

(19)



(11)

EP 2 874 887 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:

13.07.2016 Bulletin 2016/28

(51) Int Cl.:

B65B 19/02 (2006.01) **B65B 19/12** (2006.01)
B65B 19/20 (2006.01) **B65B 19/22** (2006.01)
B65B 9/067 (2012.01) **B65D 85/10** (2006.01)
B65D 75/54 (2006.01)

(21) Application number: **13767113.7**

(22) Date of filing: **22.07.2013**

(86) International application number:

PCT/IB2013/055992

(87) International publication number:

WO 2014/013478 (23.01.2014 Gazette 2014/04)

(54) **PACKING METHOD AND MACHINE FOR PRODUCING A SEALED PACKAGE CONTAINING A GROUP OF TOBACCO ARTICLES**

VERPACKUNGSVERFAHREN UND MASCHINE ZUR HERSTELLUNG EINER VERSIEGELTEN
PACKUNG MIT EINER GRUPPE VON TABAKARTIKELN

PROCÉDÉ D'EMBALLAGE ET MACHINE POUR PRODUIRE UN EMBALLAGE ÉTANCHE
CONTENANT UN GROUPE D'ARTICLES DE TABAC

(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**

• **NEGRINI, Stefano**

I-40012 Calderara Di Reno (IT)

(30) Priority: **20.07.2012 IT BO20120391**

(74) Representative: **Maccagnan, Matteo et al**
Studio Torta S.p.A.

**Via Viotti, 9
10121 Torino (IT)**

(43) Date of publication of application:
27.05.2015 Bulletin 2015/22

(56) References cited:

**WO-A1-98/49072 WO-A1-2011/110272
GB-A- 2 303 111 US-A- 5 285 621
US-A- 5 337 542 US-A1- 2003 164 314**

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

(72) Inventors:

• **SPIRITO, Gilberto**
I-40133 Bologna (IT)

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

TECHNICAL FIELD

[0001] The present invention relates to a packing method and machine for producing a sealed package containing a group of tobacco articles.

BACKGROUND ART

[0002] Rigid, hinged-lid packets of cigarettes are currently the most widely marketed, by being easy to produce and easy and practical to use, and by effectively protecting the cigarettes inside.

[0003] A rigid, hinged-lid packet of cigarettes comprises an inner package comprising a foil-wrapped group of cigarettes; and a rigid outer container housing the inner package. The outer container comprises a cup-shaped container housing the group of cigarettes and having an open top end; and a cup-shaped lid hinged to the container to rotate, with respect to the container, between an open position and a closed position opening and closing the open end respectively.

[0004] A sealed (i.e. airtight) package has recently been proposed comprising a cigarette extraction opening closed by an open-close sealing flap (the sealing flap is applied with non-dry, re-stick glue enabling it to be stuck repeatedly in the closed position closing the cigarette extraction opening).

[0005] Patent Application WO2011110272A1 describes a packing method for producing a sealed package containing a group of cigarettes. As a whole, the packing method described is substantially conventional, by causing the group of cigarettes to intercept a flat sheet of packing material, so that the sheet of packing material folds into a 'U' about the group of cigarettes.

[0006] To improve the efficiency of the packing cycle described in Patent Application WO2011110272A1, Patent Application WO2011110272A1 proposes a further packing method for producing a sealed package containing a group of cigarettes. This further method is based on the so-called 'flow-pack' method, in which a tubular wrapping is formed about a succession of groups of cigarettes by continuously and longitudinally heat-sealing a web of packing material folded into a tube; and the tubular wrapping is heat-sealed and cut transversely, upstream and downstream from each group of cigarettes, into individual sealed inner packages.

[0007] The sealed inner packages formed using the method described in Patent Application WO2011110272A1, however, have the major drawback of complicating withdrawal of the cigarettes through the extraction opening, due to the presence of a transverse heat-seal astride the top wall of the inner package.

[0008] Patent Application WO9849072A1 describes a further packing method for producing a sealed package containing a group of cigarettes. This further method is based on the so-called 'flow-pack' method, in which a

tubular wrapping is formed about a succession of groups of cigarettes by continuously and longitudinally heat-sealing a web of packing material folded into a tube; and the tubular wrapping is heat-sealed and cut transversely, upstream and downstream from each group of cigarettes, into individual sealed inner packages. Each group of cigarettes, fitted with a stiffener, is fed transversely along a packing path, i.e. with the longitudinal axes of the cigarettes perpendicular to the packing path and to the longitudinal heat-seal, and parallel to the transverse heat-seals. The sealed inner packages formed using the method described in Patent Application WO9849072A1, however, have the major drawback of the groups of cigarettes very often 'falling out of shape', i.e. failing to maintain the set orderly shape of the group (in other words, at least some of the cigarettes in the group are 'out of place'). In other words, when forming the tubular wrapping using the packing method described in Patent Application WO9849072A1, each group of cigarettes may possibly fall out of shape, i.e. the cigarettes in the group may shift out of position, thus resulting in the formation of an irregularly shaped sealed package which is inevitably rejected.

DESCRIPTION OF THE INVENTION

[0009] It is an object of the present invention to provide a packing method and machine for producing a sealed package containing a group of tobacco articles, which method and machine are designed to eliminate the above drawbacks and at the same time are cheap and easy to implement.

[0010] According to the present invention, there are provided a packing method and machine for producing a sealed package containing a group of tobacco articles, as claimed in the accompanying Claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] A number of non-limiting embodiments of the present invention will be described by way of example with reference to the attached drawings, in which:

Figure 1 shows a front view in perspective of a packet of cigarettes in a closed configuration;

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

Figure 3 shows a rear view in perspective of the Figure 1 packet of cigarettes in a closed configuration; Figure 4a shows a front view in perspective of a sealed package of the Figure 1 packet of cigarettes, formed using the packing method according to the present invention;

Figures 4b and 4c show front and rear views in perspective respectively of the Figure 4a sealed package prior to folding lateral heat-seal fins;

Figure 5 shows a view in perspective of a group of

cigarettes enclosed in the Figure 4 sealed package; Figure 6 shows a view in perspective of a stiffener inserted inside the Figure 4 sealed package; Figure 7 shows a longitudinal section of the Figure 6 stiffener; Figure 8 shows a view in perspective of the Figure 6 stiffener, illustrating the way in which a tab on the bottom wall is folded; Figure 9 shows a spread-out view of a blank from which to form the Figure 6 stiffener; Figures 10-31 show alternative embodiments of the Figure 6 stiffener and/or the blank from which to form the Figure 6 stiffener; Figure 32 shows a schematic view in perspective, with parts removed for clarity, of a packing machine for producing the Figure 1 packet of cigarettes; Figures 33 and 34 show two schematic views in perspective, with parts removed for clarity, of a packing unit of the Figure 32 packing machine, for producing the sealed package in Figure 4; Figure 35 shows a schematic plan view, with parts removed for clarity, of the packing unit in Figures 33 and 34; Figure 36 shows a schematic plan view of material flow on the Figure 33 and 34 packing unit; Figure 37 shows a schematic view in perspective of how the Figure 9 blank is folded to form the Figure 6 stiffener; Figure 38 shows a schematic section, with parts removed for clarity, of a coupling conveyor of the Figure 33 and 34 packing unit; Figure 39 shows a schematic view in perspective, with parts removed for clarity, of a packing conveyor of the Figure 33 and 34 packing unit; Figure 40 shows a schematic view in perspective of material flow on an end portion of the Figure 39 packing conveyor; Figures 41, 42 and 43 show three schematic views in perspective, with parts removed for clarity, of a variation of the Figure 33 and 34 packing unit.

PREFERRED EMBODIMENTS OF THE INVENTION

[0012] Number 1 in Figures 1, 2 and 3 indicates as a whole a rigid packet of cigarettes. Packet 1 of cigarettes comprises a cup-shaped outer container 2, which is made of cardboard, has a hinged lid, and houses a sealed package 3 (Figure 2). Sealed package 3 encloses a parallelepiped-shaped group 4 of cigarettes (Figure 5) and, at the top and front, has a central cigarette extraction opening 5 extending over part of a front wall and part of a top wall of sealed package 3. The cigarettes in group 4 are cylindrical with a longitudinal axis. Sealed package 3 comprises a reclosable (i.e. 'open-close') sealing flap (i.e. sealing panel) 6 designed to seal extraction opening 5 and coated on the underside with non-dry, re-stick glue (i.e. non-dry glue allowing the sealing flap to be detached and re-attached repeatedly). That is, sealing flap 6 nor-

mally adheres to sealed package 3 to seal extraction opening 5, and can be detached temporarily from sealed package 3 to free, and so withdraw a cigarette through, extraction opening 5.

[0013] In the embodiment shown in the attached drawings, sealing flap 6 is applied externally to the packing material of sealed package 3. In alternative embodiments, sealing flap 6 is either formed in two-layer packing material of sealed package 3, or is in the form of a frame applied to the inside of the packing material of sealed package 3.

[0014] As shown more clearly in Figure 4, sealing flap 6 has a grip tab 7 with no re-stick adhesive and located close to, normally beneath, extraction opening 5.

[0015] As shown in Figures 6, 7 and 8, sealed package 3 comprises a U-shaped stiffener (i.e. tray) 8 made of cardboard (identical to that of outer container 2) and which is inserted inside sealed package 3, contacting group 4 of cigarettes. Stiffener 8 comprises a front wall 9 positioned contacting the cylindrical lateral walls of the cigarettes in group 4; two lateral walls 10 on opposite sides of front wall 9 and positioned contacting the cylindrical lateral walls of the cigarettes in group 4; and a bottom wall 11 positioned contacting the tips of the cigarettes in group 4. Front wall 9 preferably has a top recess 12 located at cigarette extraction opening 5, so that front wall 9 does not overlap cigarette extraction opening 5.

[0016] Each lateral wall 10 comprises a lateral tab 13, which is folded 90° with respect to lateral wall 10 onto bottom wall 11. Bottom wall 11 comprises a bottom tab 14, which is folded 180° with respect to and onto bottom wall 11; and bottom tab 14 comprises an appendix 15, which is folded 90° with respect to bottom tab 14 onto front wall 9.

[0017] Stiffener 8 has no glue, and comprises a jointing system to hold bottom wall 11 and lateral walls 10 in position. The jointing system comprises a U-shaped through slit 16 formed through front wall 9, along the fold line between front wall 9 and bottom wall 11; and a U-shaped projection 17 formed on bottom tab 14, along the fold line between bottom tab 14 and appendix 15. Projection 17 on bottom tab 14 is inserted through slit 16 in front wall 9 (by elastically deforming projection 17) to form a joint, between projection 17 and through slit 16, which holds bottom wall 11 and lateral walls 10 in position, by requiring significant deformation for its release. Through slit 16 is formed by making a U-shaped cut through front wall 9, along the fold line between front wall 9 and bottom wall 11. Likewise, projection 17 is formed by making a U-shaped cut through appendix 15, along the fold line between appendix 15 and bottom tab 14.

[0018] In the finished packet 1 of cigarettes, stiffener 8 serves to reinforce and maintain the shape of sealed package 3, to prevent sealed package 3 from collapsing, when some of the cigarettes are removed, and so complicating withdrawal of the remaining cigarettes and, in particular, opening and closing of sealing flap 6. When producing sealed package 3, on the other hand, and as

described in detail below, stiffener 8 serves to hold the cigarettes in group 4 together in the right position.

[0019] Figure 9 shows a blank 18, which is folded to form the stiffener 8 in Figures 6, 7 and 8. Figure 8 clearly shows the cuts defining through slit 16 and projection 17.

[0020] Figure 10 shows a variation of the Figure 9 blank 18. The Figure 10 blank 18 differs from the Figure 9 blank 18 by comprising a 'logo', which is visible in positive form at top recess 12 (i.e. at the part of stiffener 8 visible through extraction opening 5 of sealed package 3), and in negative form at bottom tab 14 and appendix 15 (in this way, the Figure 10 blank 18 can be formed from a continuous web of cardboard with no waste).

[0021] Figures 11 and 12 show an alternative embodiment of the Figure 6, 7 and 8 stiffener 8, which differs from the Figure 6, 7 and 8 stiffener 8 by comprising an appendix 15 reduced to a minimum in size.

[0022] Figures 13 and 14 show an alternative embodiment of the Figure 6, 7 and 8 stiffener 8, which is formed from the blank 18 shown in Figure 15, and which differs from the Figure 6, 7 and 8 stiffener 8 by having no appendix 15, and by the tip of bottom tab 14 being inserted (by elastically deforming bottom tab 14) through slit 16 to form a joint between bottom tab 14 and through slit 16.

[0023] Figures 16 and 17 show an alternative embodiment of the Figure 6, 7 and 8 stiffener 8, which is formed from the blank 18 shown in Figure 18, and which differs from the Figure 6, 7 and 8 stiffener 8 by having no through slit 16 and no projection 17, and by front wall 9 having a through cut 19 (typically inverted-U-shaped) through which appendix 15 is fitted (by elastically deforming through cut 19). In other words, the jointing system comprises the inverted-U-shaped through cut 19 in front wall 9; and appendix 15 on bottom tab 14, which is folded 90° with respect to bottom tab 14 onto front wall 9, at and to fit inside through cut 19. Figure 19 shows a variation of the Figure 18 blank 18, which differs from the Figure 18 blank 18 by comprising a 'logo', which is visible in positive form at top recess 12 (i.e. at the part of stiffener 8 visible through extraction opening 5 of sealed package 3), and in negative form at bottom tab 14 and appendix 15 (in this way, the Figure 19 blank 18 can be formed from a continuous web of cardboard with no waste).

[0024] Figures 20, 21 and 22 show an alternative embodiment of the Figure 6, 7 and 8 stiffener 8, which is formed from the blank 18 shown in Figure 23, and which differs from the Figure 6, 7 and 8 stiffener 8 by having no appendix 15, no through slit 16, and no projection 17, and by lateral tabs 13 having cuts 20 into which bottom tab 14 fits (by elastically deforming lateral tabs 13).

[0025] Figures 24, 25 and 26 show three alternative embodiments of the Figure 9 blank 18, which differ from the Figure 9 blank 18 by having no bottom tab 14, no appendix 15, no through slit 16, and no projection 17; by lateral tabs 13 having cuts 20; and by bottom wall 11 having two cuts 21. When lateral tabs 13 are superimposed on bottom wall 11, each cut 20 fits inside a corresponding cut 21 (by elastically deforming relative lateral

tab 13).

[0026] Figure 27 shows an alternative embodiment of the Figure 6, 7 and 8 stiffener 8, which differs from the Figure 6, 7 and 8 stiffener 8 by having no bottom tab 14, no appendix 15, no through slit 16, and no projection 17, and by bottom wall 11 having two cuts 21. When lateral tabs 13 are superimposed on bottom wall 11, the tip of each lateral tab 13 deforms elastically to fit inside a corresponding cut 21.

[0027] Figure 28 shows an alternative embodiment of the Figure 6, 7 and 8 stiffener 8, which differs from the Figure 6, 7 and 8 stiffener 8 by having no bottom tab 14, no appendix 15, no through slit 16, and no projection 17; by the two lateral tabs 13 being connected to opposite ends of bottom wall 11, and being folded 90° with respect to bottom wall 11 onto lateral walls 10; and by each lateral wall 10 comprising a lateral wing 22, which is folded 180° with respect to and onto lateral wall 10 to enclose a corresponding lateral tab 13. Each lateral wing 22 has two projections 23, which (by deforming elastically) fit through corresponding through slits 24 in front wall 9 to form a joint between projections 23 and through slits 24.

[0028] Figures 29 and 30 show an alternative embodiment of the Figure 6, 7 and 8 stiffener 8, which differs from the Figure 6, 7 and 8 stiffener 8 by having no appendix 15, no through slit 16, and no projection 17; and by bottom tab 14 being folded 90° with respect to bottom wall 11.

[0029] Figure 31 shows an alternative embodiment of the Figure 9 blank 18, which differs from the Figure 9 blank 18 by having no bottom tab 14, no appendix 15, no through slit 16, and no projection 17; and by each lateral tab 13 being glued by glue 25 to bottom wall 11. In other words, in all the embodiments shown in Figures 6-30, stiffener 8 has no glue, and comprises a jointing system to hold bottom wall 11 and lateral walls 10 in position; whereas, in the Figure 31 embodiment, stiffener 8 has no jointing system, but has two areas of glue 25 to hold bottom wall 11 and lateral walls 10 in position. In an alternative embodiment (not shown) perfectly equivalent to the one in Figure 31, the two lateral tabs 13 are connected to opposite ends of bottom wall 11, are folded 90° with respect to bottom wall 11 onto lateral walls 10, and are glued by glue 25 to lateral walls 10.

[0030] Choosing which of the above embodiments of stiffener 8 to employ depends on the relationship between the thickness of group 4 of cigarettes (and therefore the size of bottom wall 11 of stiffener 8) and the size of recess 12 (which, to avoid waste, also affects the shape and size of bottom tab 14 and appendix 15).

[0031] Number 26 in Figure 32 indicates as a whole a packing machine for producing packet 1 of cigarettes in Figures 1, 2 and 3. Packing machine 26 comprises a packing section 27 for producing sealed packages 3; and a follow-up packing section 28 for producing outer containers 2 by folding rigid blanks 29 about the sealed packages 3 from packing section 27.

[0032] As shown in Figure 33, packing section 27 com-

prises a forming unit 30 for producing groups 4 of cigarettes, and for producing stiffeners 8 by folding blanks 18; a coupling unit 31 for fitting groups 4 of cigarettes with respective stiffeners 8; and a packing unit 32 for producing sealed packages 3 by folding and heat-sealing a strip 33 of packing material (complete with extraction openings 5 and superimposed sealing flaps 6) about groups 4 of cigarettes fitted with respective stiffeners 8.

[0033] Forming unit 30 comprises a hopper 34 with four outlets; and a forming belt conveyor 35 supporting a number of forming pockets 36. Forming conveyor 35 feeds each forming pocket 36 from an input station 37, located in front of an outlet of hopper 34 and where a group 4 of cigarettes is expelled from the outlet of hopper 34 into forming pocket 36, to an output station 38 where the group 4 of cigarettes is expelled from forming pocket 36. Forming unit 30 also comprises a folding belt conveyor 39 supporting a number of folding pockets (not shown) and extending parallel to and alongside forming conveyor 35. Folding conveyor 39 feeds each folding pocket from an input station 40, where a blank 18 is fed into the folding pocket; through a number of folding stations, where blank 18 is folded (completely or partly) to form a stiffener 8; and to an output station 41, where the stiffener 8 is expelled from the folding pocket.

[0034] As shown in Figure 38, coupling unit 31 comprises a coupling conveyor 42, which is positioned perpendicular to forming conveyor 35 and folding conveyor 39, picks up each group 4 of cigarettes at output station 38 of forming conveyor 35, couples group 4 of cigarettes with a corresponding stiffener 8 at a coupling station 43 (located over and aligned vertically with output station 41 of folding conveyor 39), and feeds group 4 of cigarettes, fitted with stiffener 8, to an input station 44 of packing unit 32. Coupling conveyor 42 comprises an endless belt 45 fitted with a number of paddles 46, which push groups 4 of cigarettes along a slide surface 47 connecting output station 38 of forming conveyor 35 to input station 44 of packing unit 32.

[0035] Slide surface 47 is static (i.e. mounted in a fixed position) and is connected to an elevator 47a movable vertically between a bottom position (Figure 38), in which elevator 47a is located at output station 41 of folding conveyor 39, and a top position (not shown in Figure 38), in which elevator 47a is located at coupling station 43. Slide surface 47 has a through opening, through which a stiffener 8 is raised by elevator 47a. In actual use, elevator 47a is moved into the bottom position to pick up a stiffener 8, and is then raised to feed stiffener 8 into coupling station 43, where stiffener 8 intercepts and couples with a corresponding group 4 of cigarettes (i.e. as it moves along, group 4 of cigarettes impacts bottom wall 11 of stiffener 8, thus drawing stiffener 8 along with it). In a preferred embodiment, the end of slide surface 47 around the through opening is designed to finish folding bottom tab 14 and appendix 15 as stiffener 8 is pushed up by elevator 47a.

[0036] As shown in Figure 39, packing unit 32 com-

prises a packing conveyor 48, which feeds each group 4 of cigarettes (fitted with respective stiffener 8) along a straight packing path P. A fixed folding device 49 (shown schematically in Figure 35) winds strip 33 of packing material longitudinally, i.e. parallel to packing path P, about packing path P to bring the two opposite edges of strip 33 of packing material into contact and so form a tubular wrapping enclosing groups 4 of tobacco articles (fitted with respective stiffeners 8). Packing unit 32 also comprises a heat-sealing device 50 (shown schematically in Figures 35 and 40) located downstream from folding device 49, and which heat-seals the two opposite overlapping edges of strip 33 of packing material longitudinally, i.e. parallel to packing path P, to stabilize the tubular wrapping. Packing unit 32 also comprises a heat-sealing device 51 (shown schematically in Figures 35 and 40) located downstream from heat-sealing device 50, and which heat-seals and cuts the tubular wrapping transversely, i.e. perpendicularly to packing path P, upstream and downstream from each group 4 of cigarettes (fitted with respective stiffener 8), to complete sealed packages 3.

[0037] It is important to note that packing conveyor 48 feeds each group 4 of cigarettes (fitted with respective stiffener 8) transversely along packing path P, i.e. with the longitudinal axes of the cigarettes perpendicular to packing path P and to the longitudinal heat-seal, and parallel to the transverse heat-seals. Feeding groups 4 of cigarettes along the packing path in this way is extremely important, by enabling the formation of sealed packages 3 with the transverse heat-seals along the lateral walls, and with no heat-seals at all on the bottom wall and, more importantly, on the top wall in which extraction opening 5 is formed.

[0038] As stated, strip 33 of packing material is already complete with extraction openings 5 covered with open-close sealing flaps 6, which are formed and applied respectively at work stations (not shown) upstream from packing unit 32. On strip 33 of packing material, extraction openings 5 covered with open-close sealing flaps 6 are located on the opposite side of the tubular wrapping to the longitudinal heat-seal, and are centred between the two transverse heat-seals. In a different embodiment not shown, extraction openings 5 covered with open-close sealing flaps 6 may be located on the same side as the longitudinal heat-seal and, as opposed to being centred, may be more or less asymmetrical in shape and/or position.

[0039] As shown in Figure 39, packing conveyor 48 comprises a static (i.e. stationary) slide surface 52, along which each group 4 of cigarettes slides, and about which strip 33 of packing material is wound; and a push device 53 located over groups 4 of cigarettes, and which pushes each group 4 of cigarettes along packing path P. Push device 53 comprises a conveyor belt 54, which is located over each group 4 of cigarettes, extends parallel to packing path P, presses each group 4 of cigarettes against slide surface 52, and comprises paddles 55, which

project from conveyor belt 54 and are positioned upstream and downstream from, to define a seat for, each group 4 of cigarettes.

[0040] Finally, packing unit 32 comprises a feed conveyor 56, which receives groups 4 of cigarettes from coupling conveyor 42 at input station 44, and feeds groups 4 of cigarettes onto slide surface 52. Feed conveyor 56 comprises two parallel, side by side conveyor belts 57 located beneath groups 4 of cigarettes, and on which groups 4 of cigarettes rest. Each conveyor belt 57 comprises paddles 58, which project from conveyor belt 57 and are positioned upstream and downstream from, to define a seat for, each group 4 of cigarettes.

[0041] In a preferred embodiment, packing unit 32 comprises two conveyor belts 59 positioned facing each other on opposite sides of packing path P, directly upstream from heat-sealing device 50. As strip 33 of packing material is wound, the two conveyor belts 59 press on opposite sides of the tubular wrapping to compress the two opposite longitudinal edges of the tubular wrapping transversely (i.e. the two conveyor belts 59 press on the longitudinally oriented bottom wall and top wall of each sealed package 3 in the making).

[0042] As shown more clearly in Figure 40, longitudinally heat-sealing (by means of heat-sealing device 50) the two opposite overlapping edges of strip 33 of packing material to stabilize the tubular wrapping produces a longitudinal fin 60, which initially projects perpendicularly from the tubular wrapping. In a preferred embodiment, heat-sealing device 50 forming the longitudinal heat-seal is connected to a folding device, which folds the longitudinal fin 60 ninety degrees and presses it onto the tubular wrapping. Likewise, each transverse heat-seal (by heat-sealing device 51) on the tubular wrapping produces a transverse fin 61, which initially projects perpendicularly from (i.e. from a lateral wall of) the corresponding sealed package 3. In a preferred embodiment, a folding device downstream from heat-sealing device 51 folds each transverse fin 61 ninety degrees and presses it onto the corresponding sealed package 3 (i.e. onto a lateral wall of the corresponding sealed package 3). Each transverse fin 61 is preferably fixed (heat-sealed or glued) to the corresponding sealed package 3 (i.e. to a lateral wall of the corresponding sealed package 3) so that it remains permanently contacting sealed package 3.

[0043] It is important to note that, whereas each transverse fin 61 must be fixed to remain permanently contacting the corresponding sealed package 3, the transverse heat-seals provide for holding the longitudinal fin 60 permanently contacting the corresponding sealed package 3.

[0044] Figures 4b and 4c show a sealed package 3 prior to folding (fixing) the two transverse fins 61, and Figure 4a a sealed package 3 after the two transverse fins 61 are folded (fixed).

[0045] In the Figure 32-40 embodiment, each group 4 of cigarettes is formed on forming conveyor 35 independently and separately from the corresponding stiffener 8;

each stiffener 8 is folded on folding conveyor 39 independently and separately from formation of the corresponding group 4 of cigarettes; and each pre-formed group 4 of cigarettes is coupled on coupling conveyor 42 with the corresponding pre-folded stiffener 8. As stated, forming conveyor 35 for forming groups 4 of cigarettes extends parallel to and alongside folding conveyor 38 for folding stiffeners 8; whereas coupling conveyor 42, on which each pre-formed group 4 of cigarettes is coupled with the corresponding pre-folded stiffener 8, is perpendicular to forming conveyor 35 and folding conveyor 38.

[0046] In the Figure 41-43 embodiment, on the other hand, each stiffener 8 is fed into a forming pocket 36 on forming conveyor 35, upstream from hopper 34; and each group 4 of cigarettes is transferred from hopper 34 into forming pocket 36 (containing stiffener 8) and directly into stiffener 8. In this embodiment, as opposed to extending parallel to and alongside forming conveyor 35, folding conveyor 39 for folding stiffeners 8 is located upstream from forming conveyor 35 to feed stiffeners 8, already folded, to the start of forming conveyor 35.

[0047] For the sake of simplicity, Figures 41-43 show a simplified stiffener 8 with only front wall 9 and lateral walls 10 (i.e. with no bottom wall 11). Though, clearly, stiffener 8 in the Figure 41-43 embodiment may also be as described with reference to Figures 6-31.

[0048] In one embodiment, packing unit 32 comprises a processing device for extracting air (by suction) from the tubular wrapping to form vacuum-sealed packages 3. Alternatively, in addition to extracting air by suction from the tubular wrapping, the processing device also injects inert gas to form controlled-atmosphere sealed packages 3.

[0049] The sealed package production process may therefore comprise a step of extracting air from the tubular wrapping to form vacuum-sealed packages, and/or a step of injecting inert gas into the tubular wrapping to form controlled-atmosphere sealed packages.

[0050] In a different embodiment not shown, packing machine 26 only comprises packing section 27 for producing sealed packages 3, which are marketed as they are, without outer containers 2 (i.e. each packet 1 of cigarettes only comprises sealed package 3, and has no outer container 2); or else a further packing machine (separate from and fully independent of packing machine 26) receives sealed packages 3 from packing machine 26, and forms outer containers 2 about sealed packages 3.

[0051] The packing method and machine 26 described above have numerous advantages.

[0052] Firstly, they provide for 'flow-pack' producing sealed packages 3 enabling trouble-free withdrawal of the cigarettes through extraction opening 5. As stated, this is achieved by each sealed package 3 having the transverse heat-seals (i.e. transverse fins 61) along the lateral walls, and no heat-seals at all on the bottom wall and, more importantly, on the top wall in which extraction opening 5 is formed.

[0053] Secondly, the packing method and machine 26 described provide for 'flow-pack' producing sealed packages 3 with perfectly formed groups 4 of cigarettes, i.e. in which the cigarettes are positioned correctly as shown in Figure 5. On packing conveyor 48, on which each group 4 of cigarettes travels transversely (i.e. with the longitudinal axes of the cigarettes perpendicular to packing path P), the danger of group 4 of cigarettes falling out of shape, i.e. of the cigarettes in group 4 shifting out of position, is averted by the combined action of stiffener 8, which defines a 'box' for containing and retaining group 4 of cigarettes, and of packing conveyor 48, which maintains sufficient transverse and longitudinal pressure on stiffener 8 (and therefore on group 4 of cigarettes inside stiffener 8). More specifically, stiffener 8 (and therefore group 4 of cigarettes inside stiffener 8) is compressed longitudinally by paddles 55 of push device 53, which define a seat for group 4 of cigarettes; and stiffener 8 (and therefore group 4 of cigarettes inside stiffener 8) is compressed transversely by the two conveyor belts 59.

[0054] Essential to ensuring the correct shape of group 4 of cigarettes is the fact that stiffener 8 comprises a system for connecting bottom wall 11 to lateral walls 10, and for preventing bottom wall 11 from moving with respect to lateral walls 10 (or, conversely, preventing lateral walls 10 from moving with respect to bottom wall 11). This connecting system, in fact, increases the rigidity of stiffener 8 and so further prevents unwanted movements of the cigarettes in group 4, particularly when forming the tubular wrapping.

[0055] Moreover, in a preferred but non-limiting embodiment, the system connecting bottom wall 11 and lateral walls 10 has no glue, thus eliminating any glue inside sealed package 3, and the possibility of the substances in the glue somehow altering the taste and/or aroma of the tobacco in the cigarettes.

[0056] Finally, the packing method and machine 26 described are cheap and easy to implement, by employing simple, easily powered component parts.

[0057] Given its numerous advantages, the design of packet 1 of cigarettes described may also be used for producing a carton of cigarettes, which is substantially the same as packet 1 described, except that it contains a group of packets of cigarettes as opposed to a group of cigarettes, or for producing a packet of cigars or similar, which is substantially the same as packet 1 described, except that it contains a group of cigars or similar, as opposed to a group of cigarettes.

Claims

1. A packing method for producing a sealed package (3) containing a group (4) of cylindrical tobacco articles, the packing method comprising the steps of:

coupling the group (4) of tobacco articles with a stiffener (8) comprising a front wall (9) oriented

longitudinally and positioned contacting the cylindrical lateral walls of the tobacco articles; and two lateral walls (10) located on opposite sides of the front wall (9), positioned contacting the cylindrical lateral walls of the tobacco articles, and oriented crosswise to a packing path (P); feeding the group (4) of tobacco articles, coupled with the stiffener (8), along the packing path (P) on a packing conveyor (48); folding a strip (33) of packing material longitudinally, i.e. parallel to the packing path (P), about the packing path (P) to bring the two opposite edges of the strip (33) of packing material into contact and so form a tubular wrapping enclosing the group (4) of tobacco articles coupled with the stiffener (8); heat-sealing the two opposite overlapping edges of the strip (33) of packing material longitudinally, i.e. parallel to the packing path (P), to stabilize the tubular wrapping; and heat-sealing and cutting the tubular wrapping transversely, i.e. perpendicularly to the packing path (P), upstream and downstream from the group (4) of tobacco articles coupled with the stiffener (8), to complete the sealed package (3);

wherein the group (4) of tobacco articles coupled with the stiffener (8) is fed transversely along the packing path (P), i.e. with the longitudinal axes of the tobacco articles perpendicular to the packing path (P) and to the longitudinal heat-seal, and parallel to the transverse heat-seals; the packing method being **characterized in that:**

the stiffener (8) comprises a bottom wall (11) positioned contacting the tips of the tobacco articles and oriented longitudinally with respect to the packing path (P); and the stiffener (8) comprises a connecting system connecting the bottom wall (11) and the lateral walls (10) of the stiffener (8), and which prevents the two lateral walls (10) from moving with respect to the bottom wall (11).

2. A packing method as claimed in Claim 1, wherein the strip (33) of packing material has an extraction opening (5), which is covered by an open-close sealing flap (6), and is located on the opposite side of the tubular wrapping to the longitudinal seal, and centrally between the two transverse heat-seals.
3. A packing method as claimed in Claim 1 or 2, and comprising the further steps of:

forming the group (4) of tobacco articles independently and separately from the stiffener (8); folding the stiffener (8) independently and separately from formation of the group (4) of tobacco

- articles; and
coupling the pre-formed group (4) of tobacco articles with the pre-folded stiffener (8).
4. A packing method as claimed in Claim 3, and comprising the further steps of:
- forming the group (4) of tobacco articles by means of a forming conveyor (35) connected to a hopper (34); and
folding the stiffener (8) by means of a folding conveyor (38) parallel to and alongside the forming conveyor (35).
5. A packing method as claimed in Claim 4, and comprising the further step of coupling the group (4) of tobacco articles with the stiffener (8) by means of a coupling conveyor (42) perpendicular to the forming conveyor (35) and the folding conveyor (38).
6. A packing method as claimed in Claim 1 or 2, and comprising the further steps of:
- inserting the stiffener (8) into a forming pocket (36) of a forming conveyor (35) upstream from a hopper (34); and
transferring the group (4) of tobacco articles from the hopper (34) to the forming pocket (36) and directly into the previously inserted stiffener (8).
7. A packing method as claimed in one of Claims 1 to 6, wherein the packing conveyor (48) comprises a slide surface (52) on which the group (4) of tobacco articles slides, and about which the strip (33) of packing material is wound; and a push device (53) located over the group (4) of tobacco articles, and which pushes the group (4) of tobacco articles along the packing path (P).
8. A packing method as claimed in Claim 7, wherein the push device (53) comprises a first conveyor belt (54), which is located over the group (4) of tobacco articles, parallel to the packing path (P), presses the group (4) of tobacco articles against the slide surface (52), and comprises paddles (55), which project from the first conveyor belt (54), and are positioned upstream and downstream from the group (4) of tobacco articles, to form a seat housing the group (4) of tobacco articles.
9. A packing method as claimed in Claim 7 or 8, wherein the group (4) of tobacco articles is fed onto the slide surface (52) by a feed conveyor (56) comprising at least one second conveyor belt (57) beneath the group (4) of tobacco articles and on which the group (4) of tobacco articles rests.
10. A packing method as claimed in one of Claims 1 to 9, and comprising the further step, when folding the strip (33) of packing material, of compressing two opposite longitudinal edges of the tubular wrapping transversely by means of two corresponding third conveyor belts (59) positioned facing each other on opposite sides of the packing path (P).
11. A packing method as claimed in any one of Claims 1 to 10, **characterized by** comprising the step of extracting air from the tubular wrapping to form vacuum-sealed packages (3).
12. A packing method as claimed in any one of Claims 1 to 11, **characterized by** comprising the step of injecting inert gas into the tubular wrapping to form controlled-atmosphere sealed packages (3).
13. A packing machine (26) for producing a sealed package (3) containing a group (4) of tobacco articles, the packing machine (26) comprising:
- a coupling unit (31) for coupling the group (4) of tobacco articles with a stiffener (8) comprising a front wall (9) oriented longitudinally and positioned contacting the cylindrical lateral walls of the tobacco articles; and two lateral walls (10) located on opposite sides of the front wall (9), positioned contacting the cylindrical lateral walls of the tobacco articles, and oriented crosswise to a packing path (P);
a packing conveyor (48) for feeding the group (4) of tobacco articles, coupled with the stiffener (8), along the packing path (P);
a folding device (49) for folding a strip (33) of packing material longitudinally, i.e. parallel to the packing path (P), about the packing path (P) to bring the two opposite edges of the strip (33) of packing material into contact and so form a tubular wrapping enclosing the group (4) of tobacco articles coupled with the stiffener (8);
a first heat-sealing device (50) for heat-sealing the two opposite overlapping edges of the strip (33) of packing material longitudinally, i.e. parallel to the packing path (P), to stabilize the tubular wrapping; and
a second heat-sealing device (51) for heat-sealing and cutting the tubular wrapping transversely, i.e. perpendicularly to the packing path (P), upstream and downstream from the group (4) of tobacco articles coupled with the stiffener (8), to complete the sealed package (3);
- wherein the packing conveyor (48) feeds the group (4) of tobacco articles, coupled with the stiffener (8), transversely along the packing path (P), i.e. with the longitudinal axes of the tobacco articles perpendicular to the packing path (P) and to the longitudinal

heat-seal, and parallel to the transverse heat-seals; the packing machine (26) being **characterized in that** it comprises folding means which fold a blank (18) to form the stiffener (8) provided with a bottom wall (11) positioned contacting the tips of the tobacco articles and oriented longitudinally with respect to the packing path (P), and to form a connecting system connecting the bottom wall (11) and the lateral walls (10) of the stiffener (8), and which prevents the two lateral walls (10) from moving with respect to the bottom wall (11).

Patentansprüche

1. Verpackungsverfahren zur Herstellung einer versiegelten Packung (3), die eine Gruppe (4) zylindrischer Tabakartikel enthält, wobei das Verpackungsverfahren die folgenden Schritte umfasst:

Koppeln der Gruppe (4) von Tabakartikeln mit einer Versteifung (8), die eine Vorderwand (9), die längs orientiert ist und die zylindrischen Seitenwände der Tabakartikel berührend positioniert ist, und zwei Seitenwände (10), die auf entgegengesetzten Seiten der Vorderwand (9) angeordnet sind, welche die zylindrischen Seitenwände der Tabakartikel berührend positioniert sind und quer zu einem Verpackungsweg (P) orientiert sind, umfasst;

Transportieren der Gruppe (4) von Tabakartikeln, die mit der Versteifung (8) gekoppelt sind, entlang des Verpackungswegs (P) auf einem Verpackungsförderer (48);

Längsfalten eines Streifens (33) aus Verpackungsmaterial, d. h. parallel zu dem Verpackungsweg (P) um den Verpackungsweg (P), um die zwei entgegengesetzten Ränder des Streifens (33) aus Verpackungsmaterial in Berührung zu bringen und so eine rohrförmige Umhüllung zu bilden, welche die mit der Versteifung (8) gekoppelte Gruppe (4) aus Tabakartikeln umschließt;

Längsverschweißen der zwei entgegengesetzten überlappenden Ränder des Streifens (33) aus Verpackungsmaterial, d.h. parallel zu dem Verpackungsweg (P), um die rohrförmige Umhüllung zu stabilisieren; und

Querverschweißen und Schneiden der rohrförmigen Umhüllung, d.h. senkrecht zu dem Verpackungsweg (P), lauffaufwärts und lauffabwärts von der mit der Versteifung (8) gekoppelten Gruppe (4) von Tabakartikeln, um die versiegelte Packung (3) fertigzustellen;

wobei die mit der Versteifung gekoppelte Gruppe von Tabakartikeln (4) quer entlang des Verpackungswegs (P), d.h. mit den Längsachsen der Ta-

bakartikel senkrecht zu dem Verpackungsweg (P) und zu der Längsverschweißung und parallel zu den Querverschweißungen, transportiert wird; wobei das Verpackungsverfahren **dadurch gekennzeichnet ist, dass:**

die Versteifung (8) eine Bodenwand (11) umfasst, die die Spitzen der Tabakartikel berührend positioniert ist und in Bezug auf den Verpackungsweg (P) längs orientiert ist; und die Versteifung (8) ein Verbindungssystem umfasst, das die Bodenwand (11) und die Seitenwände (10) der Versteifung (8) verbindet und das verhindert, dass sich die zwei Seitenwände (10) in Bezug auf die Bodenwand (11) bewegen.

2. Verpackungsverfahren nach Anspruch 1, wobei der Streifen (33) aus Verpackungsmaterial eine Extraktionsöffnung (5) hat, die von einer Öffnungs-/Schließversiegelungsklappe (6) bedeckt ist und auf der zu der Längsverschweißung entgegengesetzten Seite der rohrförmigen Umhüllung und zentral zwischen den zwei Querverschweißungen angeordnet ist.

3. Verpackungsverfahren nach Anspruch 1 oder 2, das ferner die folgenden Schritte umfasst:

Ausbilden der Gruppe (4) von Tabakartikeln unabhängig und getrennt von der Versteifung (8); Falten der Versteifung (8) unabhängig und getrennt von der Ausbildung der Gruppe (4) von Tabakartikeln; und

Koppeln der vorgeformten Gruppe (4) von Tabakartikeln mit der vorgefalteten Versteifung (8).

4. Verpackungsverfahren nach Anspruch 3, das ferner die folgenden weiteren Schritte umfasst:

Ausbilden der Gruppe (4) von Tabakartikeln mittels eines Ausbildungsförderers (35), der mit einem Behälter bzw. Schacht (34) verbunden ist; und

Falten der Versteifung (8) mittels eines Faltförderers (38) parallel zu und entlang des Ausbildungsförderers (35).

5. Verpackungsverfahren nach Anspruch 1, das ferner den Schritt des Koppelns der Gruppe (4) von Tabakartikeln mit der Versteifung (8) mittels eines Koppelförderers (42) senkrecht zu dem Ausbildungsförderer (38) und dem Faltförderer (38) umfasst.

6. Verpackungsverfahren nach Anspruch 1 oder 2, das ferner die folgenden Schritte umfasst:

Einsetzen der Versteifung (8) in ein Ausbildungsfach (36) eines Ausbildungsförderers (35)

- laufaufwärts von einem Behälter (34); und Überführen der Gruppe (4) von Tabakartikeln von dem Behälter (34) in das Ausbildungsfach (36) und direkt in die vorher eingesetzte Versteifung (8).
7. Verpackungsverfahren nach einem der Ansprüche 1 bis 6, wobei der Verpackungsförderer (48) eine Gleitfläche (52), auf der die Gruppe (4) von Tabakartikeln gleitet und um die der Streifen (33) aus Verpackungsmaterial gewickelt ist, und eine Schiebevorrichtung (53), die über der Gruppe (4) von Tabakartikeln angeordnet ist und die die Gruppe (4) von Tabakartikeln entlang des Verpackungswegs (P) schiebt, umfasst.
8. Verpackungsverfahren nach Anspruch 7, wobei die Schiebevorrichtung (53) ein erstes Förderband (54) umfasst, das über der Gruppe (4) von Tabakartikeln parallel zu dem Verpackungsweg (P) angeordnet ist, die Gruppe (4) von Tabakartikeln gegen die Gleitfläche (52) drückt und Schaufeln (55) umfasst, die von dem ersten Förderband (54) vorstehen und laufaufwärts und laufabwärts von der Gruppe (4) von Tabakartikeln positioniert sind, um ein Auflager zu bilden, das die Gruppe (4) von Tabakartikeln aufnimmt.
9. Verpackungsverfahren nach Anspruch 7 oder 8, wobei die Gruppe (4) von Tabakartikeln durch einen Transportförderer (56), der wenigstens ein zweites Förderband (57) unterhalb der Gruppe (4) von Tabakartikeln umfasst, auf dem die Gruppe (4) von Tabakartikeln ruht, auf die Gleitfläche (52) transportiert wird.
10. Verpackungsverfahren nach einem der Ansprüche 1 bis 9, das, wenn der Streifen (33) aus Verpackungsmaterial gefaltet wird, den weiteren Schritt umfasst, in dem zwei entgegengesetzte Längsränder der rohrförmigen Umhüllung mit Hilfe von zwei entsprechenden dritten Förderbändern (59), die einander auf entgegengesetzten Seiten des Verpackungswegs (P) zugewandt positioniert sind, quer eingewickelt werden.
11. Verpackungsverfahren nach einem der Ansprüche 1 bis 10, **dadurch gekennzeichnet, dass** es den Schritt des Extrahierens von Luft aus der rohrförmigen Umhüllung umfasst, um vakuumversiegelte Packungen (3) zu bilden.
12. Verpackungsverfahren nach einem der Ansprüche 1 bis 11, **dadurch gekennzeichnet, dass** es den Schritt des Einspritzens von inertem Gas in die rohrförmige Umhüllung umfasst, um unter einer kontrollierten Atmosphäre versiegelte Packungen (3) zu bilden.

13. Verpackungsmaschine zur Herstellung einer versiegelten Packung (3), die eine Gruppe (4) von Tabakartikeln enthält, wobei die Verpackungsmaschine (26) umfasst:

eine Kopplungseinheit (31) zum Koppeln der Gruppe (4) von Tabakartikeln mit einer Versteifung (8), die eine Vorderwand (9), die längs orientiert ist und die zylindrischen Seitenwände der Tabakartikel berührend positioniert ist, und zwei Seitenwände (10), die auf entgegengesetzten Seiten der Vorderwand (9) angeordnet sind, welche die zylindrischen Seitenwände der Tabakartikel berührend positioniert sind und quer zu einem Verpackungsweg (P) orientiert sind, umfasst;

einen Verpackungsförderer (48) zum Transportieren der Gruppe (4) von Tabakartikeln, die mit der Versteifung (8) gekoppelt sind, entlang des Verpackungswegs (P);

eine Faltvorrichtung (49) zum Längsfalten eines Streifens (33) aus Verpackungsmaterial, d. h. parallel zu dem Verpackungsweg (P) um den Verpackungsweg (P), um die zwei entgegengesetzten Ränder des Streifens (33) aus Verpackungsmaterial in Berührung zu bringen und so eine rohrförmige Umhüllung zu bilden, welche die mit der Versteifung (8) gekoppelte Gruppe (4) aus Tabakartikeln umschließt;

eine erste Schweißvorrichtung (50) zum Längverschweißen der zwei entgegengesetzten überlappenden Ränder des Streifens (33) aus Verpackungsmaterial, d.h. parallel zu dem Verpackungsweg (P), um die rohrförmige Umhüllung zu stabilisieren; und

eine zweite Schweißvorrichtung (51) zum Querschweißen und Schneiden der rohrförmigen Umhüllung, d.h. senkrecht zu dem Verpackungsweg (P), laufaufwärts und laufabwärts von der mit der Versteifung (8) gekoppelten Gruppe (4) von Tabakartikeln, um die versiegelte Packung (3) fertigzustellen;

wobei der Verpackungsförderer (48) die mit der Versteifung gekoppelte Gruppe von Tabakartikeln (4) quer entlang des Verpackungswegs (P), d.h. mit den Längsachsen der Tabakartikel senkrecht zu dem Verpackungsweg (P) und zu der Längverschweißung und parallel zu den Querschweißungen, transportiert;

wobei die Verpackungsmaschine (26) **dadurch gekennzeichnet ist, dass** sie Faltmittel umfasst, die ein Rohteil (18) falten, um die Versteifung (8) zu bilden, die mit einer Bodenwand (11) versehen ist, die die Spitzen der Tabakartikel berührend positioniert ist und in Bezug auf den Verpackungsweg (P) längs orientiert ist; und um ein Verbindungssystem zu bilden, das die Bodenwand (11) und die Seitenwände (10) der

Versteifung (8) verbindet und das verhindert, dass sich die zwei Seitenwände (10) in Bezug auf die Bodenwand (11) bewegen.

Revendications

1. Procédé d'emballage pour produire un paquet scellé (3) comprenant un groupe (4) d'articles de tabac cylindriques, le procédé d'emballage comprenant les étapes consistant à :

coupler le groupe (4) d'articles de tabac à un élément de renfort (8) comprenant une paroi avant (9) orientée longitudinalement et positionnée en contact avec les parois latérales cylindriques des articles de tabac ; et deux parois latérales (10) positionnées sur les côtés opposés de la paroi avant (9), positionnées en contact avec les parois latérales cylindriques des articles de tabac, et orientées transversalement par rapport à une trajectoire d'emballage (P) ; amener le groupe (4) d'articles de tabac, couplé à l'élément de renfort (8), le long de la trajectoire d'emballage (P) sur un transporteur d'emballage (48) ;

plier une bande (33) de matériau d'emballage longitudinalement, c'est-à-dire parallèlement à la trajectoire d'emballage (P), autour de la trajectoire d'emballage (P) pour amener les deux bords opposés de la bande (33) de matériau d'emballage en contact et afin de former un emballage tubulaire enfermant le groupe (4) d'articles de tabac couplé à l'élément de renfort (8) ; thermosouder les deux bords chevauchants opposés de la bande (33) du matériau d'emballage longitudinalement, c'est-à-dire parallèlement à la trajectoire d'emballage (P), afin de stabiliser l'emballage tubulaire ; et thermosouder et couper l'emballage tubulaire transversalement, c'est-à-dire perpendiculairement à la trajectoire d'emballage (P), en amont et en aval du groupe (4) d'articles de tabac couplé à l'élément de renfort (8), afin de terminer l'emballage scellé (3) ;

dans lequel le groupe (4) d'articles de tabac couplé à l'élément de renfort (8) est amené transversalement le long de la trajectoire d'emballage (P), c'est-à-dire avec les axes longitudinaux des articles de tabac perpendiculaires à la trajectoire d'emballage (P) et à la soudure thermique longitudinale et parallèlement aux soudures thermiques transversales ; le procédé d'emballage étant **caractérisé en ce que** :

l'élément de renfort (8) comprend une paroi inférieure (11) positionnée en contact avec les

embouts des articles de tabac et orientée longitudinalement par rapport à la trajectoire d'emballage (P) ; et

l'élément de renfort (8) comprend un système de raccordement raccordant la paroi inférieure (11) et les parois latérales (10) de l'élément de renfort (8), et qui empêche les deux parois latérales (10) de se déplacer par rapport à la paroi inférieure (11).

2. Procédé d'emballage selon la revendication 1, dans lequel la bande (33) de matériau d'emballage a une ouverture d'extraction (5) qui est recouverte par un rabat de scellement pouvant s'ouvrir (6), et est positionnée sur le côté opposé de l'emballage tubulaire sur la soudure longitudinale, et de manière centrale entre les deux soudures thermiques transversales.

3. Procédé d'emballage selon la revendication 1 ou 2, et comprenant les étapes supplémentaires consistant à :

former le groupe (4) d'articles de tabac indépendamment et séparément de l'élément de renfort (8) ;

plier l'élément de renfort (8) indépendamment et séparément de la formation du groupe (4) d'articles de tabac ; et

coupler le groupe (4) préformé d'articles de tabac à l'élément de renfort (8) pré-plié.

4. Procédé d'emballage selon la revendication 3, et comprenant les étapes supplémentaires consistant à :

former le groupe (4) d'articles de tabac au moyen d'un transporteur de formage (35) raccordé à une trémie (34) ; et

plier l'élément de renfort (8) au moyen d'un transporteur de pliage (38) parallèle à et le long du transporteur de formage (35).

5. Procédé d'emballage selon la revendication 4, et comprenant l'étape supplémentaire consistant à coupler le groupe (4) d'articles de tabac avec l'élément de renfort (8) au moyen d'un transporteur de couplage (42) perpendiculaire au transporteur de formage (35) et au transporteur de pliage (38).

6. Procédé d'emballage selon la revendication 1 ou 2, et comprenant les étapes supplémentaires consistant à :

insérer l'élément de renfort (8) dans une poche de formage (36) d'un transporteur de formage (35) en amont d'une trémie (34) ; et

transférer le groupe (4) d'articles de tabac de la trémie (34) à la poche de formage (36) et direc-

tement dans l'élément de renfort (8) préalablement inséré.

7. Procédé d'emballage selon l'une des revendications 1 à 6, dans lequel le transporteur d'emballage (48) comprend une surface coulissante (52) sur laquelle le groupe (4) d'articles de tabac coulisse, et autour de laquelle la bande (33) du matériau d'emballage est enroulée ; et un dispositif de poussée (53) positionné sur le groupe (4) d'articles de tabac, et qui pousse le groupe (4) d'articles de tabac le long de la trajectoire d'emballage (P). 5
8. Procédé d'emballage selon la revendication 7, dans lequel le dispositif de poussée (53) comprend une première courroie transporteuse (54) qui est positionnée sur le groupe (4) d'articles de tabac, parallèle à la trajectoire d'emballage (P), comprime le groupe (4) d'articles de tabac contre la surface coulissante (52) et comprend des palettes (55) qui font saillie de la première courroie transporteuse (54) et sont positionnées en amont et en aval du groupe (4) d'articles de tabac, afin de former un siège logeant le groupe (4) d'articles de tabac. 10
9. Procédé d'emballage selon la revendication 7 ou 8, dans lequel le groupe (4) d'articles de tabac est amené sur la surface coulissante (52) par un transporteur d'alimentation (56) comprenant au moins une deuxième courroie transporteuse (57) au-dessous du groupe (4) d'articles de tabac et sur laquelle le groupe (4) d'articles de tabac s'appuie. 15
10. Procédé d'emballage selon l'une des revendications 1 à 9, et comprenant l'étape supplémentaire, lors du pliage de la bande (33) du matériau d'emballage, consistant à comprimer deux bords longitudinaux opposés de l'emballage tubulaire transversalement au moyen de deux troisièmes courroies transporteuses (59) correspondantes positionnées l'une en face de l'autre sur les côtés opposés de la trajectoire d'emballage (P). 20
11. Procédé d'emballage selon l'une quelconque des revendications 1 à 10, **caractérisé en ce qu'**il comprend l'étape consistant à extraire l'air de l'emballage tubulaire afin de former des emballages scellés sous vide (3). 25
12. Procédé d'emballage selon l'une quelconque des revendications 1 à 11, **caractérisé en ce qu'**il comprend l'étape consistant à injecter du gaz inerte dans l'emballage tubulaire afin de former des emballages (3) scellés sous atmosphère contrôlée. 30
13. Machine d'emballage (26) pour produire un emballage scellé (3) contenant un groupe (4) d'articles de tabac, la machine d'emballage (26) comprenant : 35

une unité de couplage (31) pour coupler le groupe (4) d'articles de tabac à un élément de renfort (8) comprenant une paroi avant (9) orientée longitudinalement et positionnée en contact avec les parois latérales cylindriques des articles de tabac ; et deux parois latérales (10) positionnées sur les côtés opposés de la paroi avant (9), positionnées en contact avec les parois latérales cylindriques des articles de tabac, et orientées transversalement par rapport à une trajectoire d'emballage (P) ;
un transporteur d'emballage (48) pour amener le groupe (4) d'articles de tabac, couplé à l'élément de renfort (8), le long de la trajectoire d'emballage (P) ;
un dispositif de pliage (49) pour plier une bande (33) de matériau d'emballage longitudinalement, c'est-à-dire parallèle à la trajectoire d'emballage (P), autour de la trajectoire d'emballage (P) pour amener les deux bords opposés de la bande (33) de matériau d'emballage en contact et afin de former un emballage tubulaire enfermant le groupe (4) d'articles de tabac couplé à l'élément de renfort (8) ;
un premier dispositif de thermosoudage (50) pour thermosouder les deux bords chevauchants opposés de la bande (33) du matériau d'emballage longitudinalement, c'est-à-dire parallèle à la trajectoire d'emballage (P), afin de stabiliser l'emballage tubulaire ; et
un second dispositif de thermosoudage (51) pour thermosouder et couper ledit emballage tubulaire transversalement, c'est-à-dire perpendiculairement à la trajectoire d'emballage (P), en amont et en aval du groupe (4) d'articles de tabac couplé à l'élément de renfort (8), afin de terminer l'emballage scellé (3) ;

dans laquelle le transporteur d'emballage (48) amène le groupe (4) d'articles de tabac, couplé à l'élément de renfort (8), transversalement le long de la trajectoire d'emballage (P), c'est-à-dire avec les axes longitudinaux des articles de tabac perpendiculaires à la trajectoire d'emballage (P) et à la soudure thermique longitudinale et parallèle aux soudures thermiques transversales ;
la machine d'emballage (26) étant **caractérisée en ce qu'**elle comprend des moyens de pliage qui plient une découpe (18) afin de former l'élément de renfort (8) prévu avec une paroi inférieure (11) positionnée en contact avec les embouts des articles de tabac et orientée longitudinalement par rapport à la trajectoire d'emballage (P) et afin de former un système de raccordement raccordant la paroi inférieure (11) et les parois latérales (10) de l'élément de renfort (8), qui empêche les deux parois latérales (10) de se déplacer par rapport à la paroi inférieure (11).

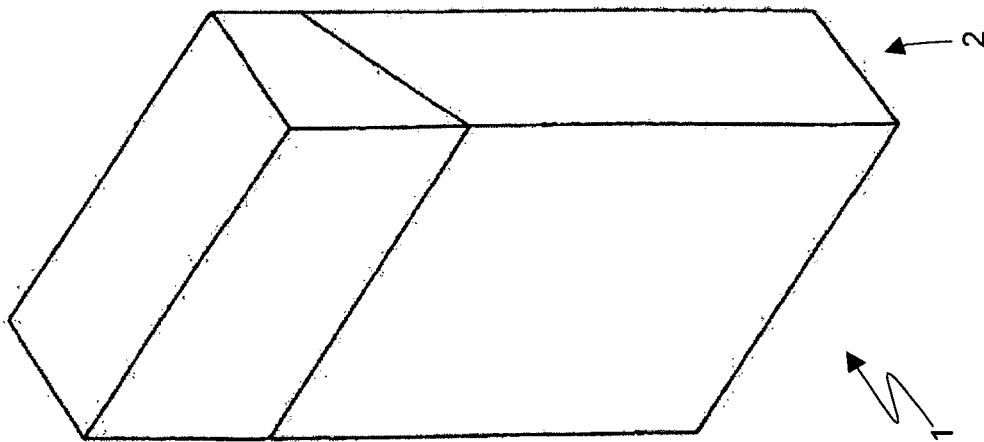


Fig. 1

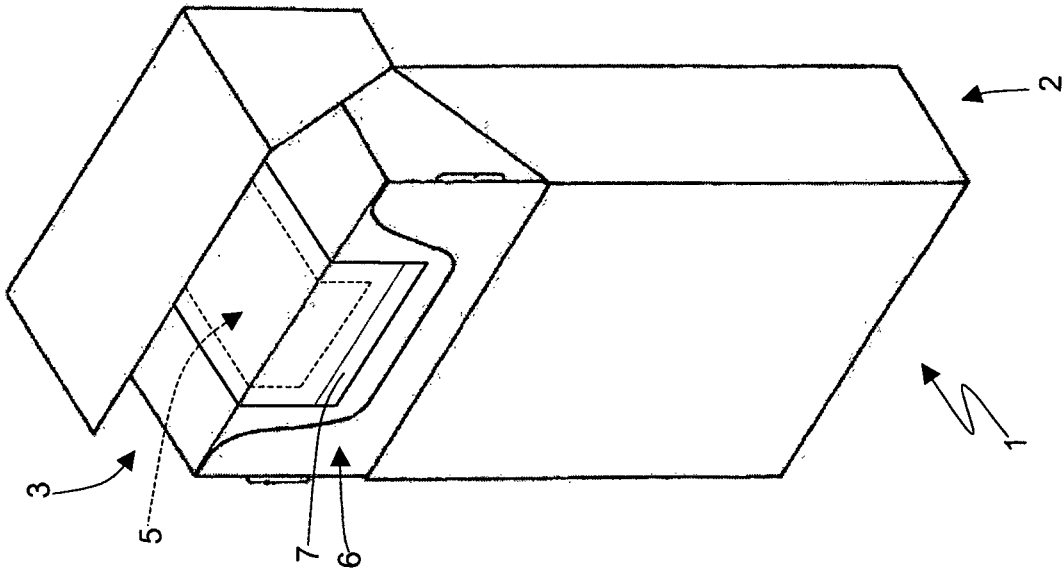


Fig. 2

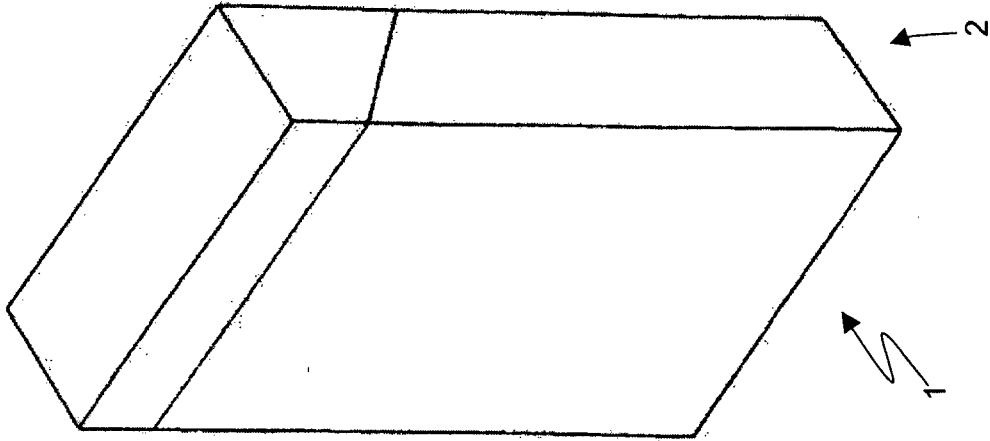


Fig. 3

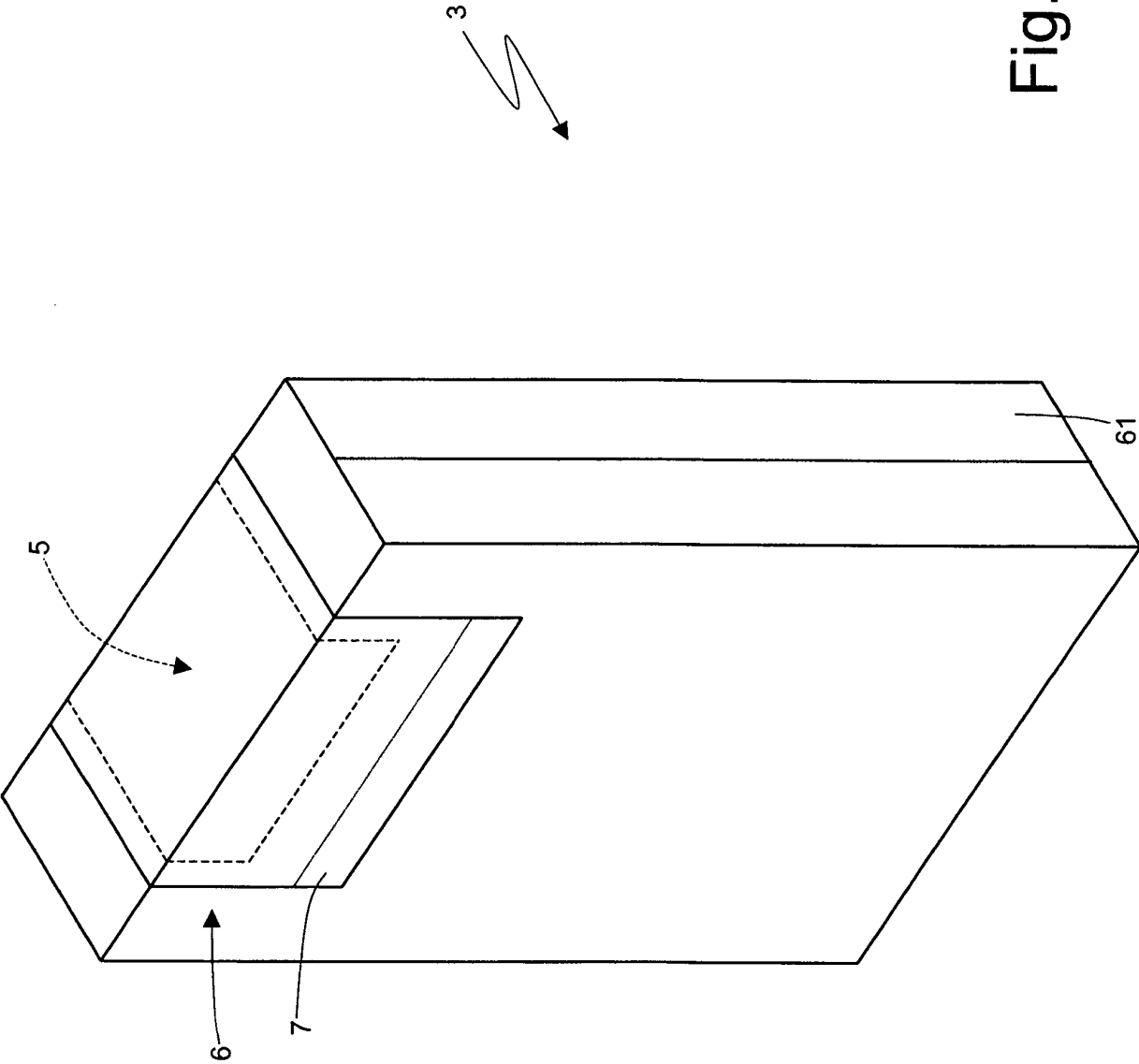
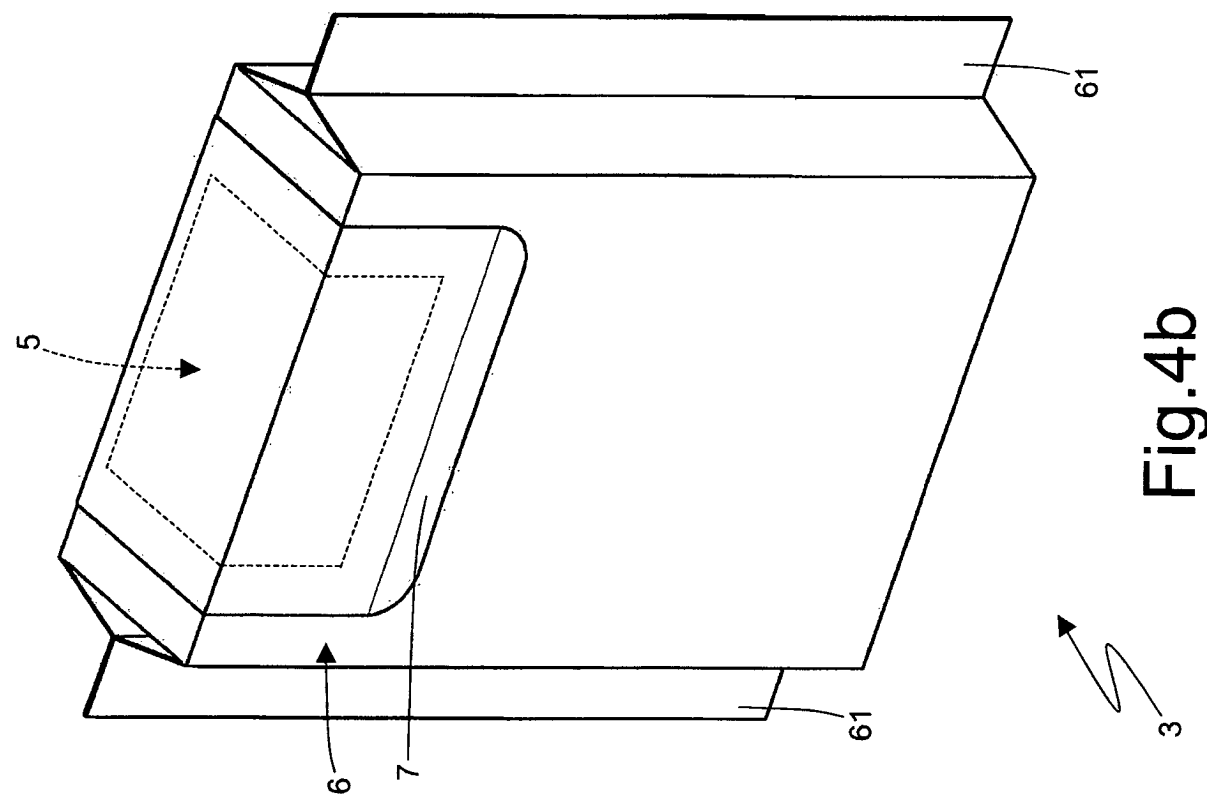
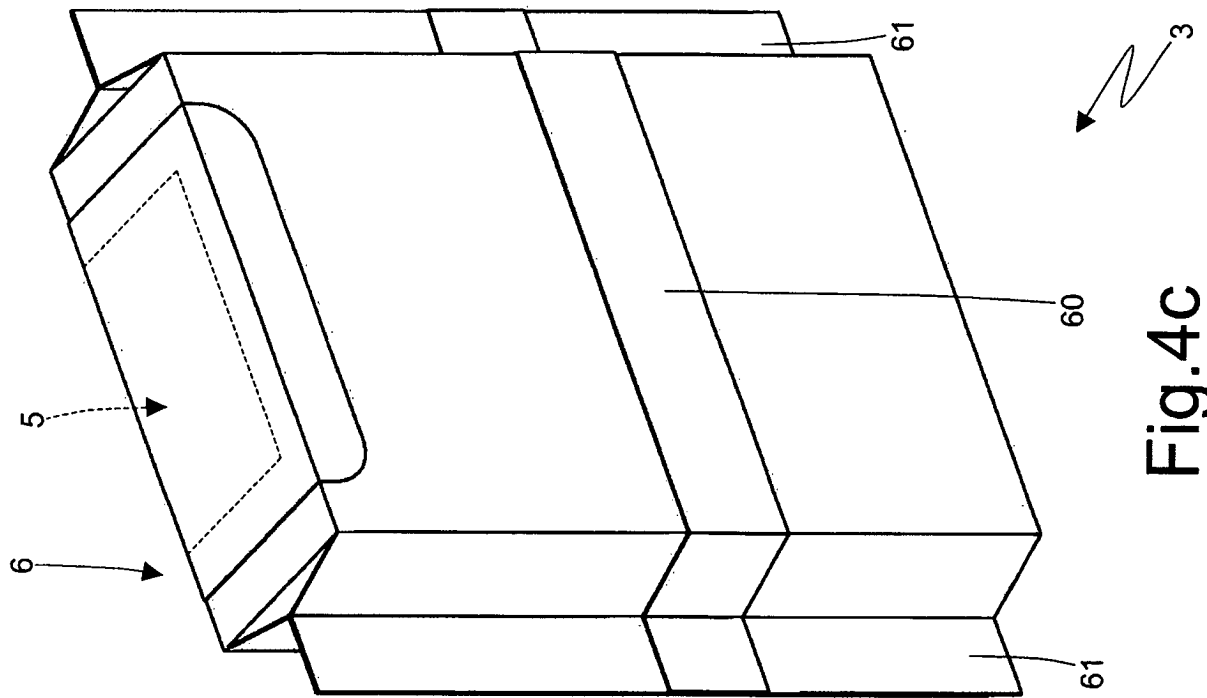


Fig.4a



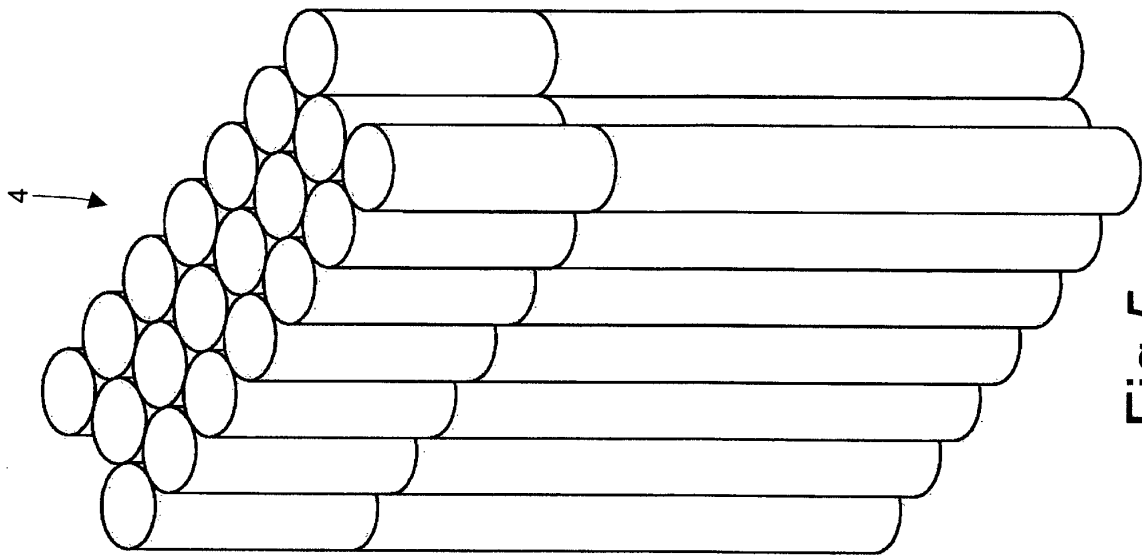


Fig. 5

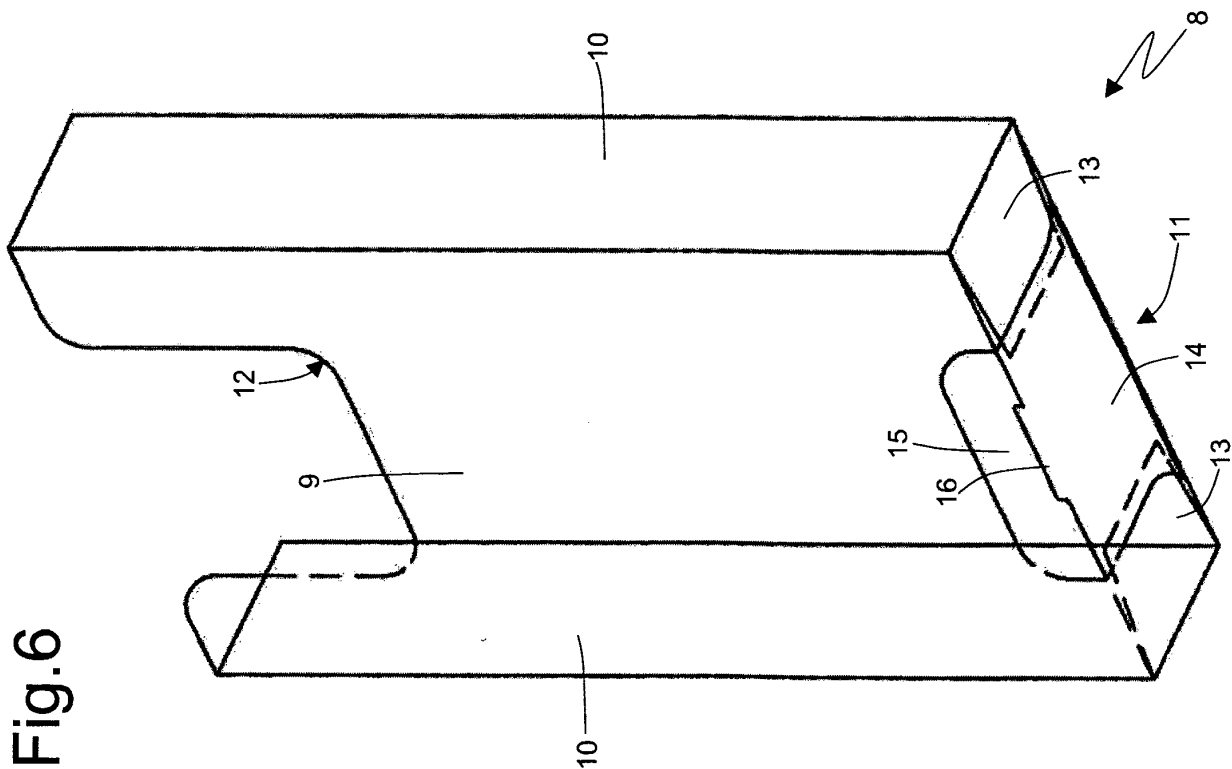


Fig. 6

Fig.7

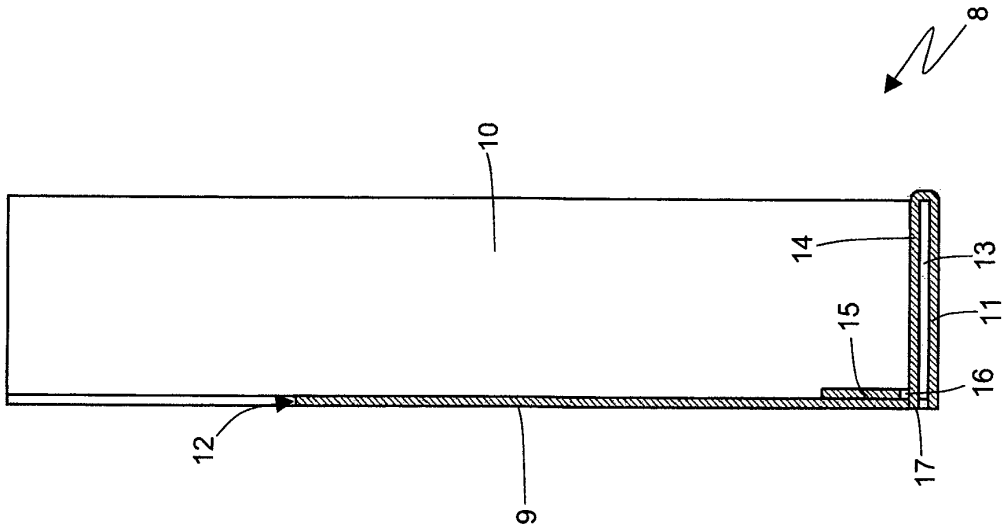
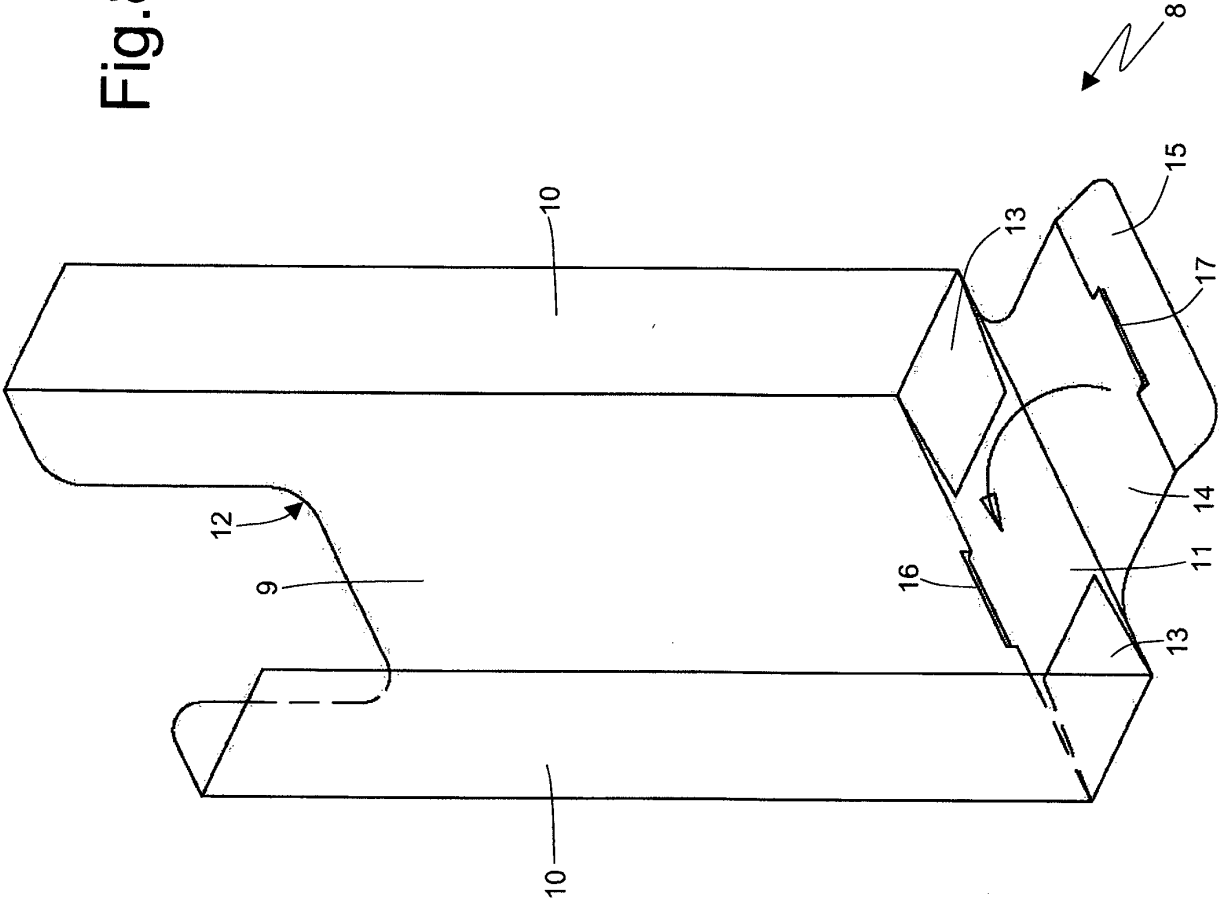


Fig.8



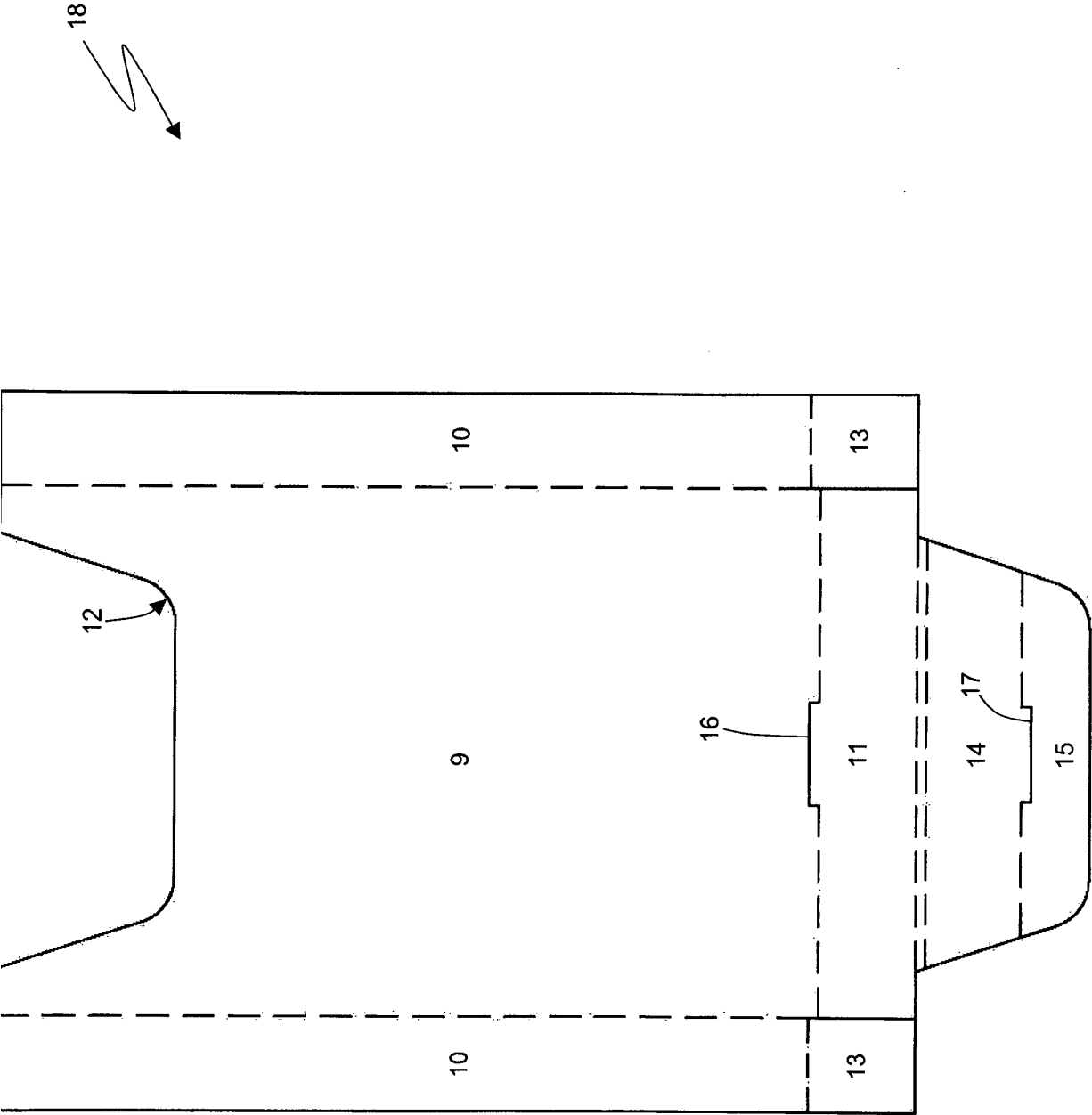


Fig.9

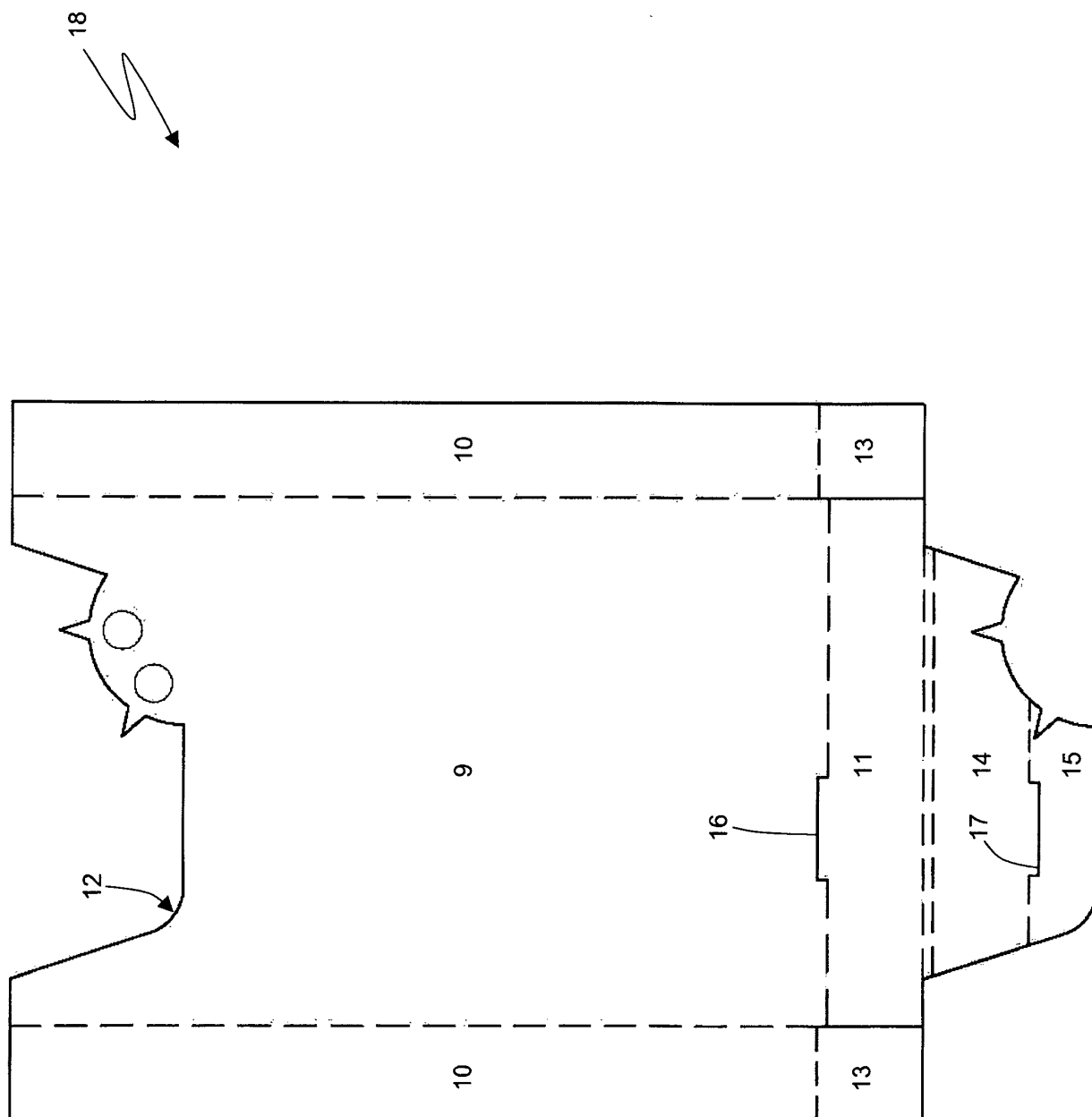


Fig. 10

Fig.11

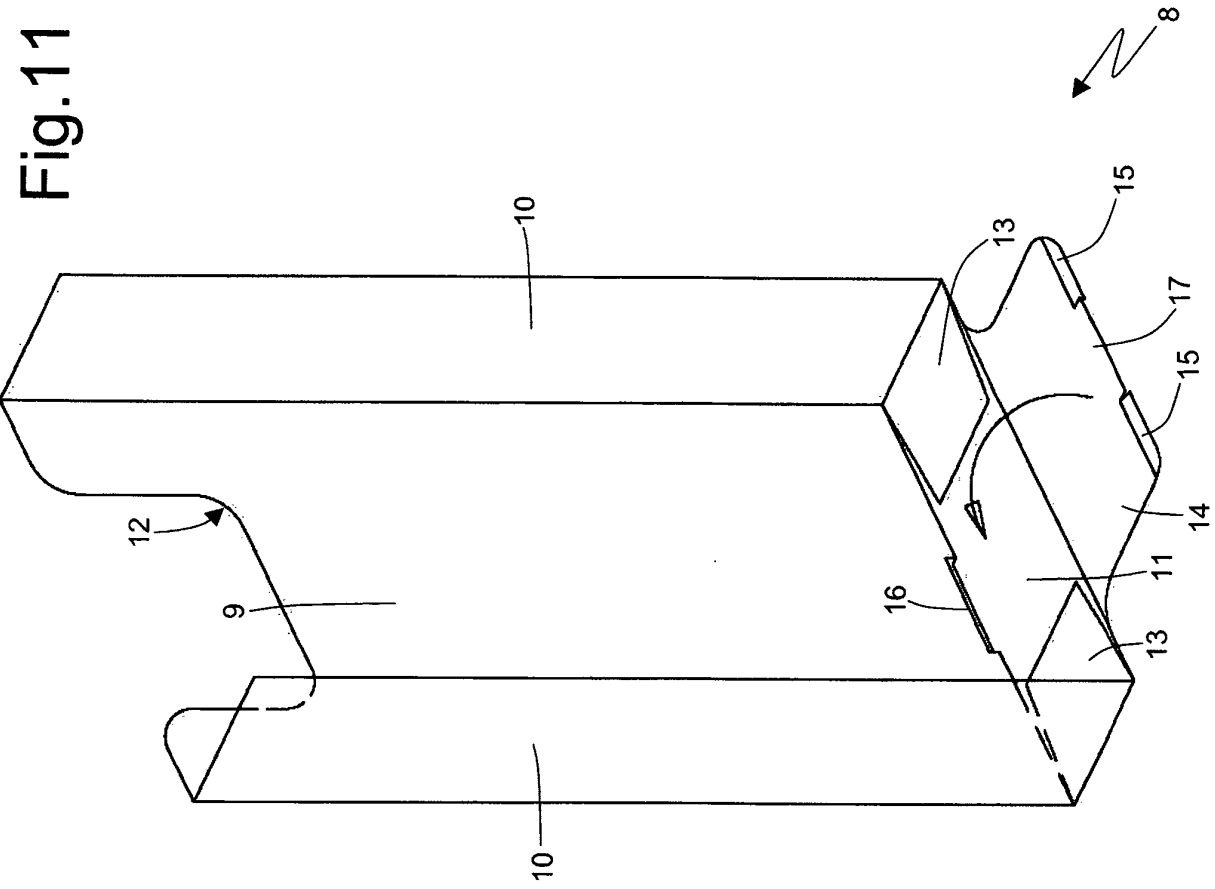


Fig.12

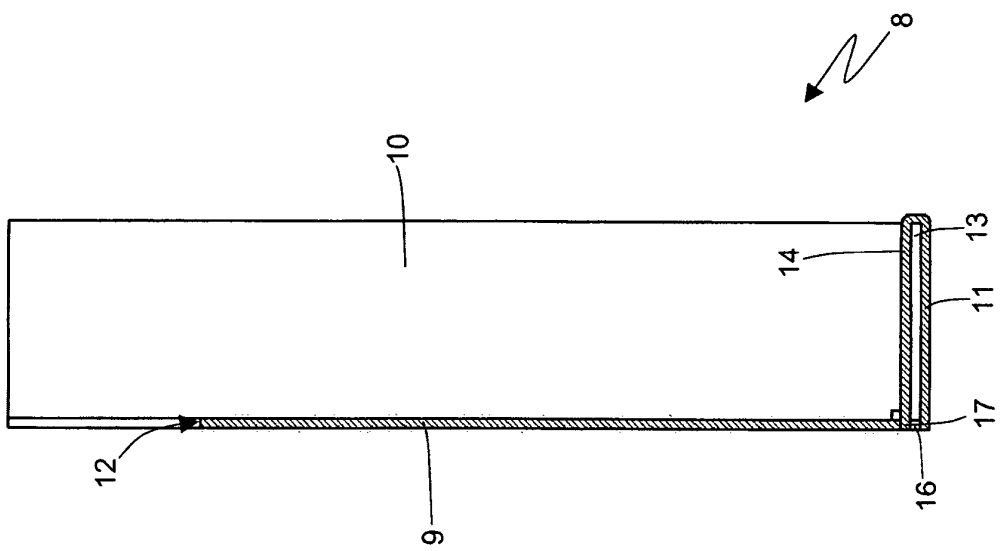


Fig.13

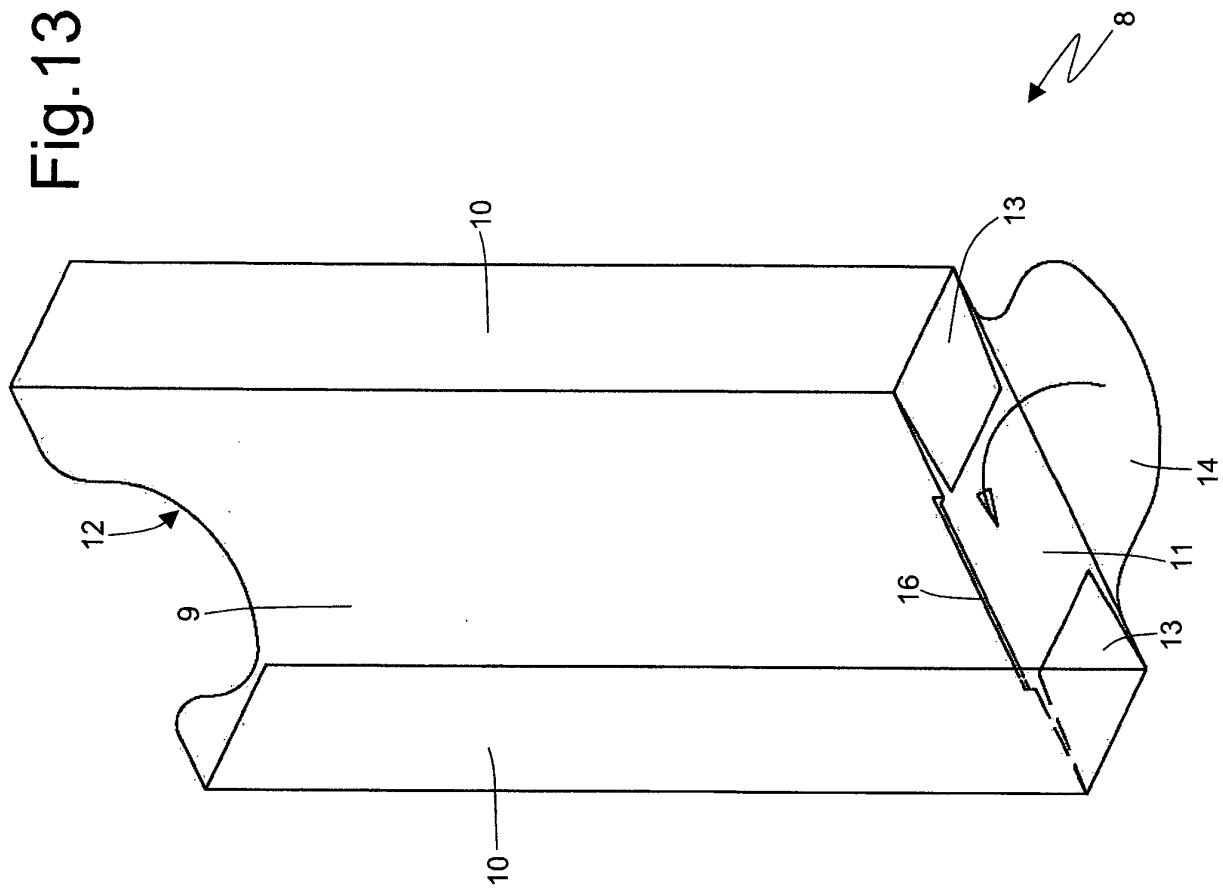
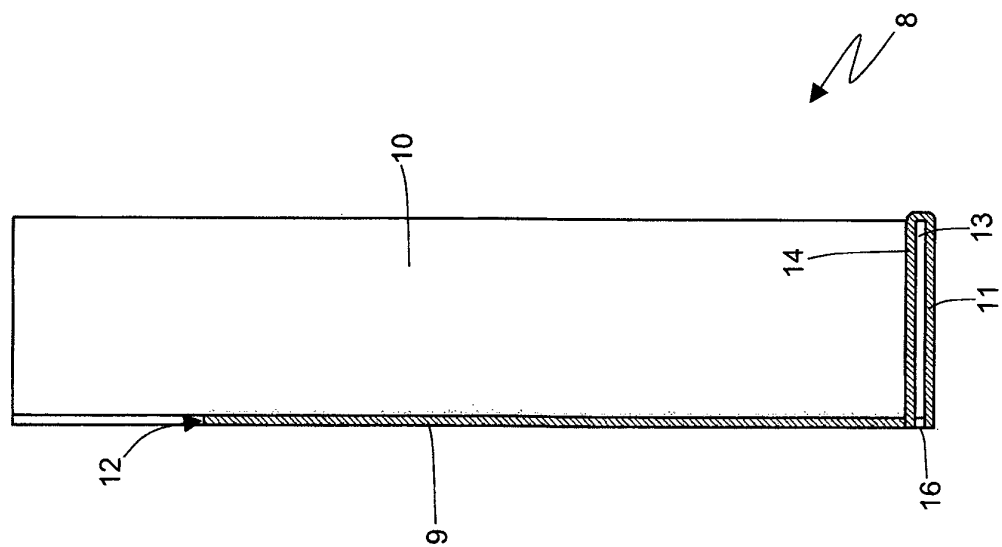


Fig.14



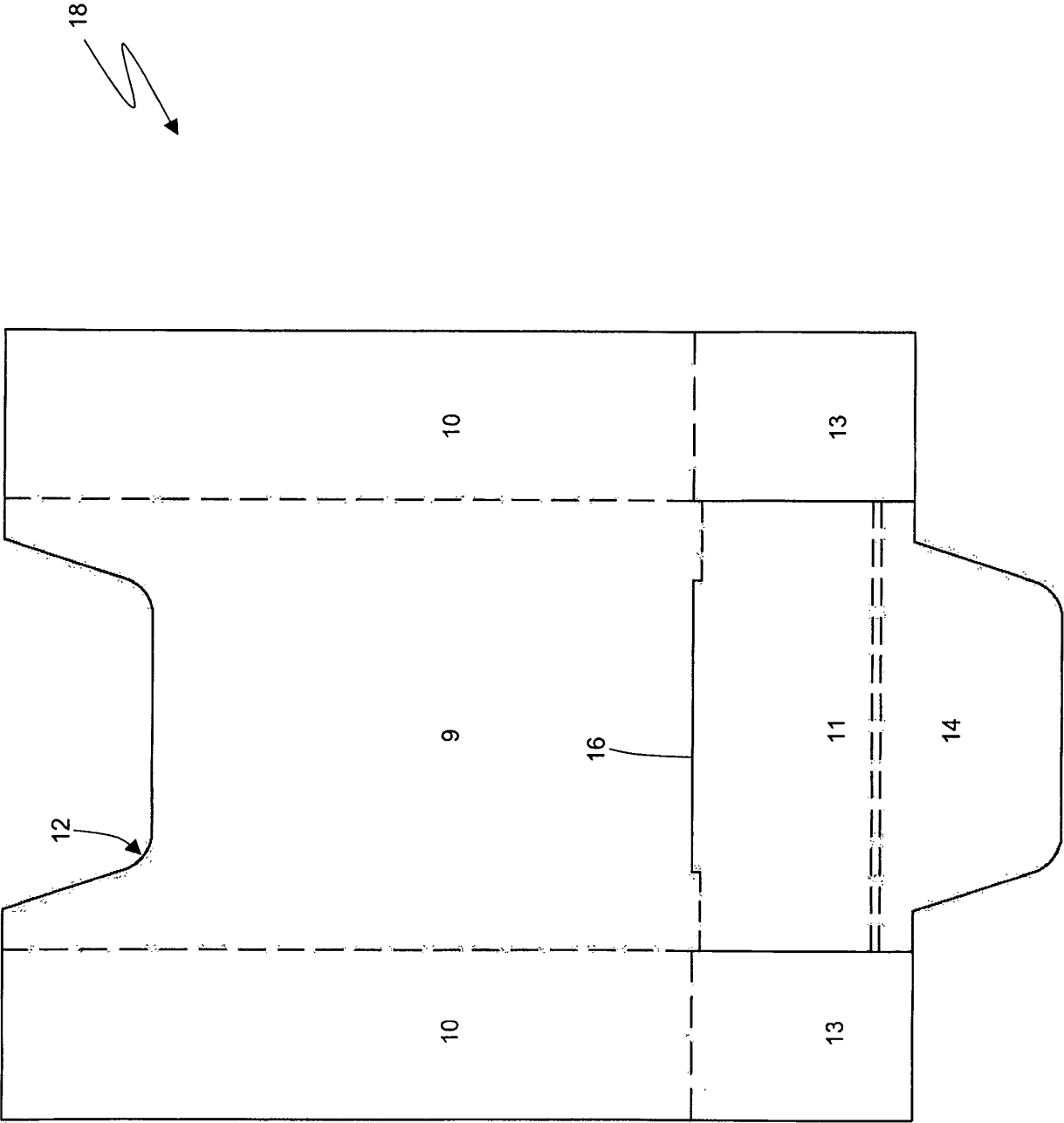


Fig.15

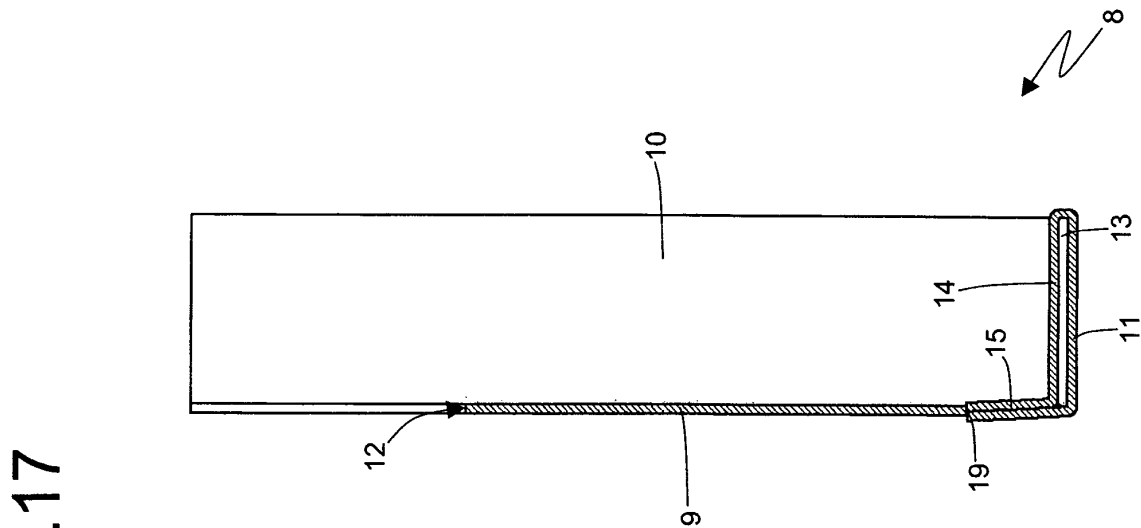
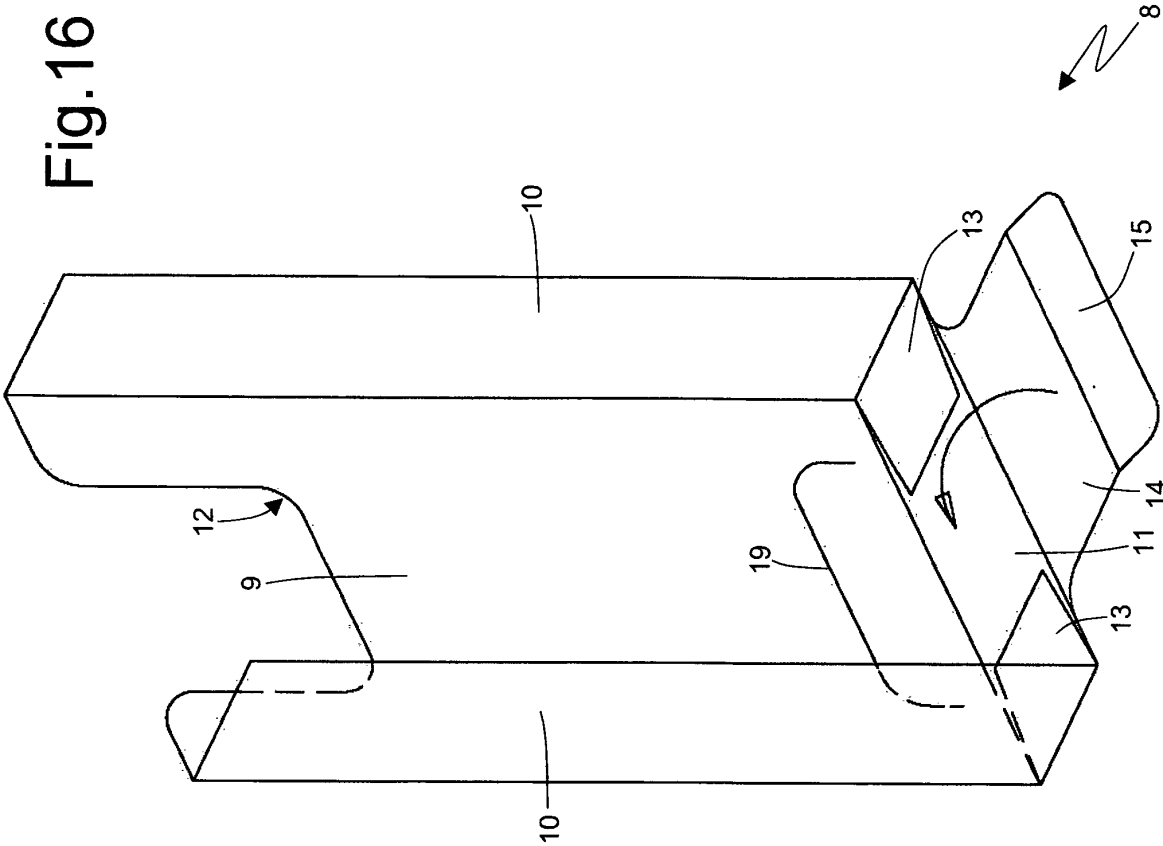


Fig.18

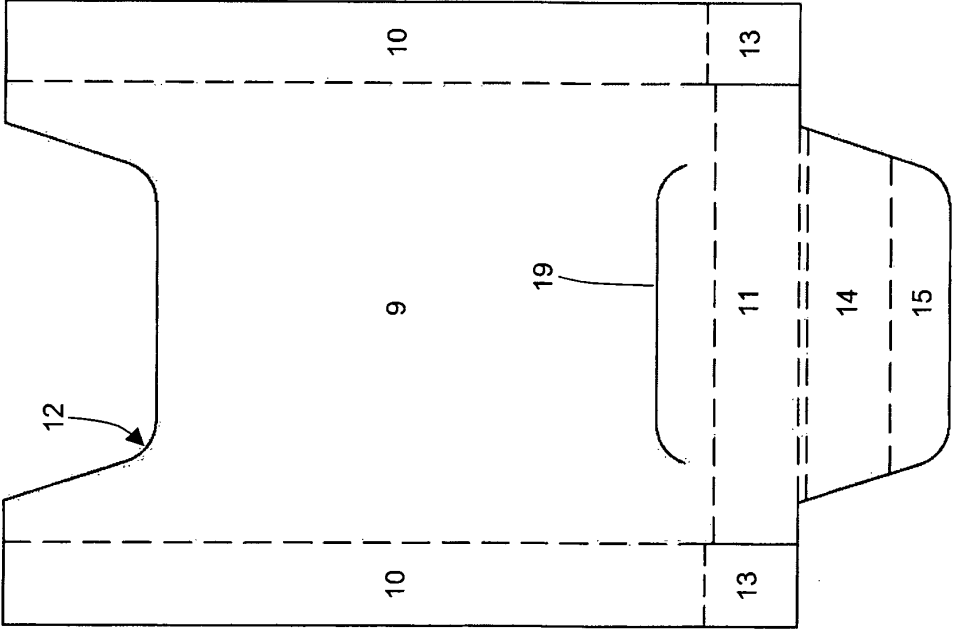
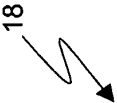


Fig.19

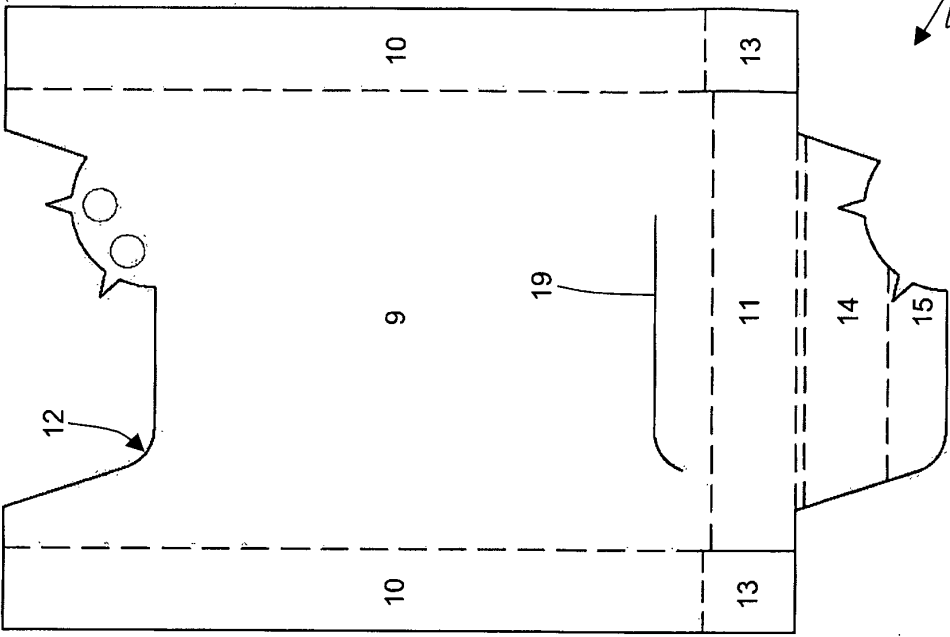


Fig.20

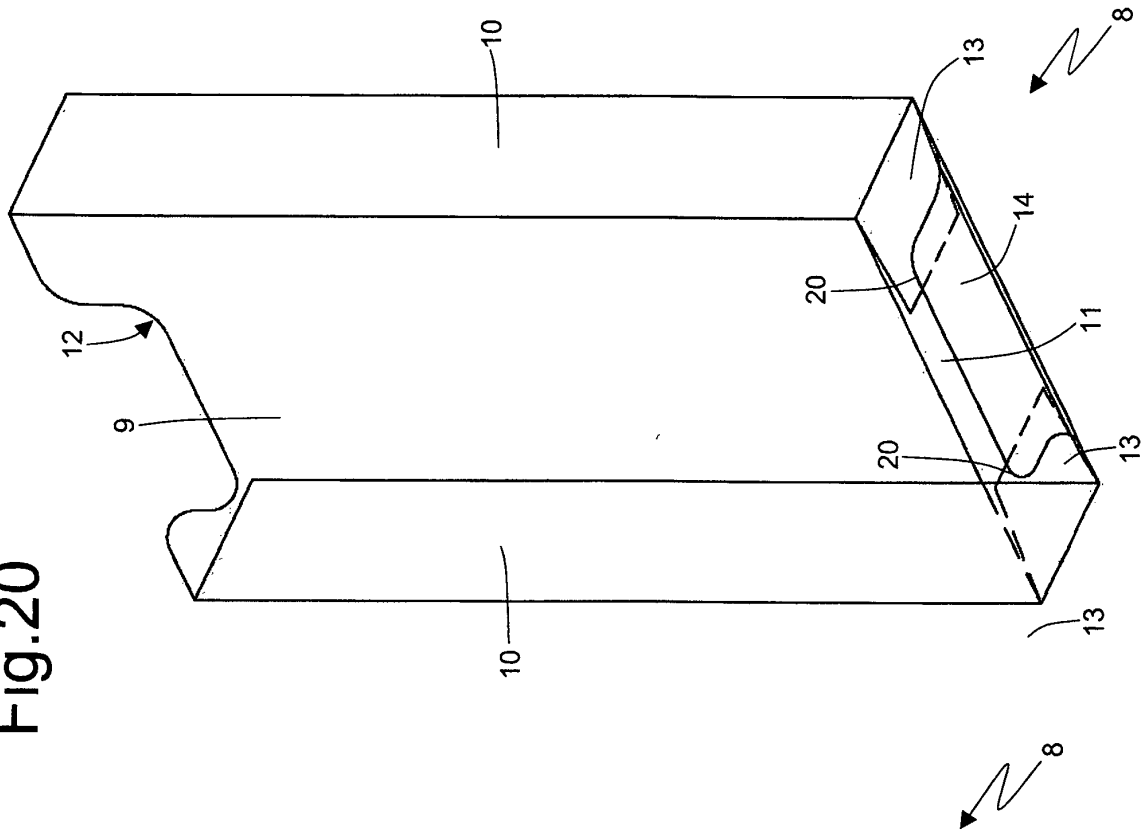


Fig.21

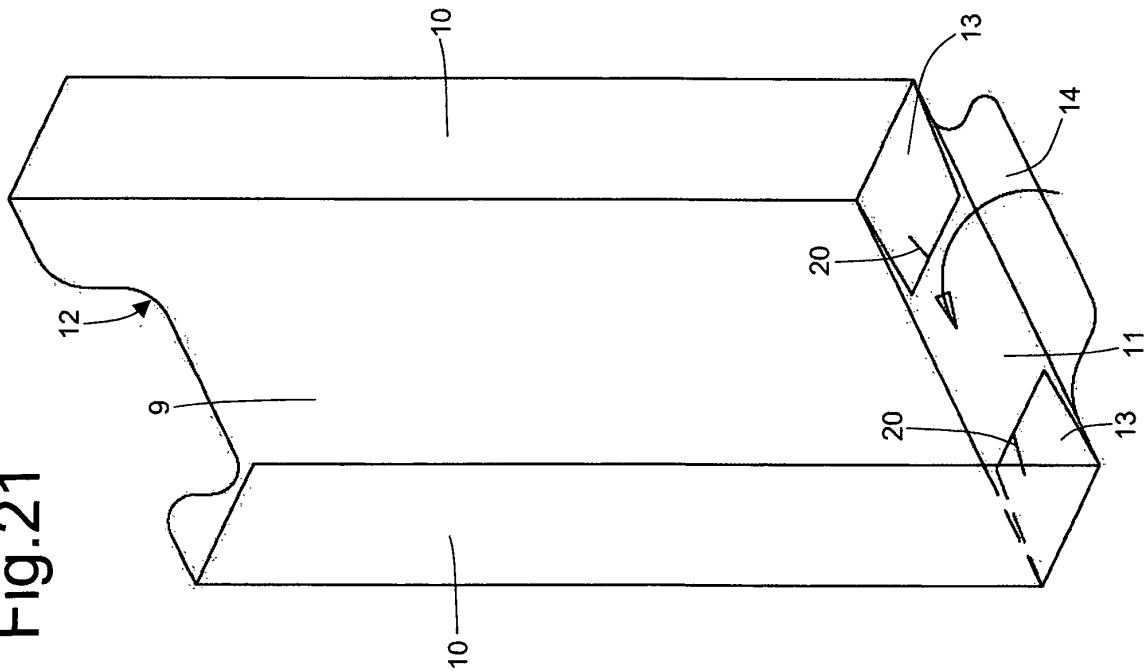


Fig.23

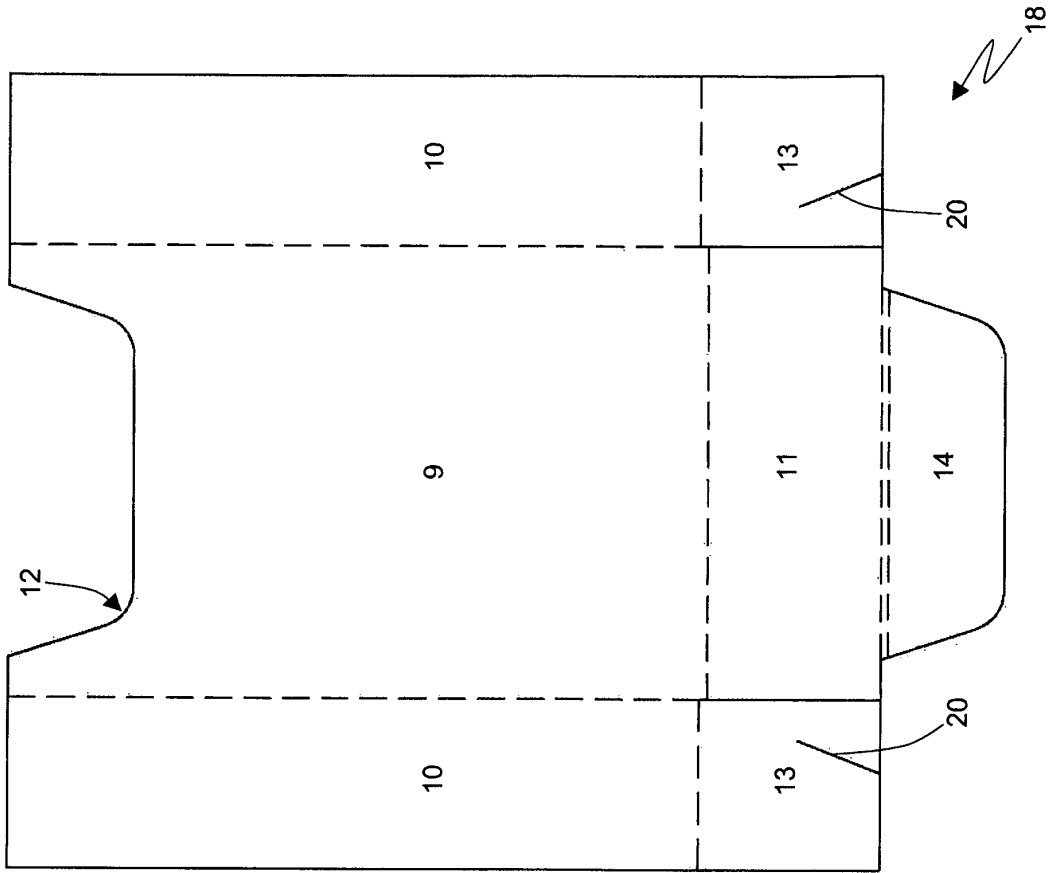
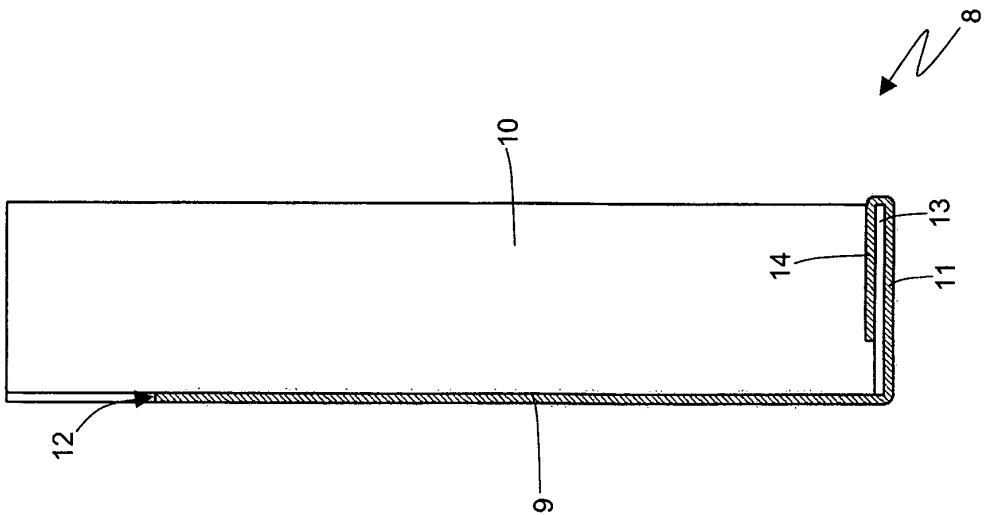


Fig.22



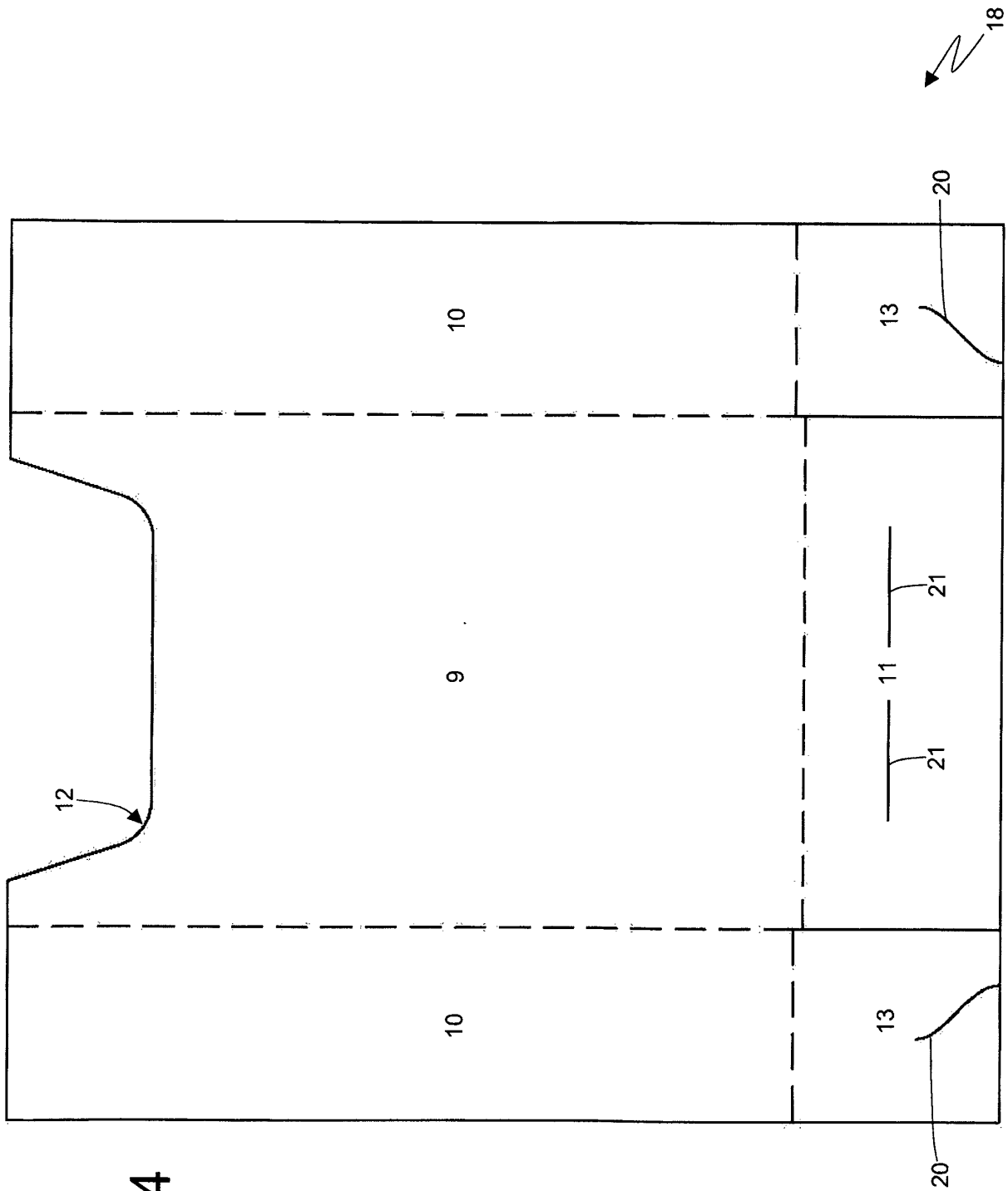


Fig. 24

Fig.25

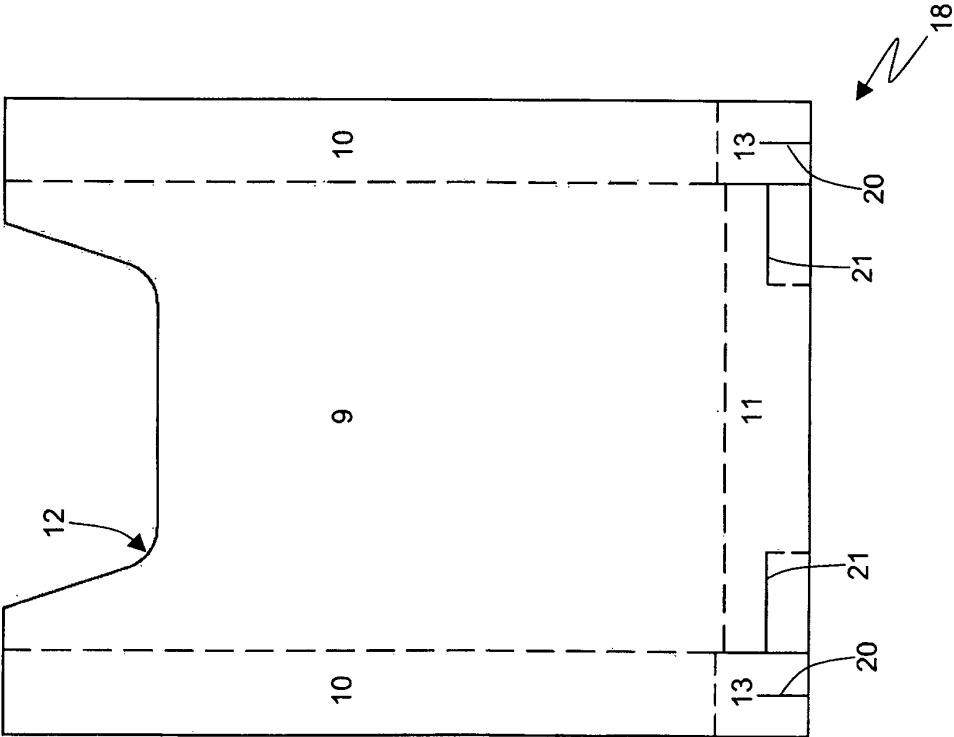


Fig.26

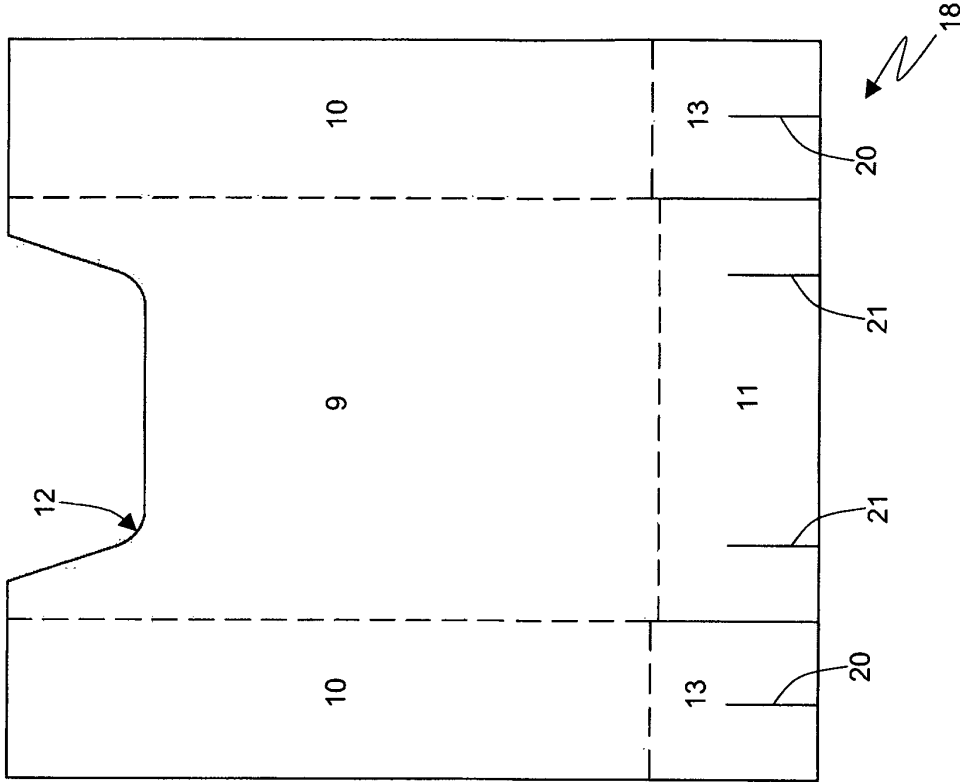


Fig.28

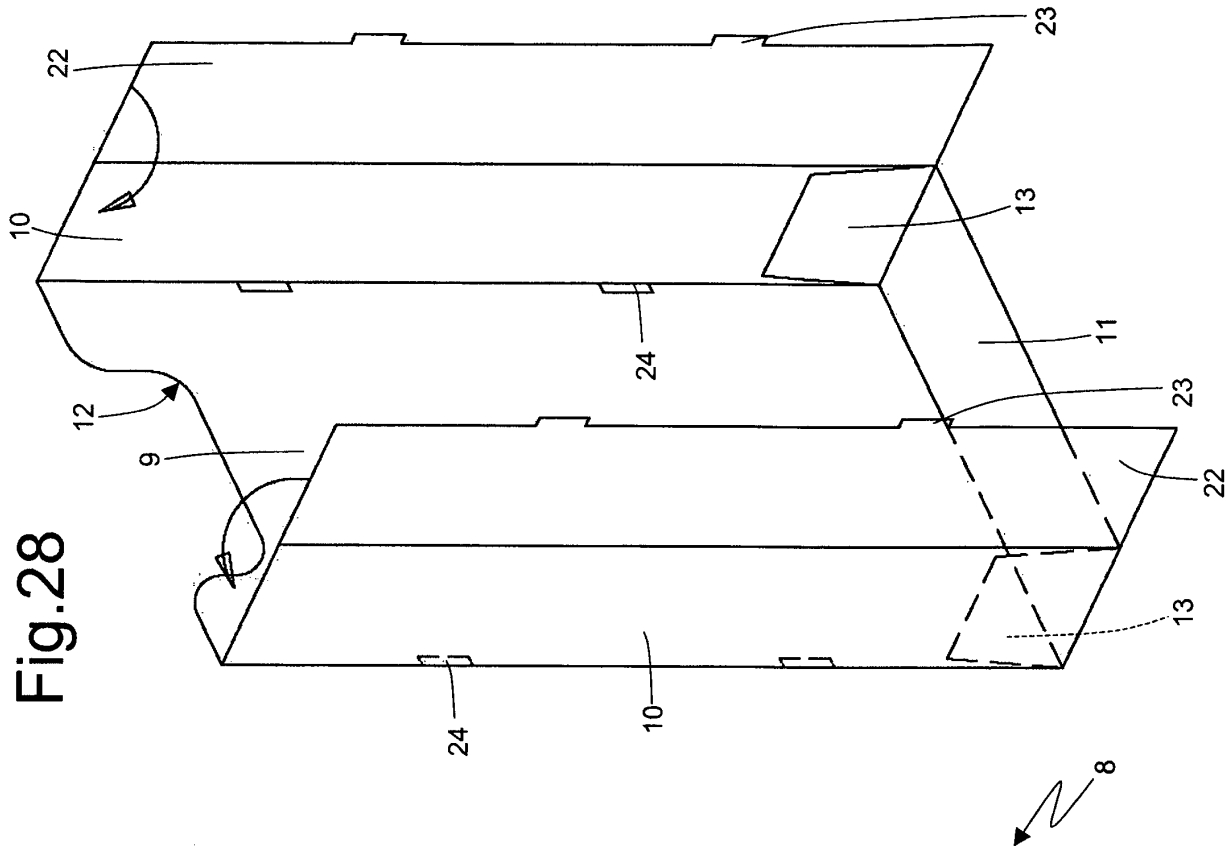


Fig.27

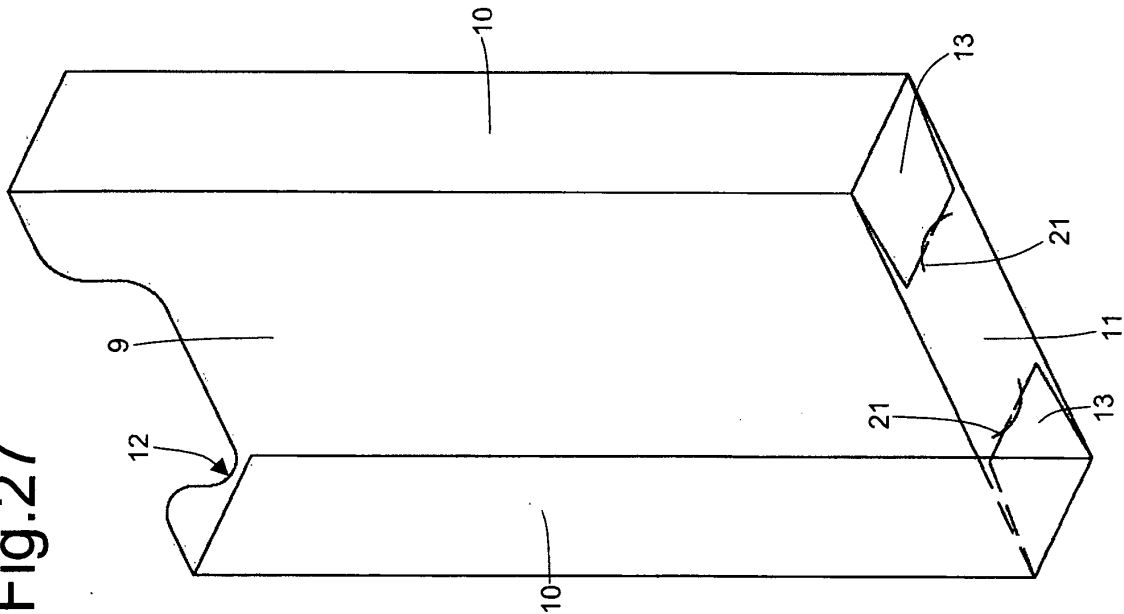


Fig.29

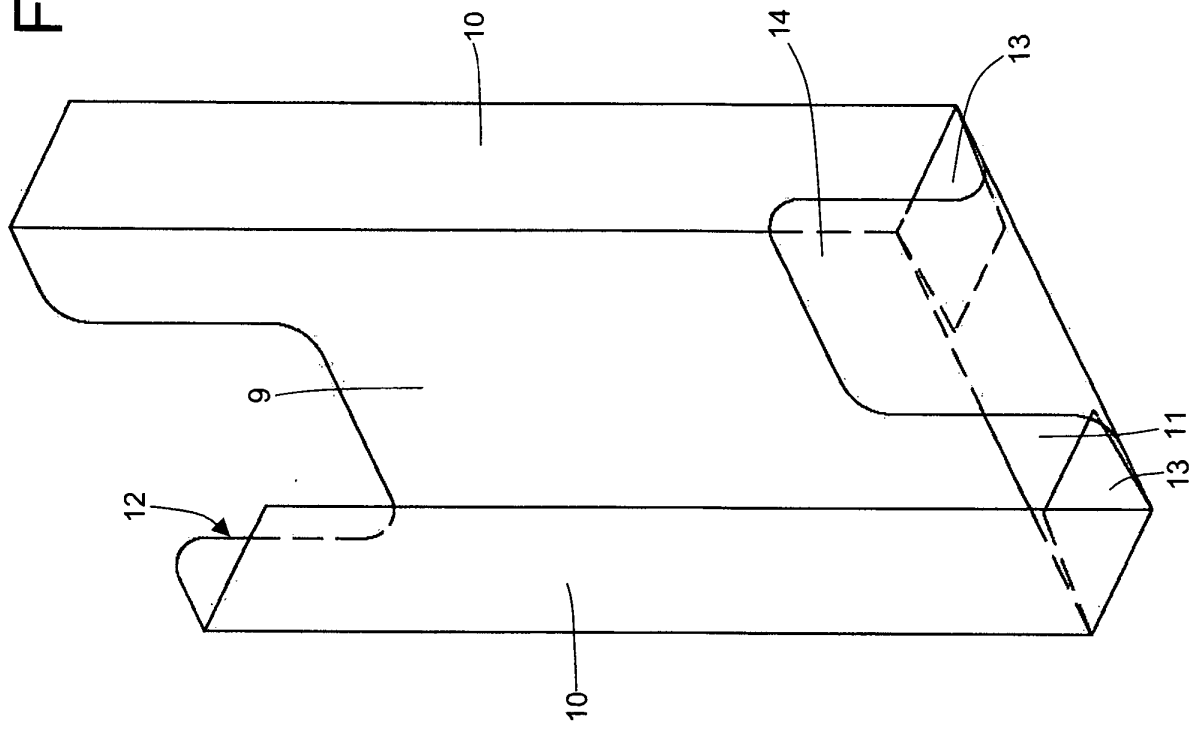
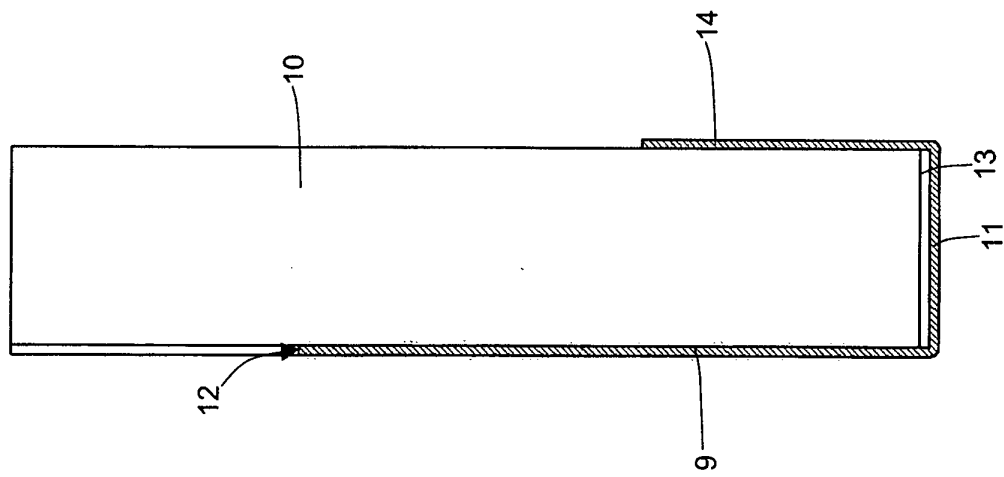


Fig.30



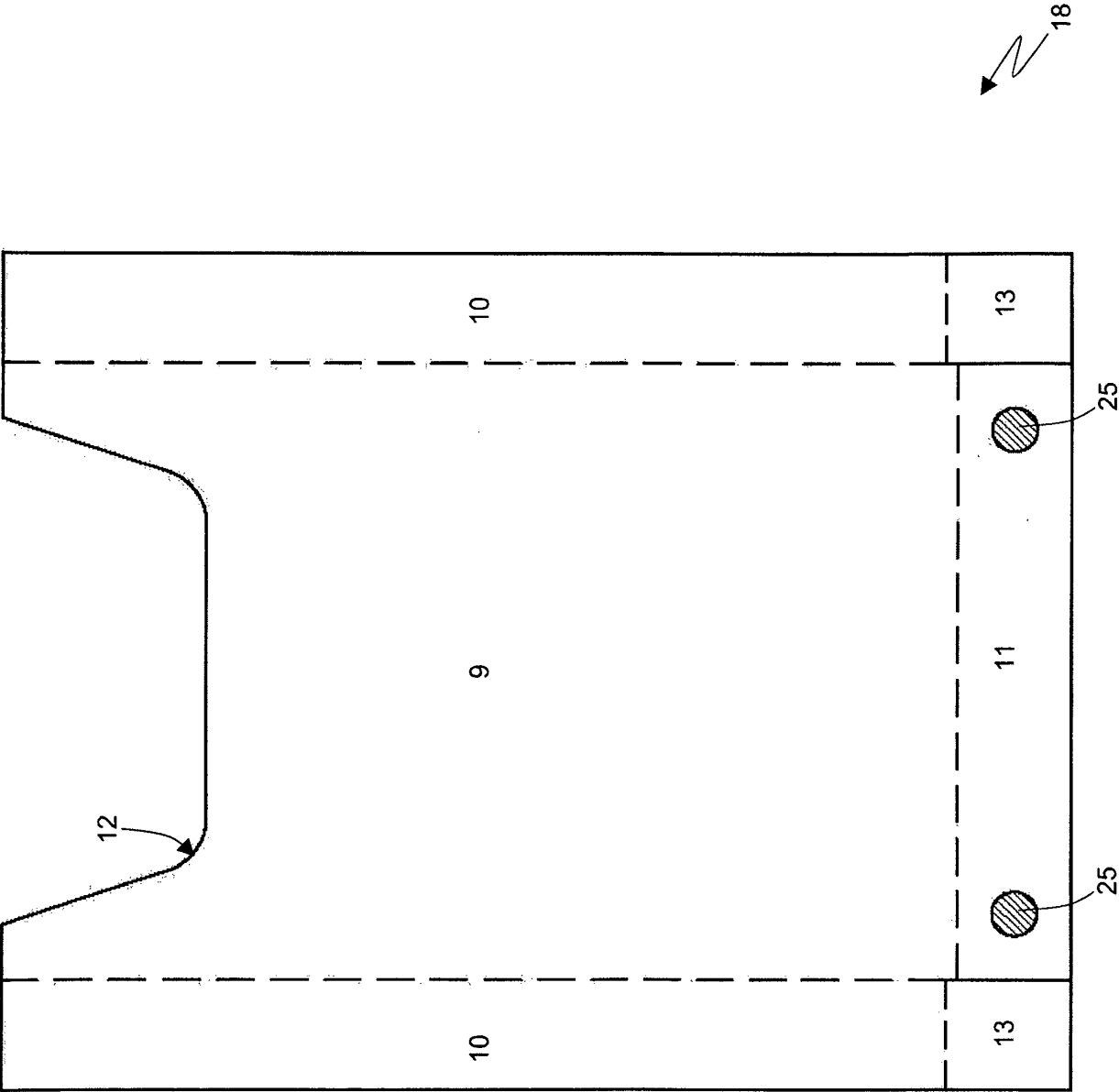


Fig.31

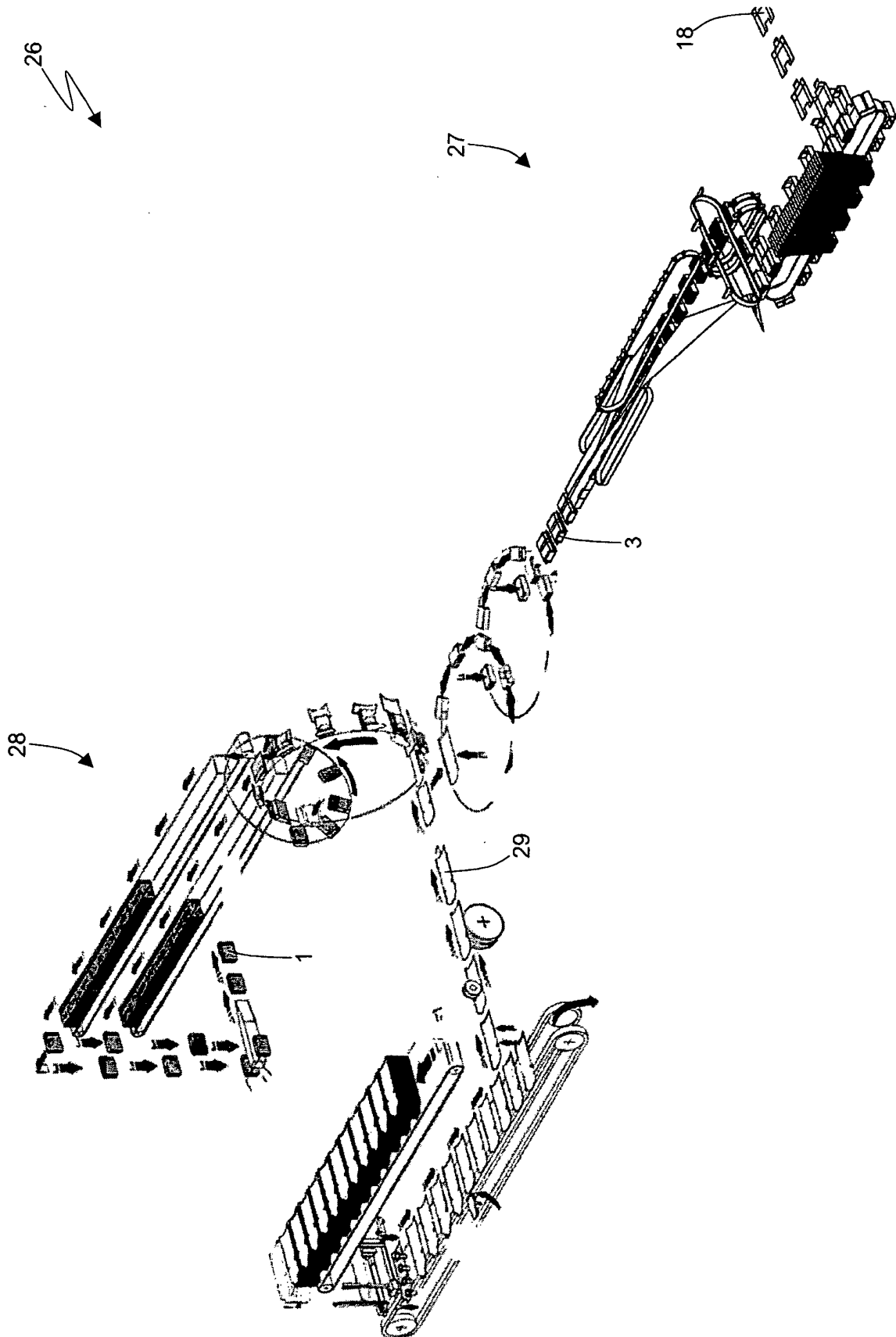


Fig.32

Fig.33

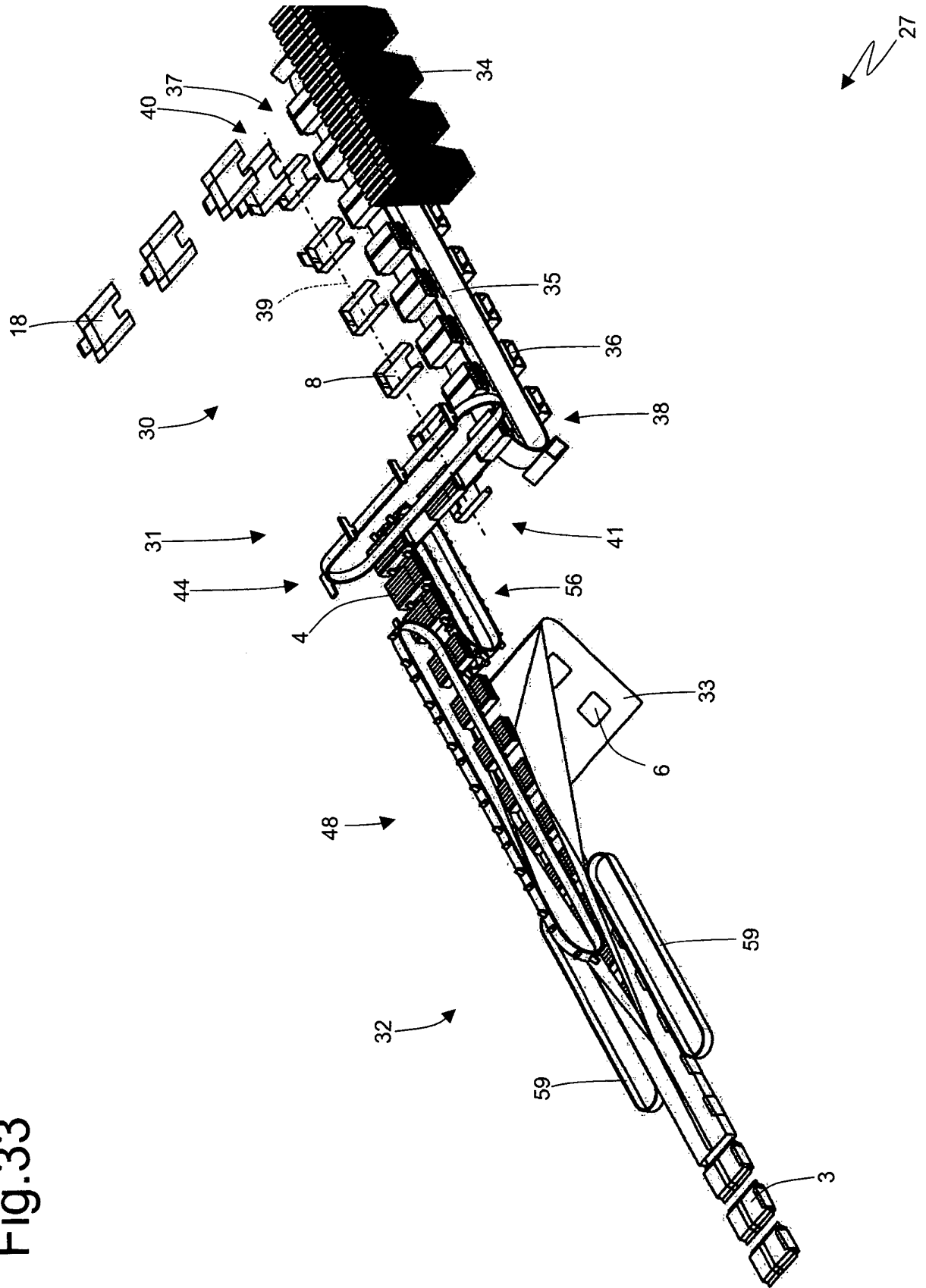


Fig.34

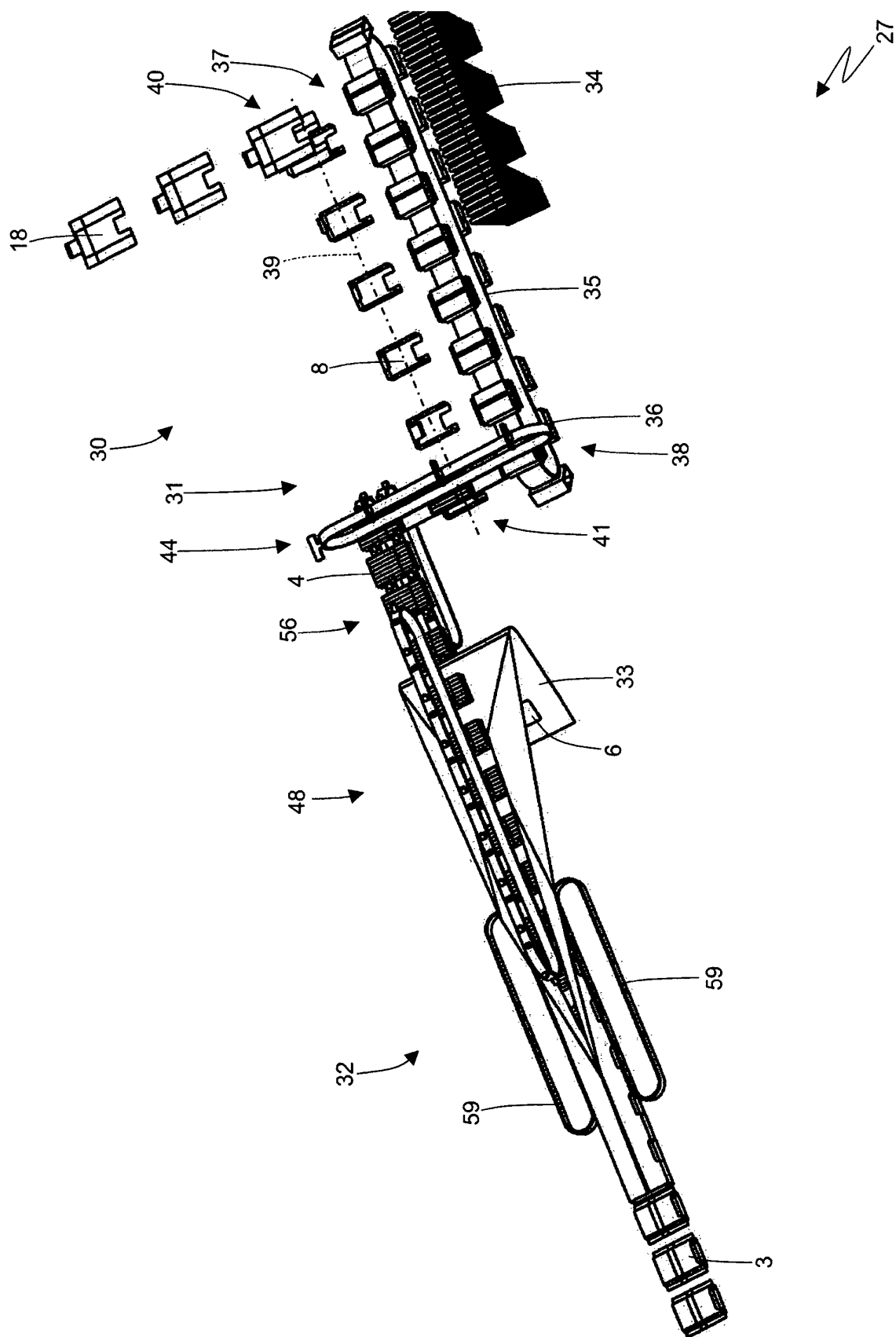
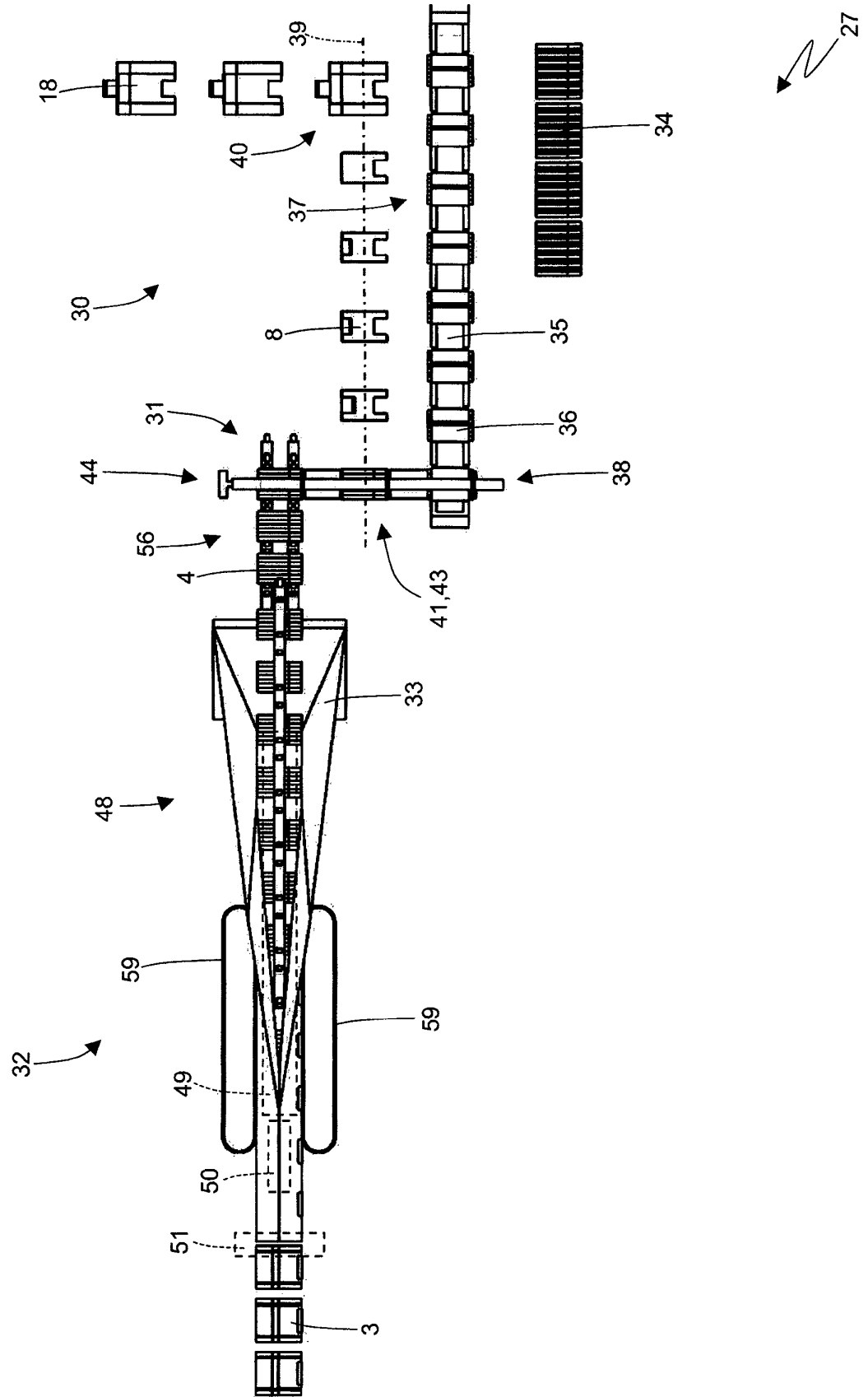


Fig.35



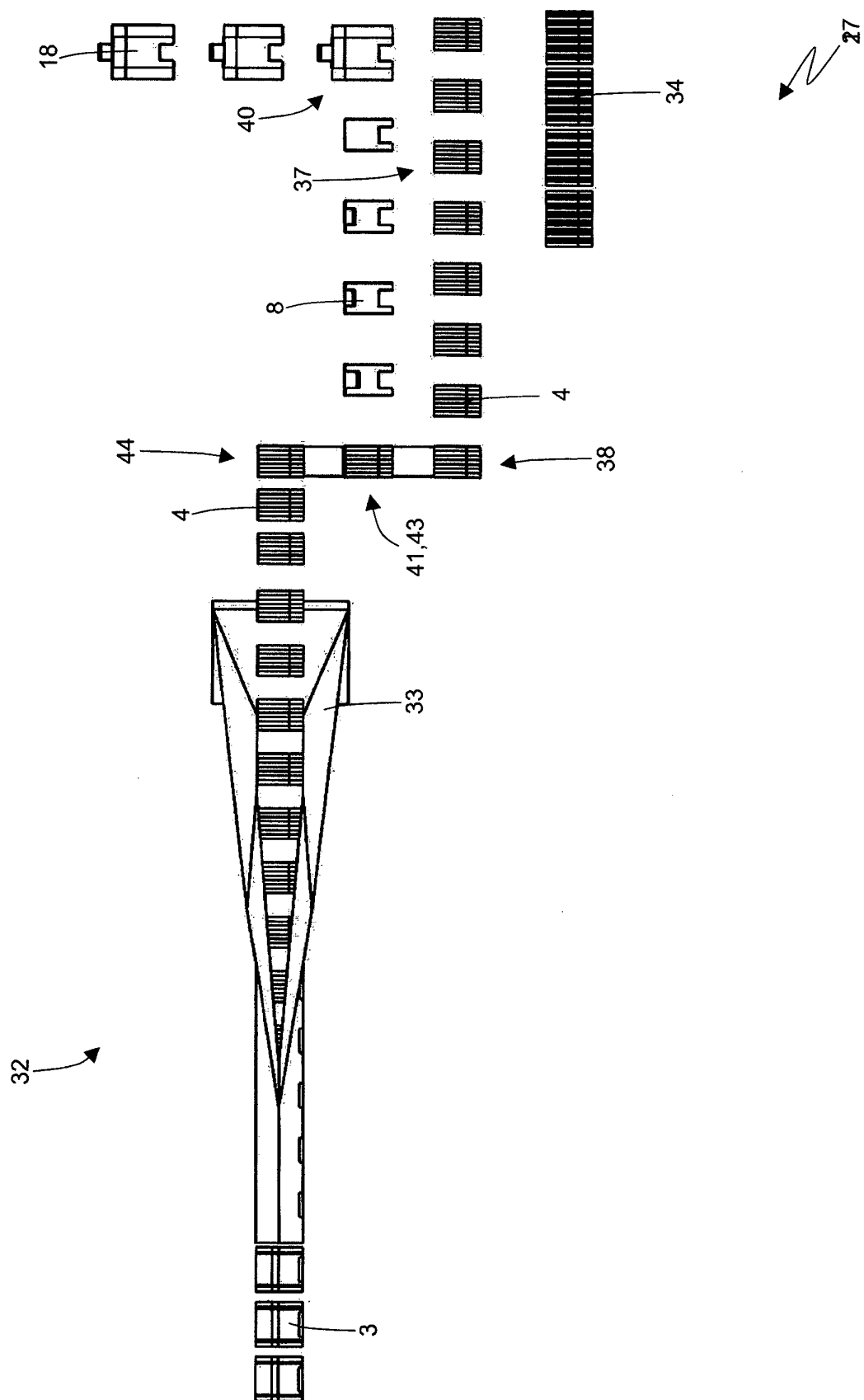
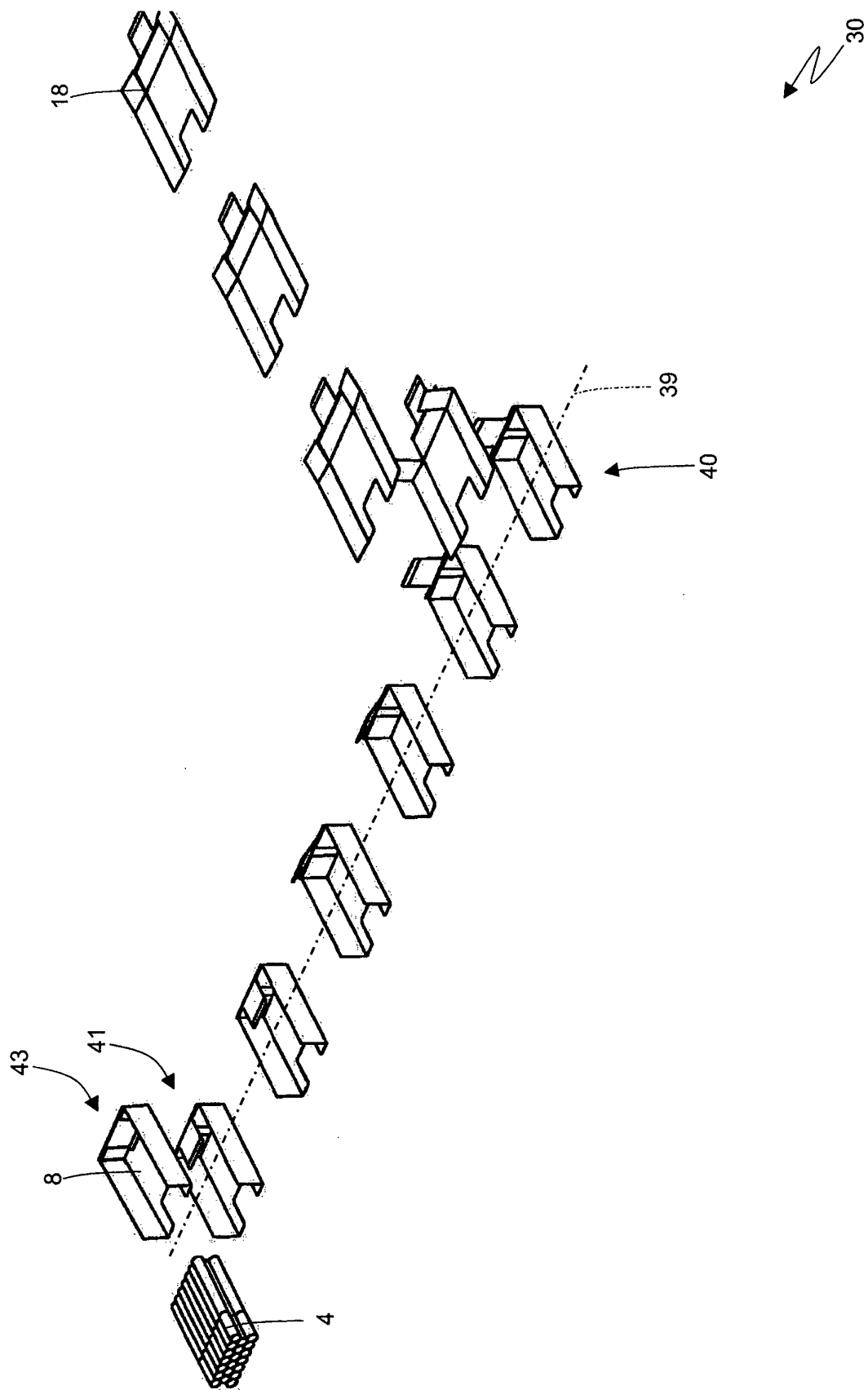


Fig. 36

Fig.37



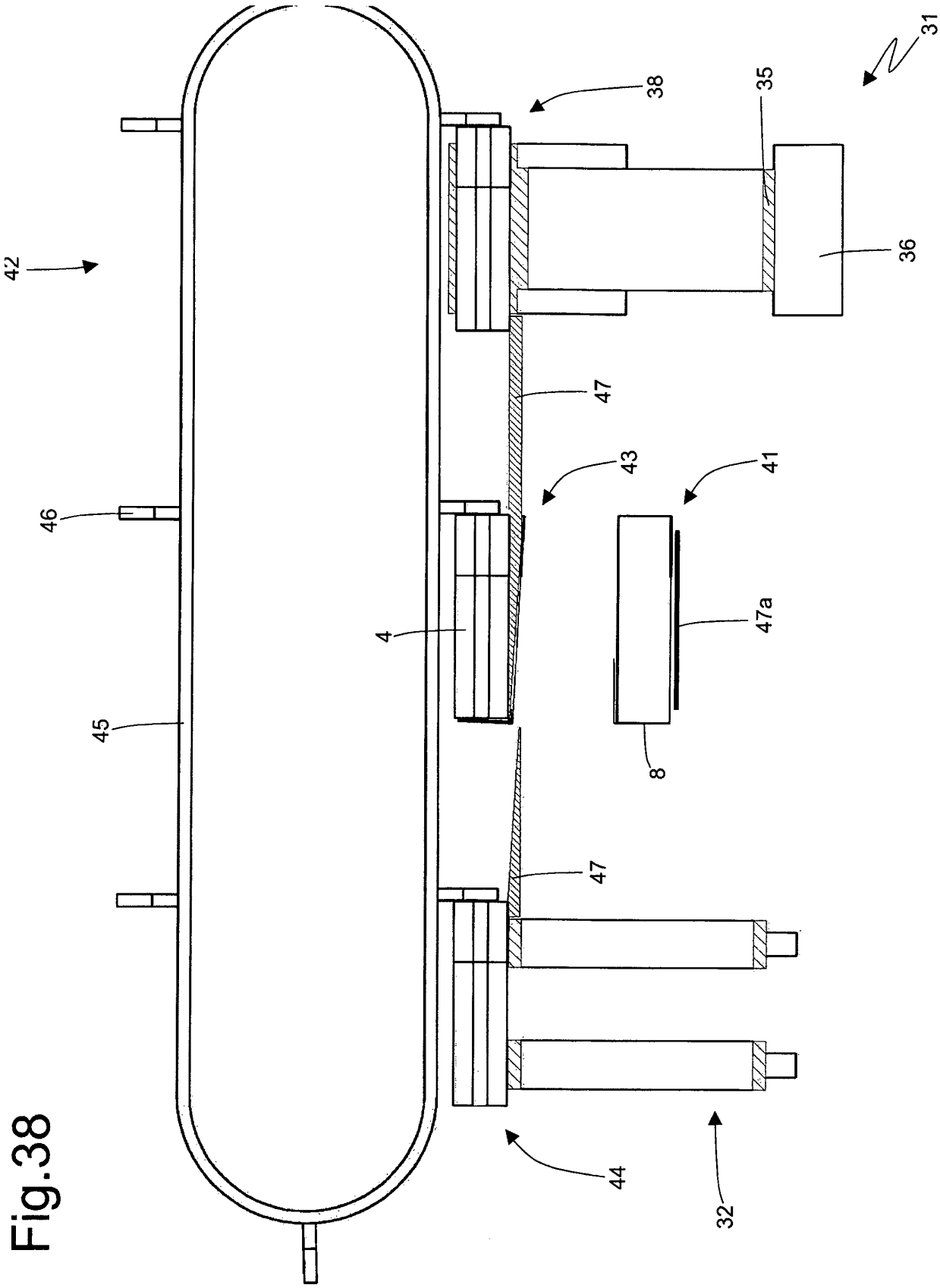
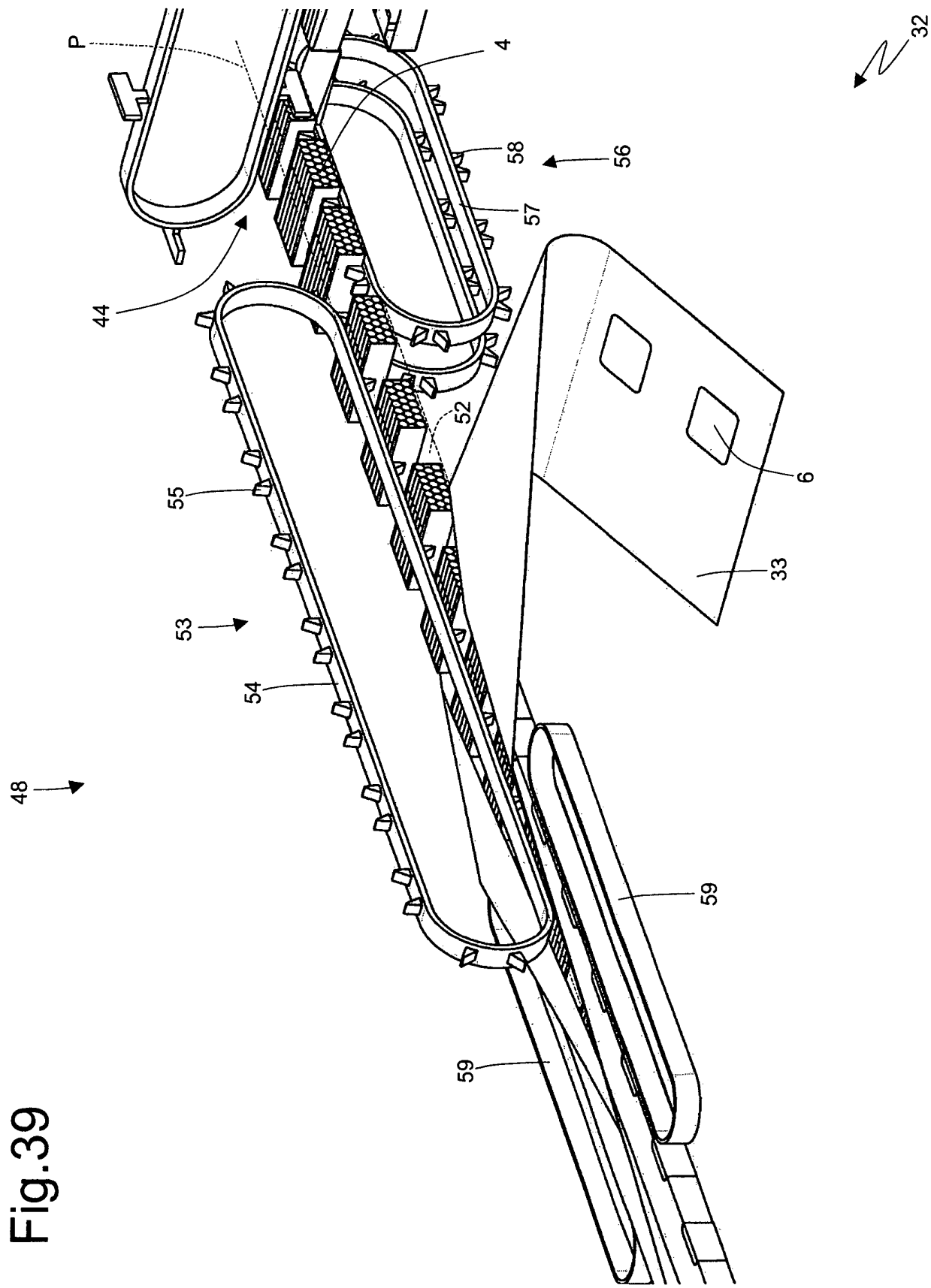


Fig. 38

Fig.39



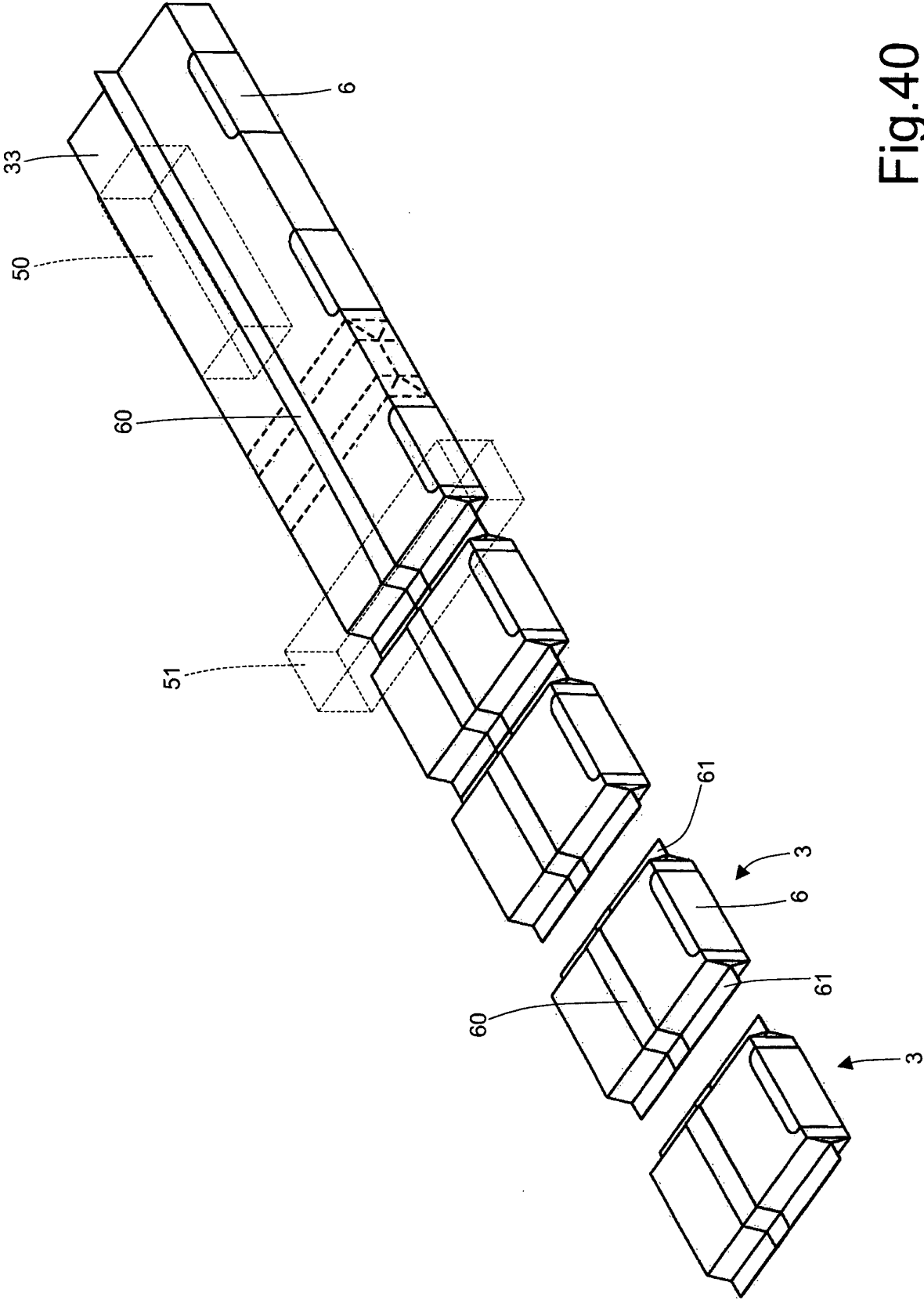


Fig.40

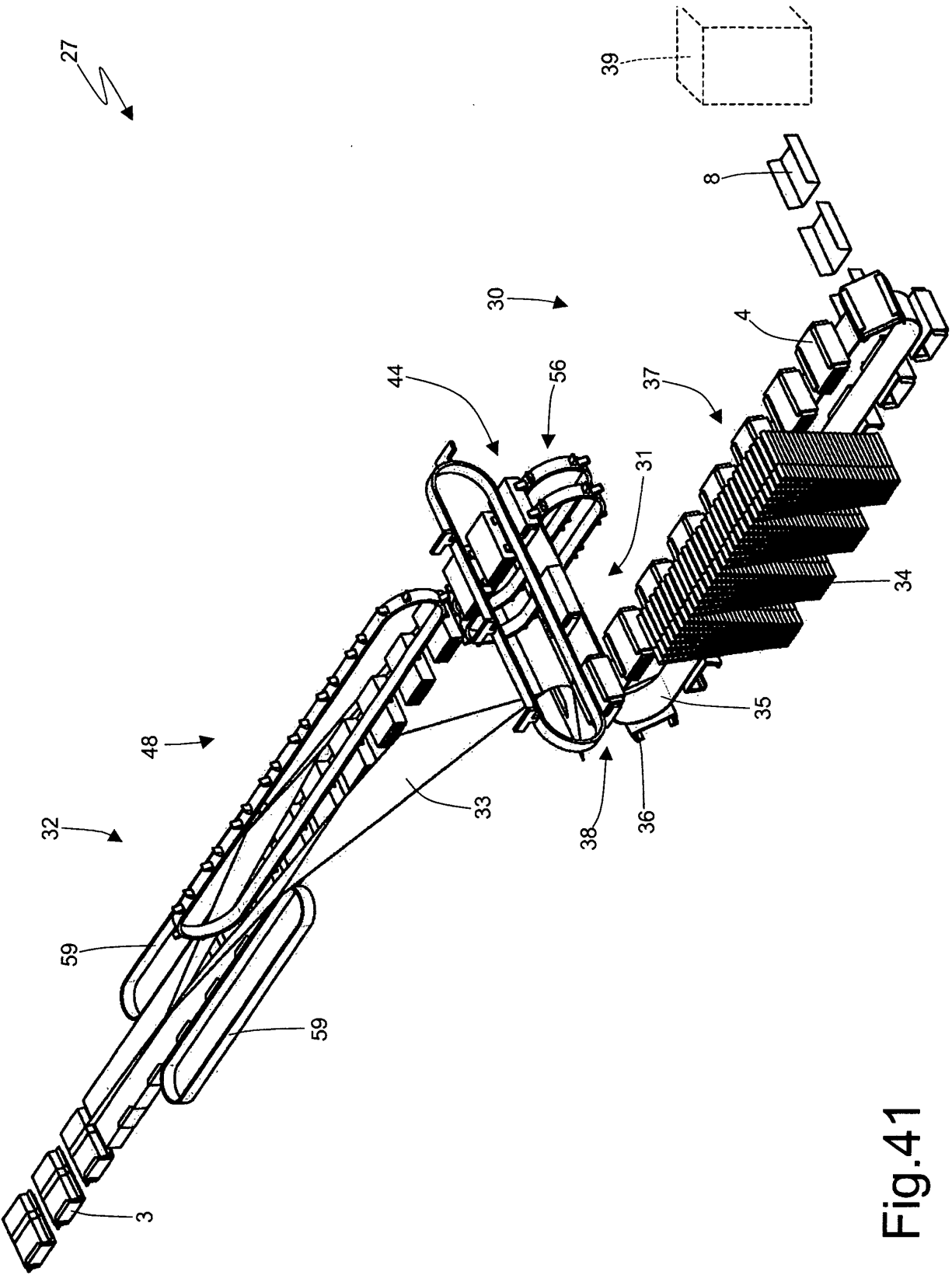


Fig.41

Fig.42

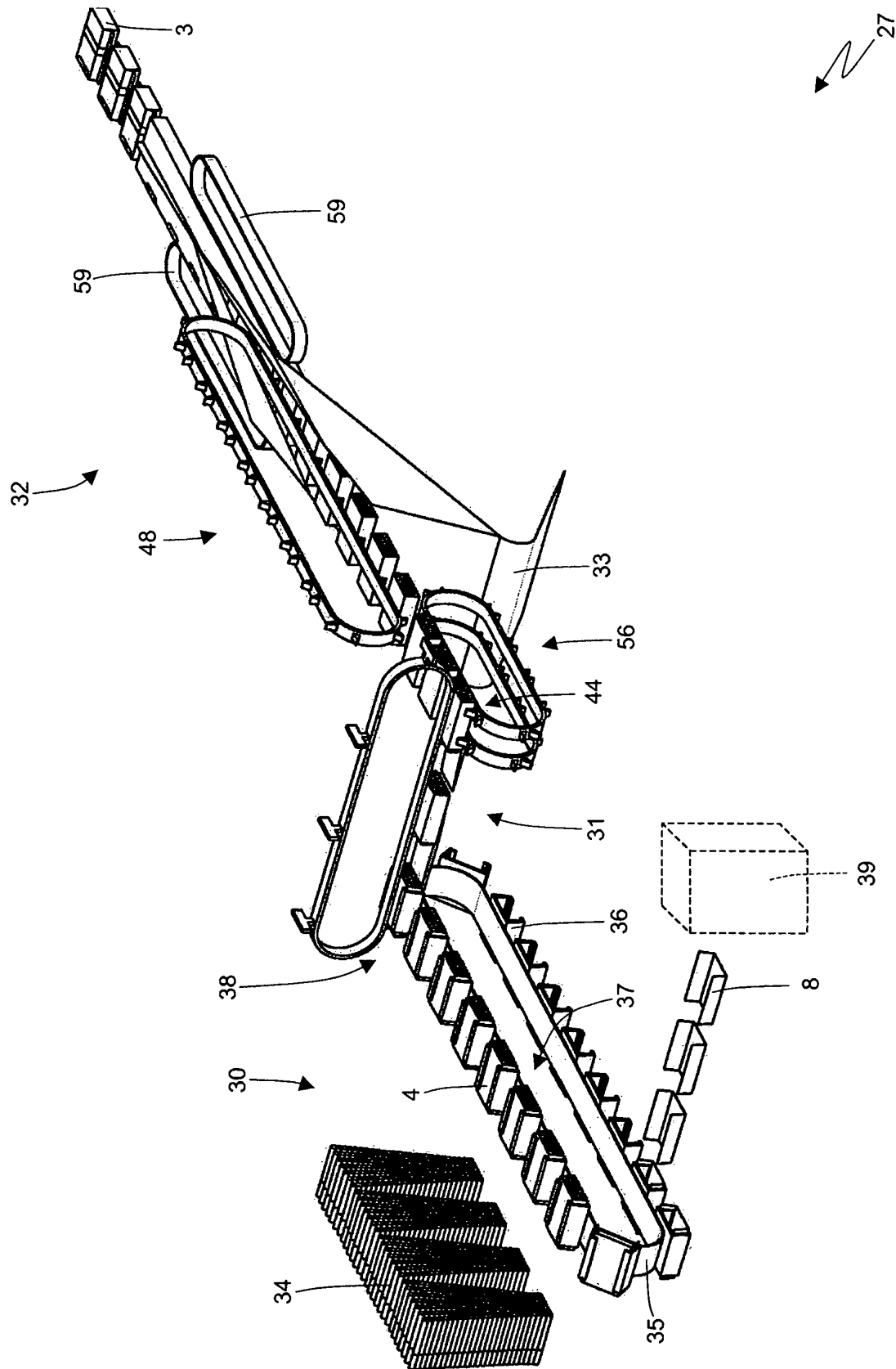
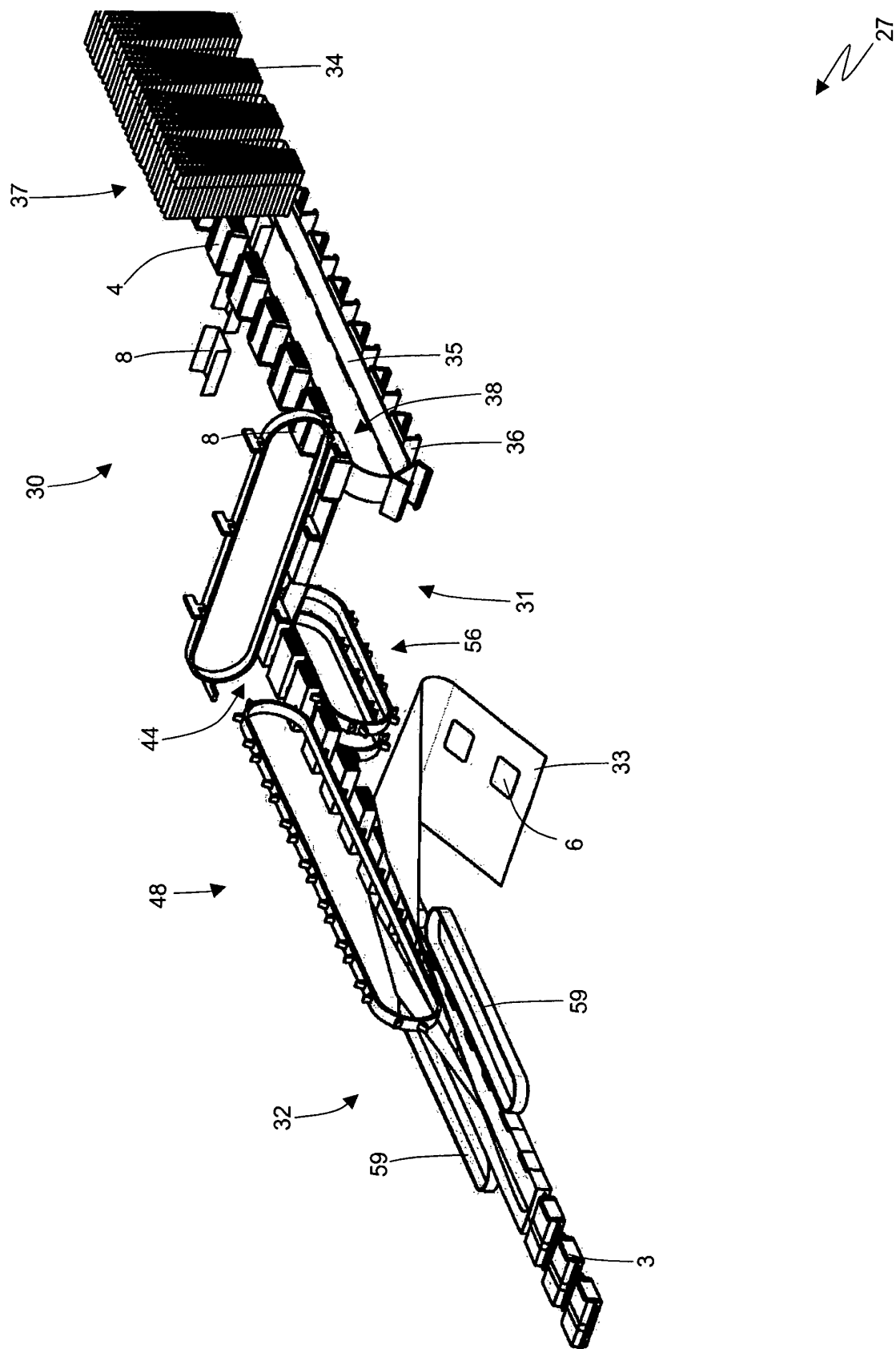


Fig.43



REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- WO 2011110272 A1 [0005] [0006] [0007]
- WO 9849072 A1 [0008]