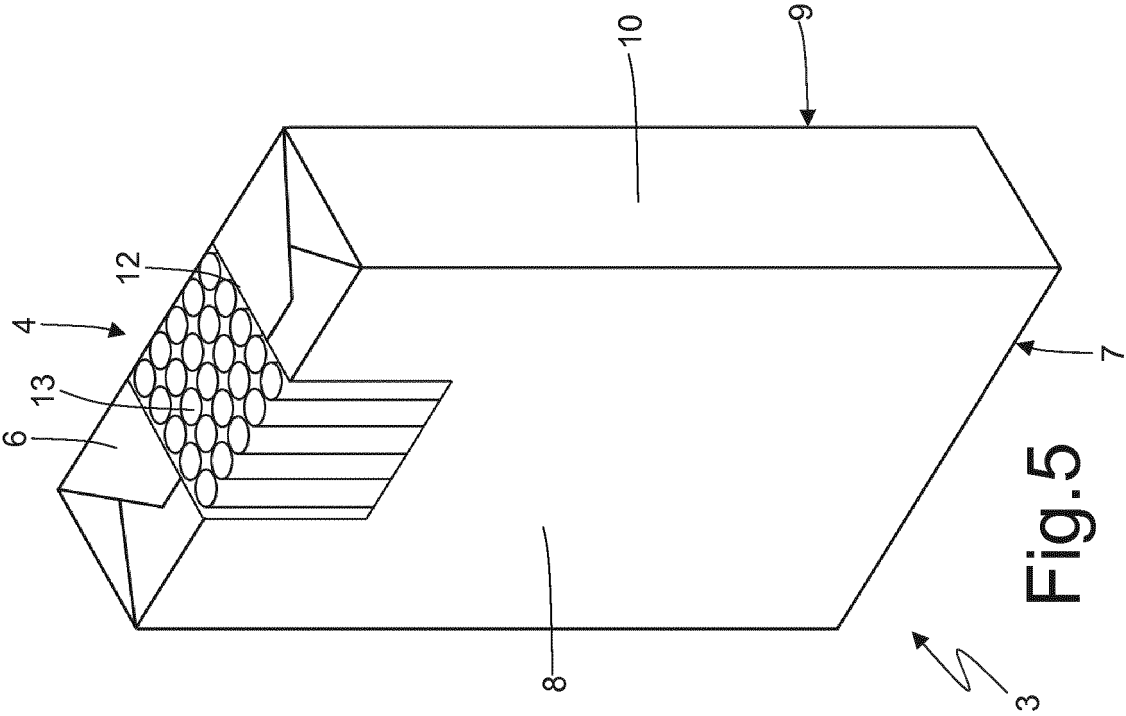
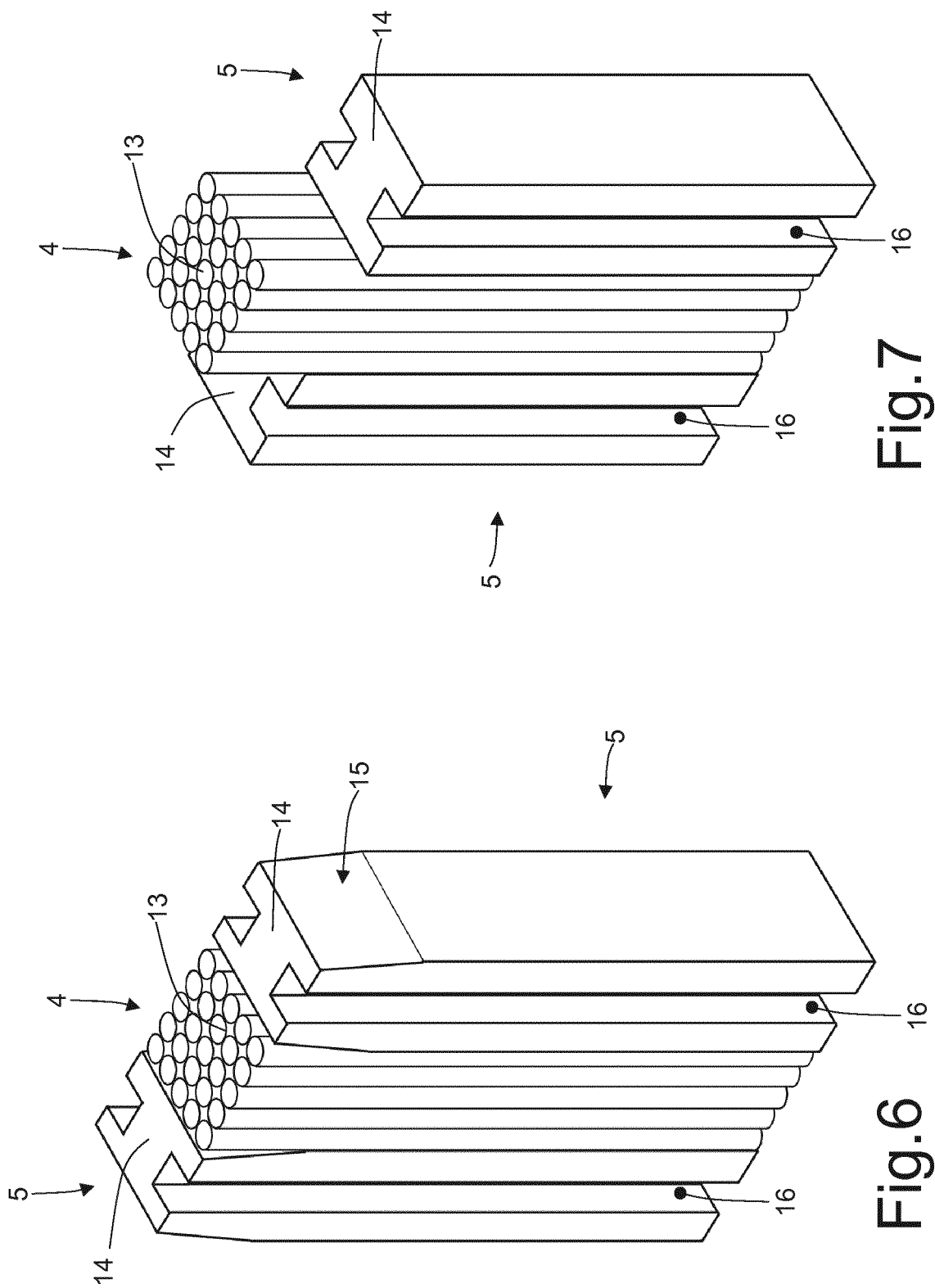


Fig.3





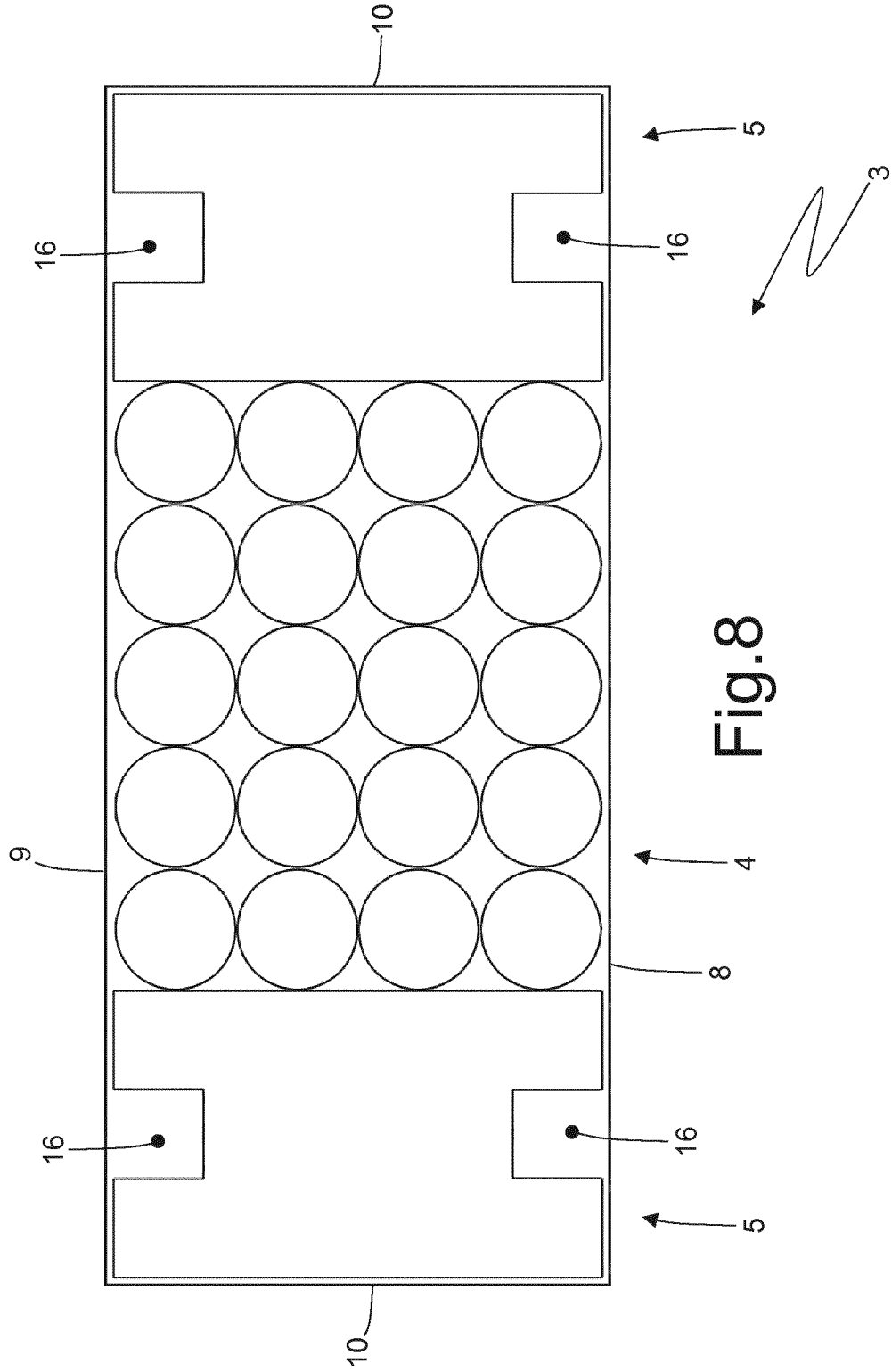
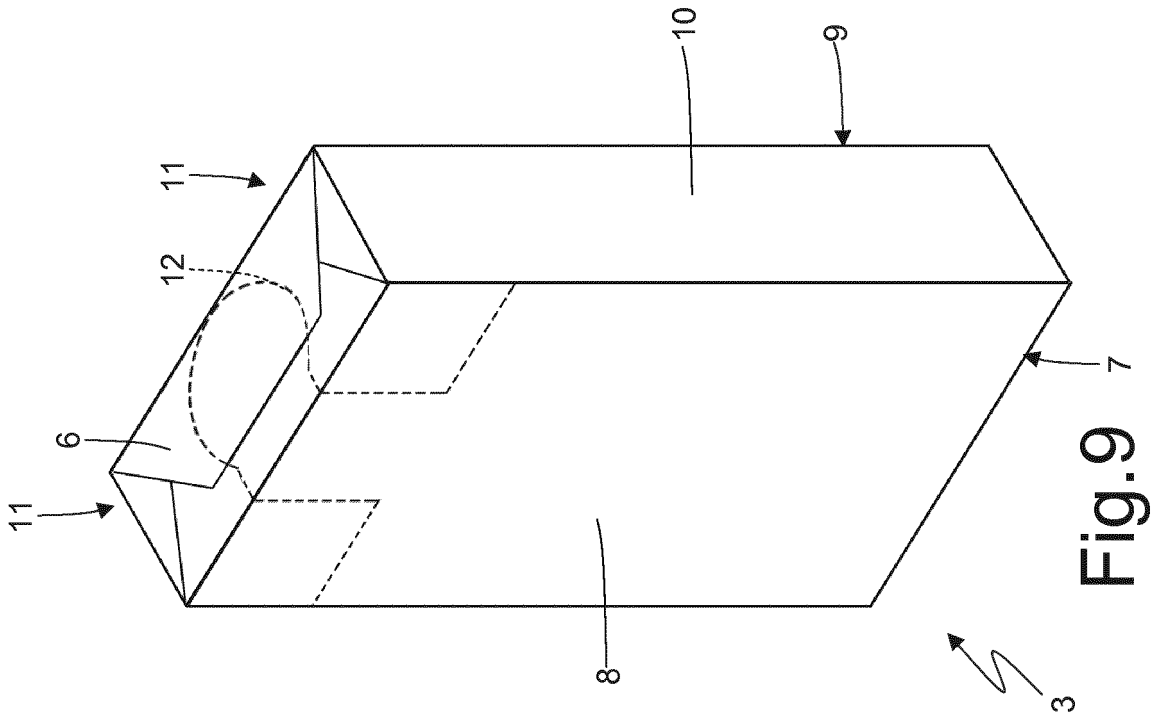
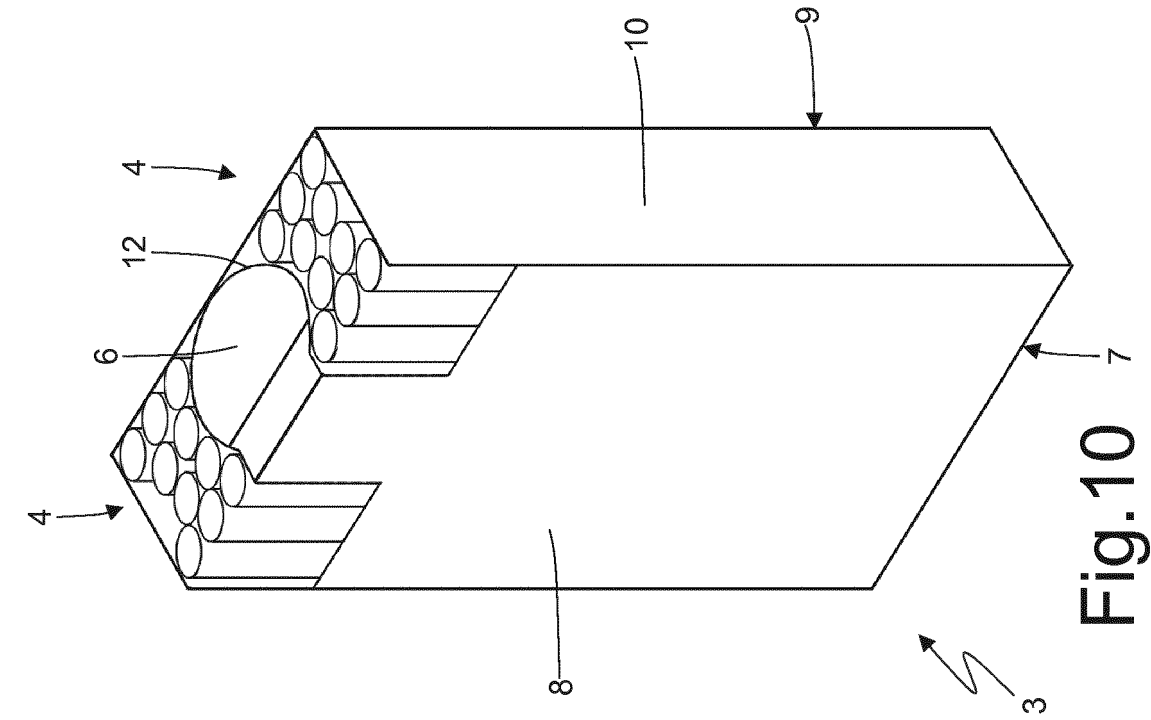


Fig. 8



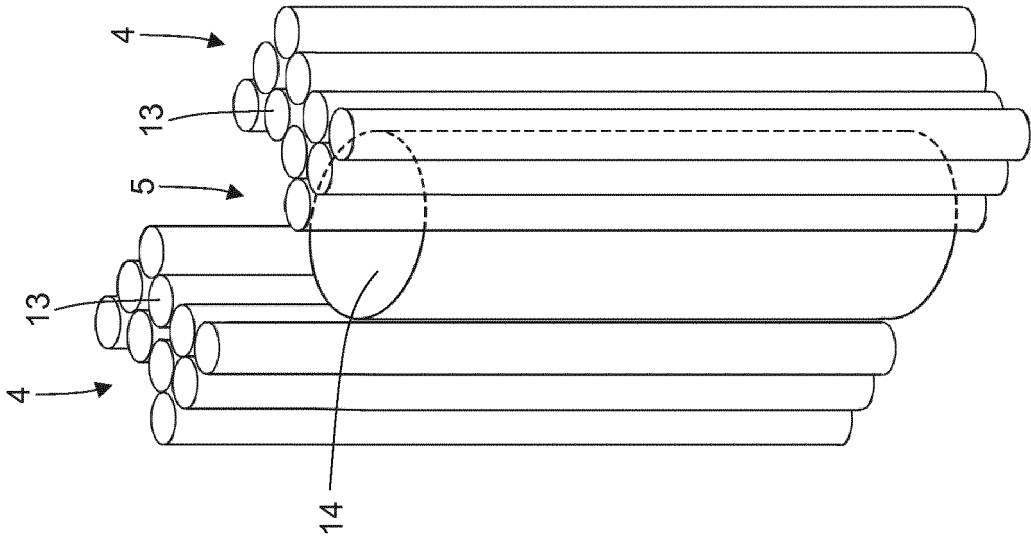


Fig.12

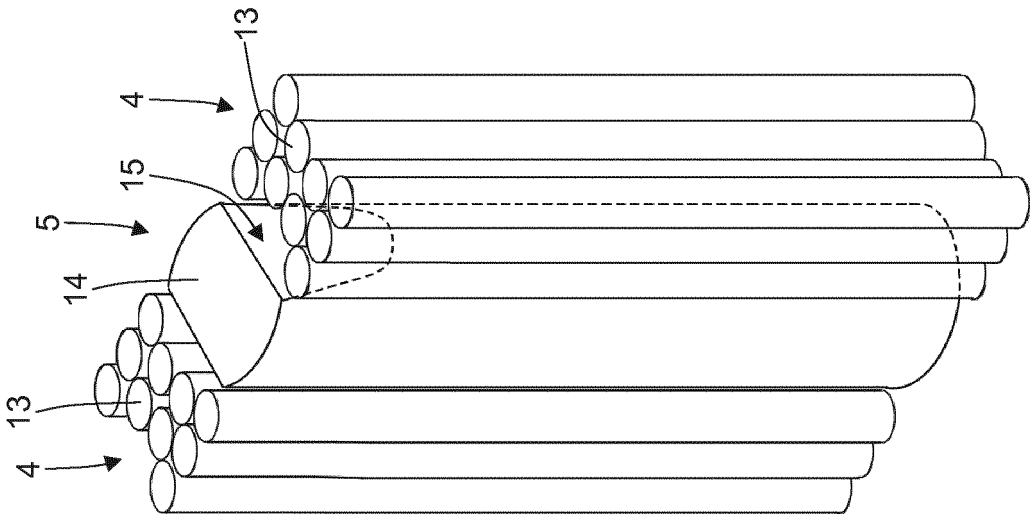


Fig.11

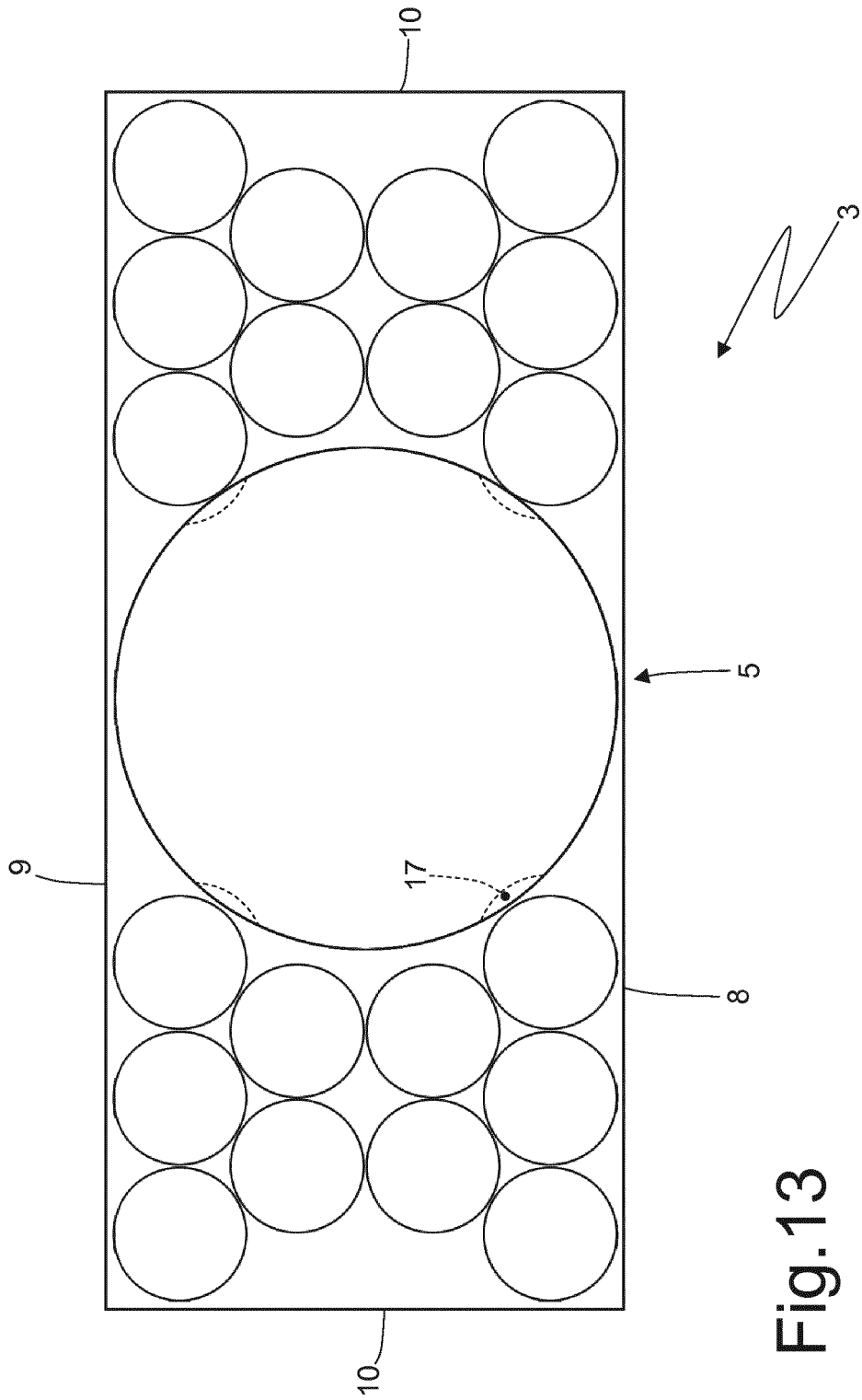


Fig.13

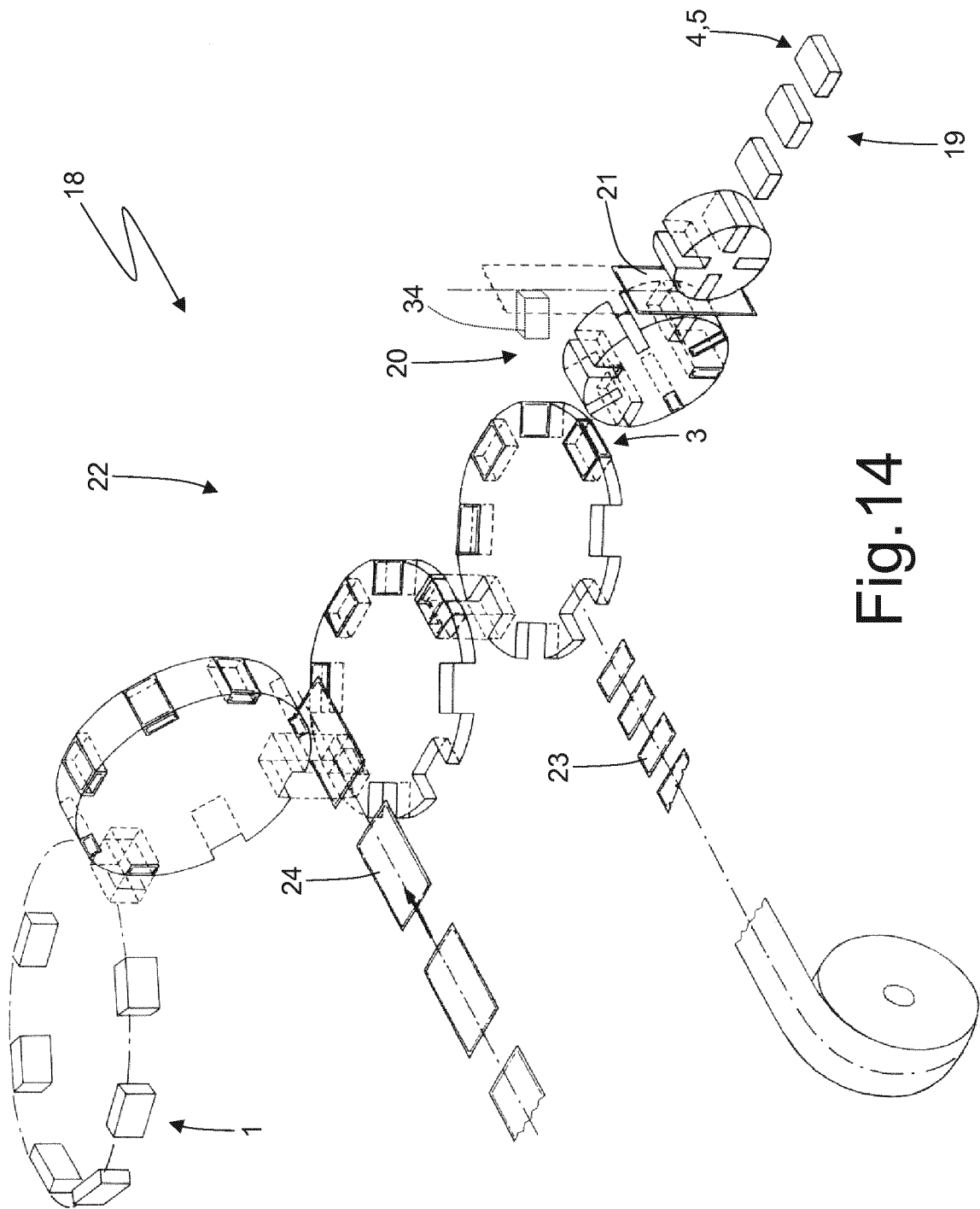


Fig. 14

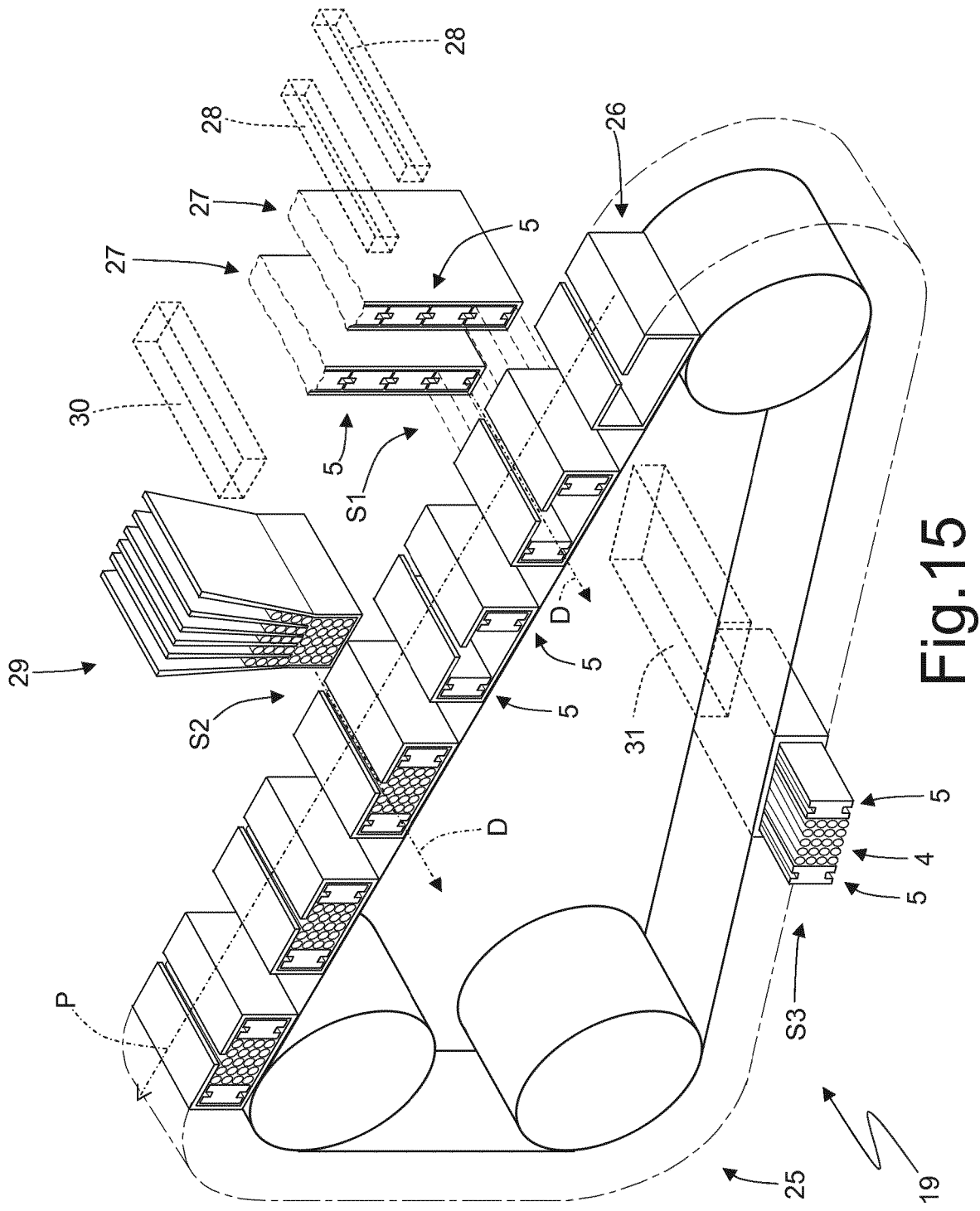
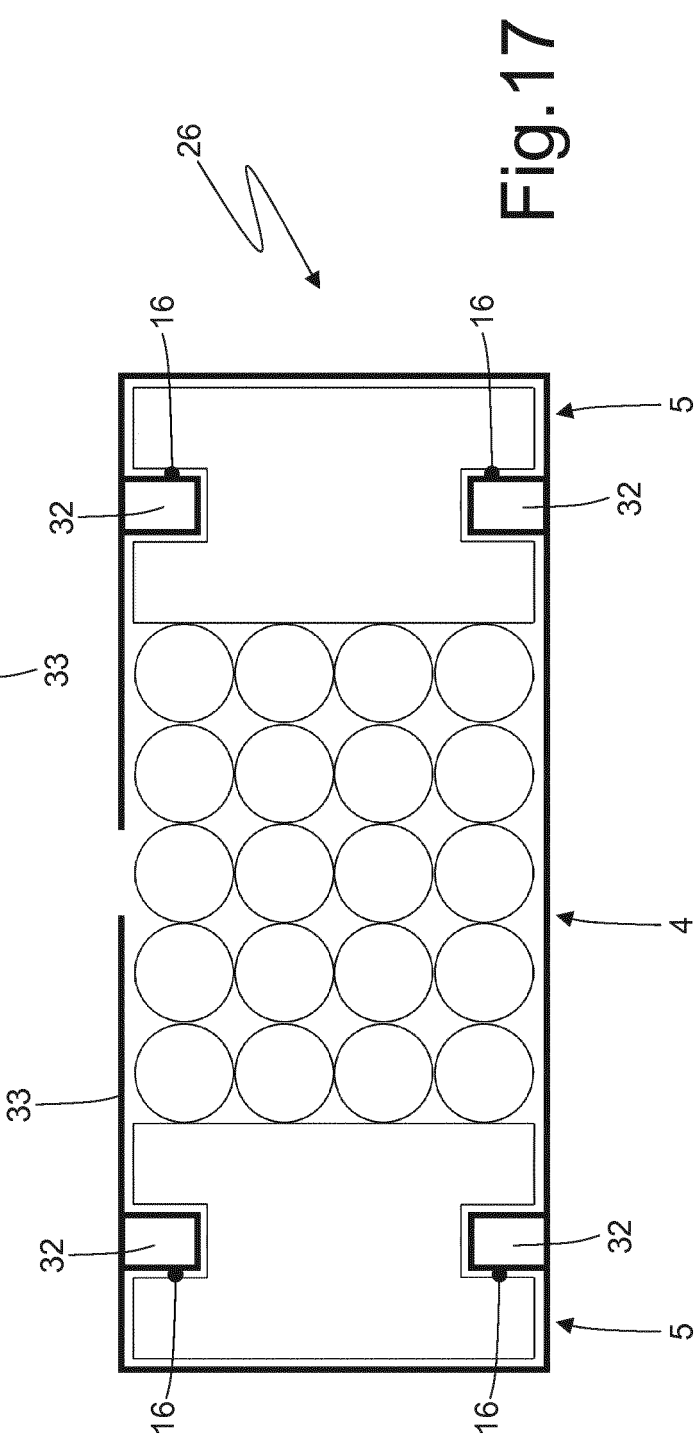
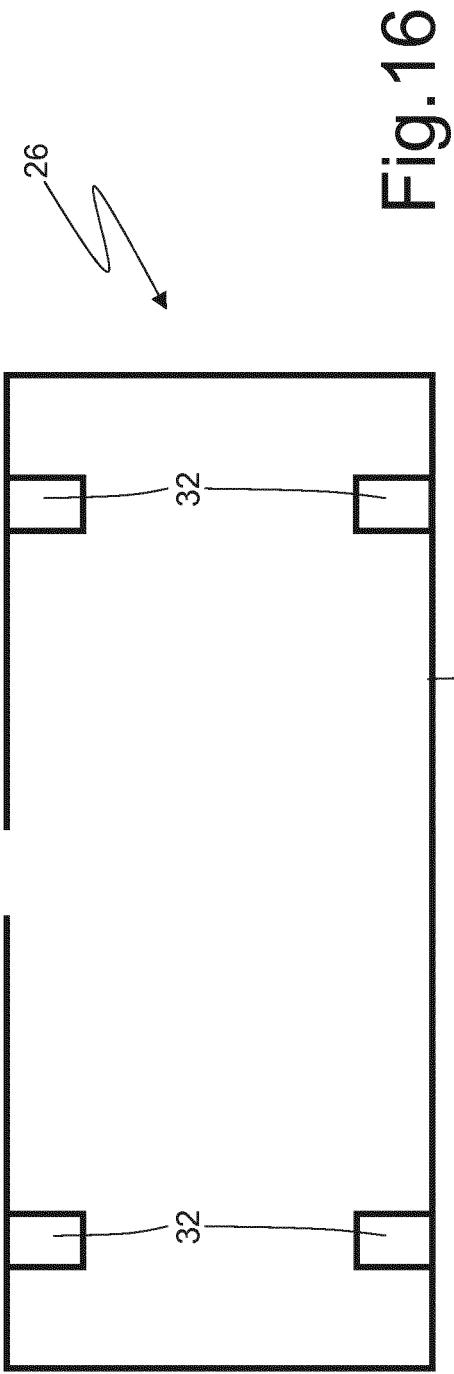


Fig.15



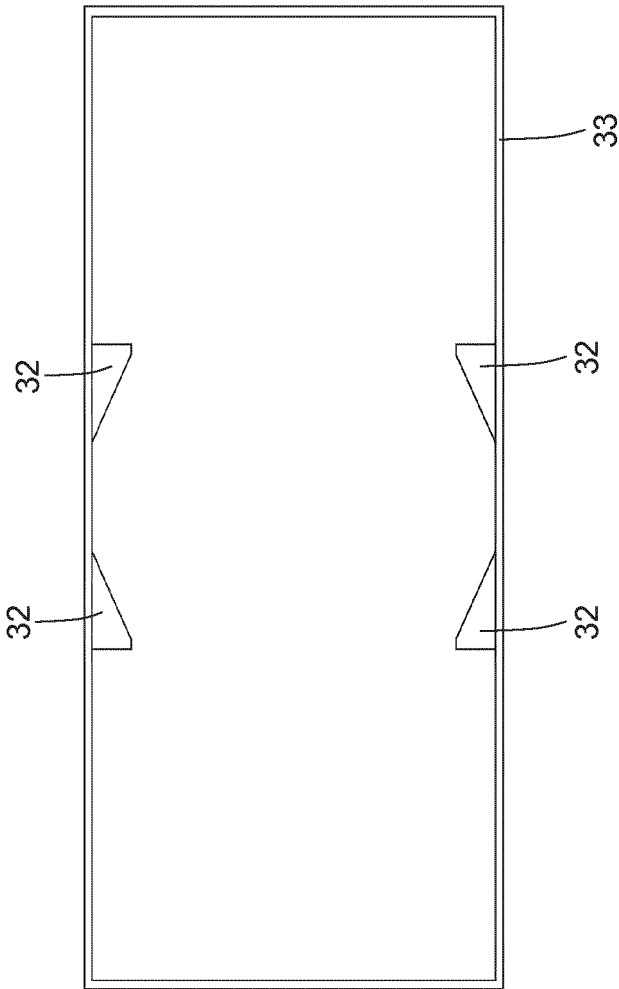


Fig. 18

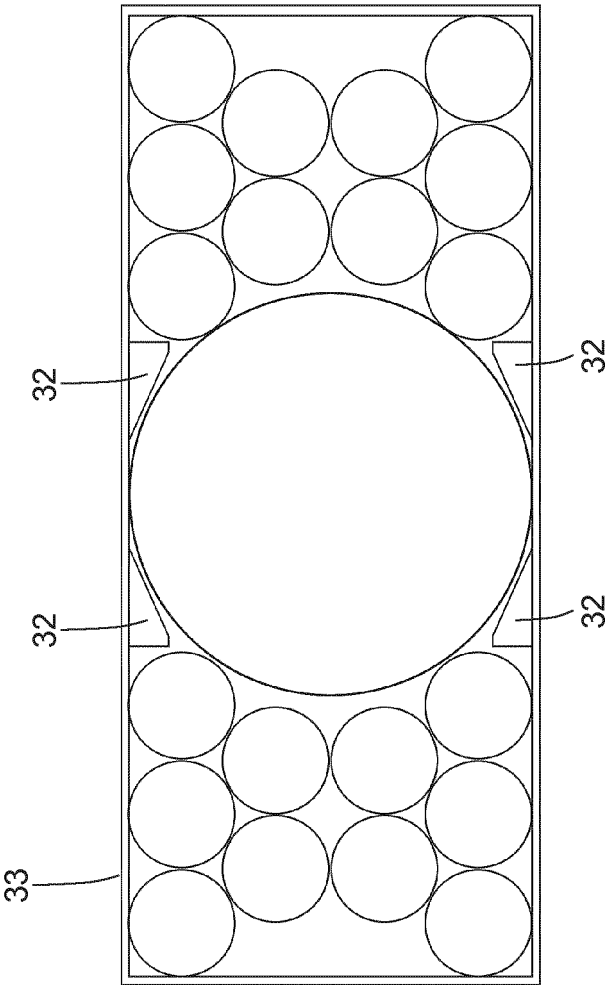


Fig. 19

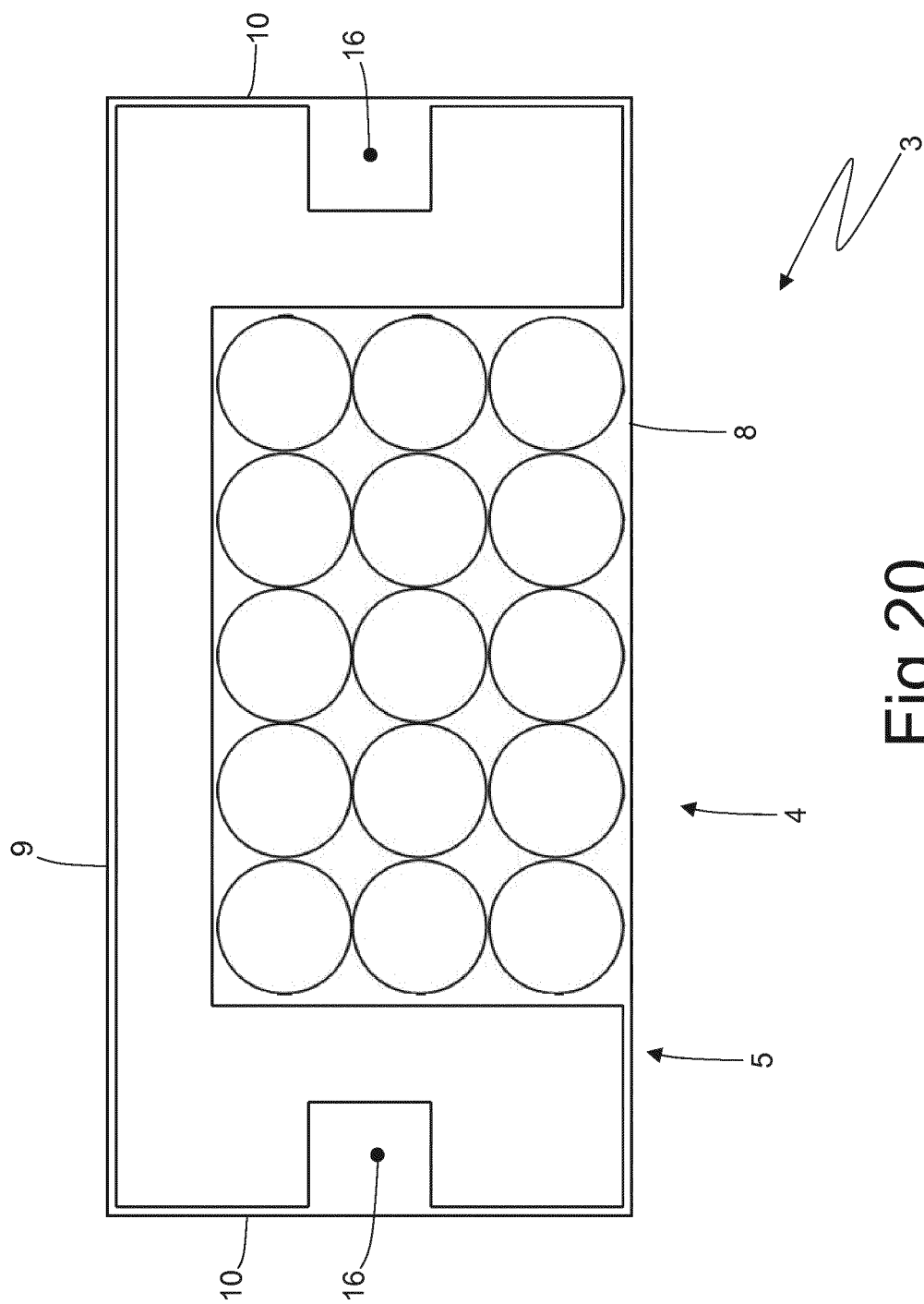


Fig. 20

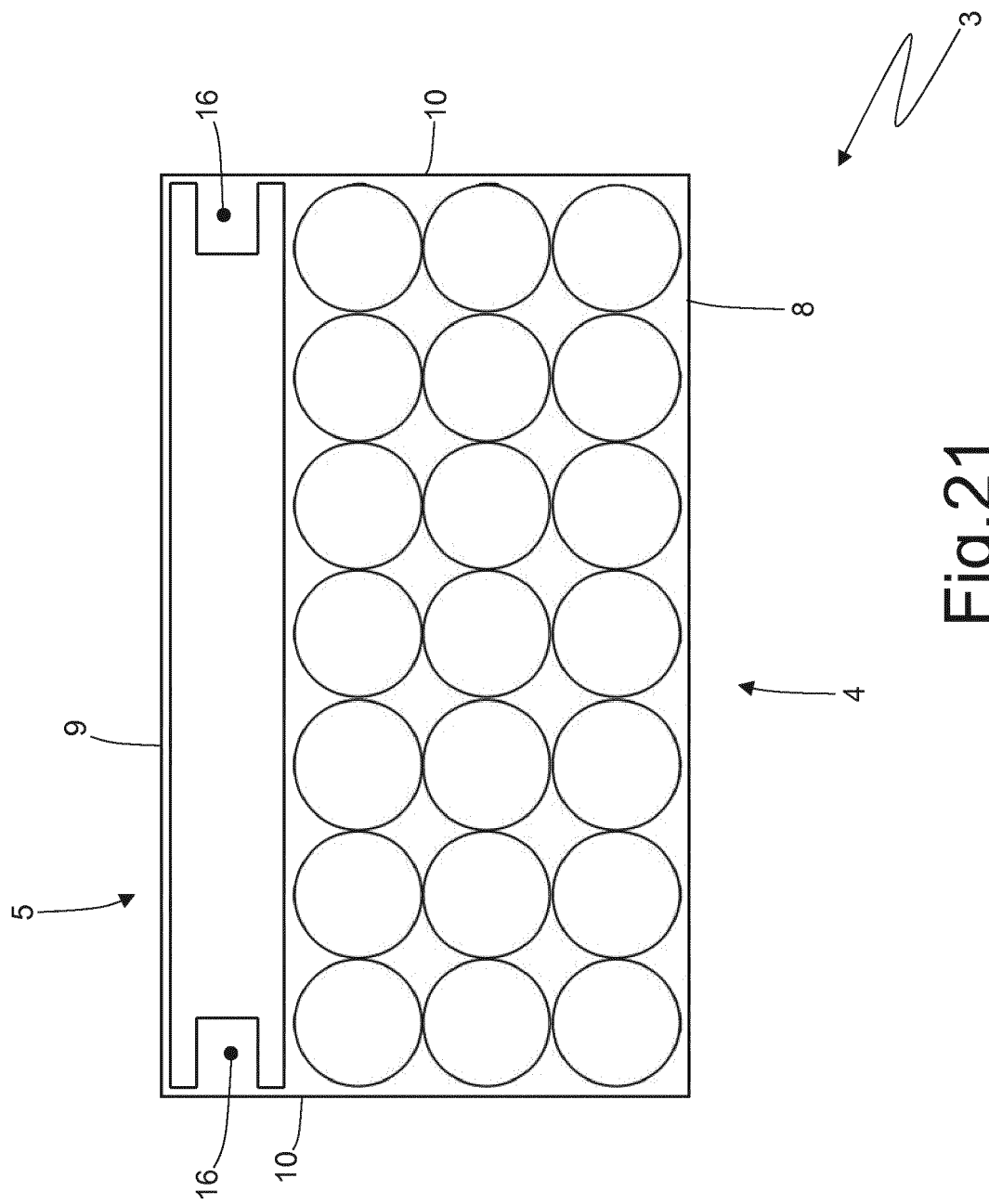


Fig. 21

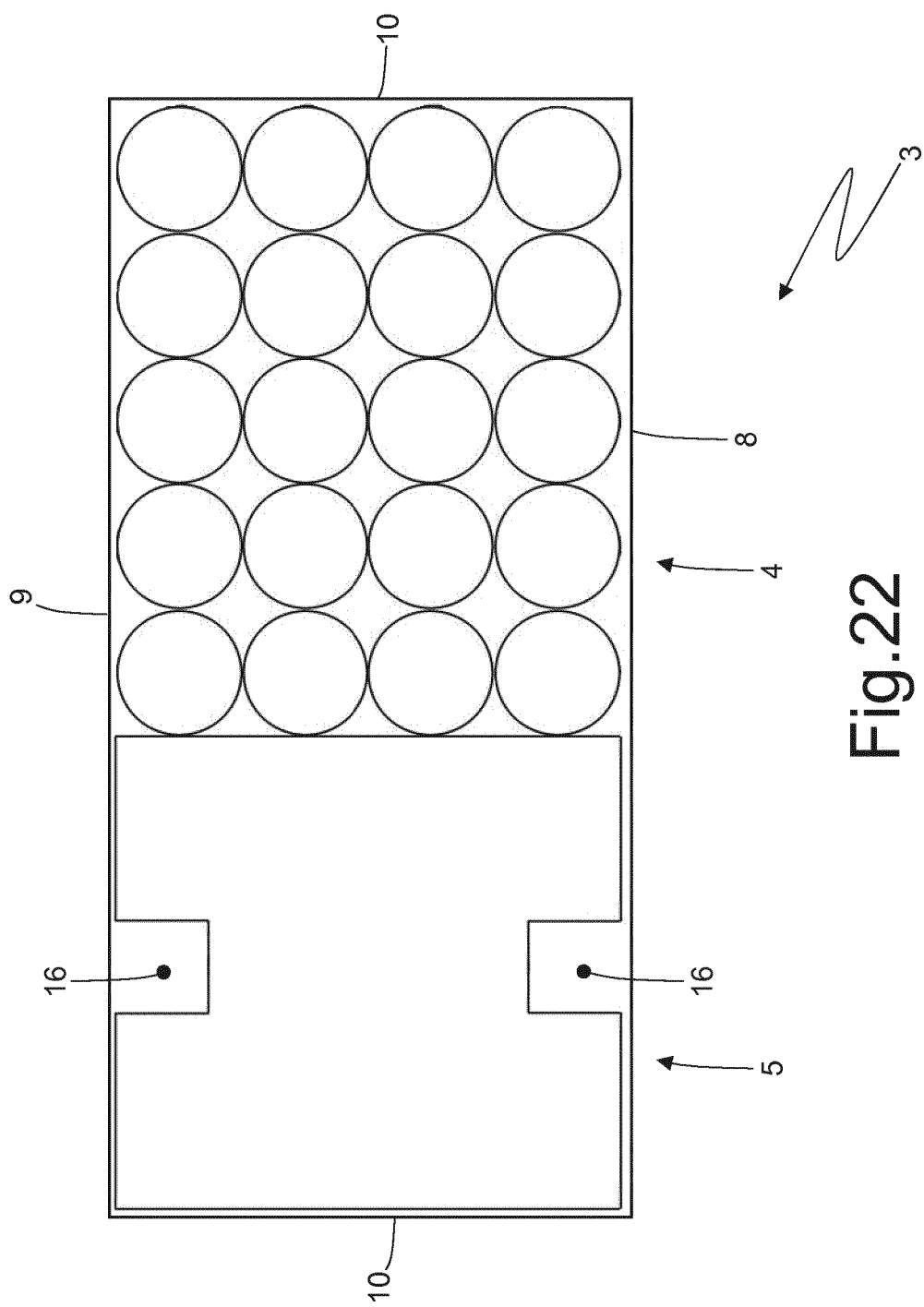


Fig. 22

REFERENCES CITED IN THE DESCRIPTION

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