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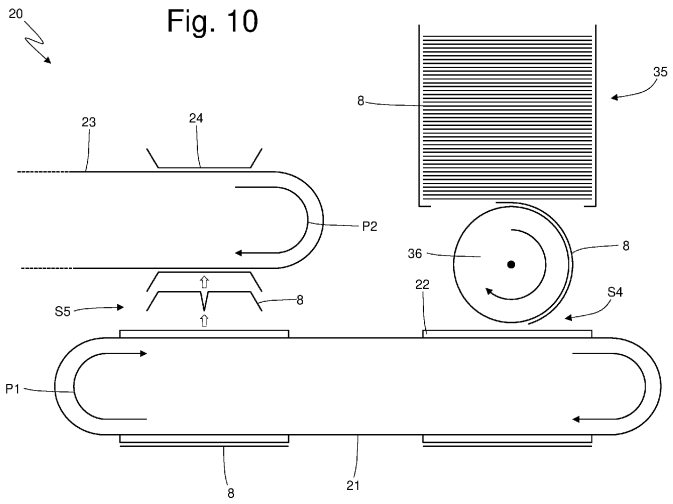
(54) PACKER MACHINE AND WRAPPING METHOD TO COUPLE AN INNER FRAME TO TWO GROUPS OF SMOKING ARTICLES

(57) Packer machine and wrapping method to couple an inner frame (8) to two groups (5) of smoking articles having two main walls (9, 10) and two dividing walls (12) interposed between the main walls (9, 10). The following are provided: a seat (22) designed to hold the inner frame (8) in a spread condition; a conveyor (21), which moves the seat (22) along a feeding path (P1); a pocket (24) designed to house the inner frame (8) in an at least partially folded condition; an input station (S4) arranged along the feeding path (P1) and configured to feed the spread inner frame (8) to the seat (22) of the conveyor (21); and a transfer station (S5) arranged along the feeding path (P1) and configured to transfer the inner frame (8) from the seat (22) to the pocket (24). The seat (22) of the conveyor (21) is designed to only hold the inner frame (8) in a spread condition, so that the inner frame (8) reaches the transfer station (S5) in a spread condition. The transfer station (S5) has a transfer device (25) configured to transfer the inner frame (8) from the seat (22) to the pocket (24), simultaneously folding the inner frame (8).

Fig. 10



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Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This patent application claims priority from Italian patent application no. 102022000012002 filed on June 07, 2022, the entire disclosure of which is incorporated herein by reference.

TECHNICAL FIELD

[0002] The present invention relates to a packer machine and to a wrapping method to couple an inner frame (namely, a reinforcing element) to two groups of smoking articles.

[0003] The present invention finds advantageous application to the production of a rigid pack of cigarettes with a hinged lid and of the *"train"* type containing a single sealed wrap that encloses two twin and side-by-side groups of cigarettes, to which the following disclosure will make explicit reference without thereby losing of generality.

PRIOR ART

[0004] Patent application EP2008935A1 describes a method and a packer machine to couple an inner frame (namely, a reinforcing element) to a group of cigarettes, wherein the group of cigarettes is fed to a first seat of a pocket, the inner frame is fed to a second seat of the pocket separated from the first seat, and finally the group of cigarettes and the inner frame are extracted together from the pocket by means of a single common extractor device so as to couple the inner frame to the group of cigarettes (namely, so as to bring the inner frame in direct contact with the group of cigarettes).

[0005] Being present for a number of years is a pack of cigarettes known commercially as *"twin"* and comprising a rigid outer container which houses two groups of identical cigarettes (namely, "*twin*" hence the commercial name of the pack of cigarettes), which are arranged next to one another and can be wrapped in a common single wrapping sheet or can be wrapped in a corresponding separate wrapping sheet.

[0006] The patents EP3643626B1 and US5461842A describe the production of a rigid pack of cigarettes with a hinged lid and of the *"twin"* type that contains a single wrap which encloses two twin and side-by-side groups of cigarettes which are separated from one another by an inner frame (namely, a reinforcing element) having a central dividing wall which keeps the two groups of cigarettes separate and spaced apart.

[0007] Patent application WO2019162982A1 represents the closest state of the art and describes a device for forming a collar (inner frame) of a rigid pack of cigarettes with hinged lid and of the "*train*" type.

DESCRIPTION OF THE INVENTION

[0008] The object of the present invention is to provide a packer machine and a wrapping method to couple an inner frame to two groups of smoking articles, which packer machine and wrapping method are simple to implement, allow to operate at a high production speed (measured as packs of cigarettes produced per time unit), and allow avoiding damage to the smoking articles when being coupled to the inner frame.

[0009] According to the present invention, a packer machine and a wrapping method are provided to couple an inner frame to two groups of smoking articles, as claimed in the attached claims.

[0010] The claims describe embodiments of the present invention forming an integral part of the present description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The present invention will now be described with reference to the attached drawings, which illustrate a non-limiting embodiment thereof, wherein:

- Figure 1 is a front perspective view and in a closed configuration of a rigid pack of cigarettes with a hinged lid and of the "*twin*" type;
- Figure 2 is a rear perspective view of the pack of cigarettes of Figure 1 in a closed configuration;
- Figure 3 is a front perspective view of the pack of cigarettes of Figure 1 in an open configuration;
- Figures 4 and 5 are two perspective views of an inner frame which is contained in the pack of cigarettes of Figure 1 and is still completely in a spread and partially folded condition, respectively;
- Figure 6 is a perspective view and with parts removed for clarity of a forming unit of a packer machine which produces the pack of cigarettes of Figure 1;
- Figure 7 is a perspective view and on an enlarged scale of a pocket of a forming conveyor of the forming unit of Figure 6 and containing an inner frame and two groups of cigarettes;
- Figures 8 and 9 are two different perspective views of the empty pocket of Figure 7;
- Figure 10 is a schematic view of a feeding unit for the frames inside a forming conveyor of the forming unit of Figure 6;
- Figures 11-16 illustrate in sequence a transfer and simultaneous folding step of an inner frame in the feeding unit of Figure 10; and
- Figure 17 is a perspective view and with parts removed for clarity of some parts of the parts of the feeding unit of Figure 10.

PREFERRED EMBODIMENTS OF THE INVENTION

[0012] In Figures 1, 2 and 3, number 1 denotes as a

whole a rigid *"twin"* pack of cigarettes. The pack 1 of cigarettes comprises a container 2 made of rigid and cup-shaped cardboard or paperboard and a single sealed wrap 3 (partially illustrated in Figure 3) housed on the inside of the container 2.

[0013] The container 2 has an open upper end and is provided with a lid 4, which is cup-shaped and is hinged to the container 2 along a hinge (illustrated in Figure 2) to rotate, relative to the container 2, between an opening (illustrated in Figure 3) and a closing (illustrated in Figures 1 and 2) position of the open upper end.

[0014] The sealed wrap 3 encloses two parallelepiped-shaped and side-by-side groups 5 of cigarettes (partially illustrated in Figure 7); each cigarette is provided with a filter and therefore the group of cigarettes has an upper wall made up of the circular ends (tips) of the filters and a lower wall, opposite the upper wall, made up of the circular ends (tips) of the tobacco rods.

[0015] As illustrated in Figure 3, the sealed wrap 3 has two side-by-side extraction openings 6 at the top and in front, each delimited by a pre-weakened tearable line, is closed by a reusable closing label 7 and it affects a portion of a front wall of the sealed wrap 3 and a portion of an upper wall of the sealed wrap 3.

[0016] According to a different embodiment not illustrated, the sealed wrap 3 is devoid of the extraction openings 6 and of the respective closing labels 7 and has (at least) a removable upper portion, which is separated from the rest of the sealed wrap 3 by a pre-weakened tearable line to be removed by tearing upon the first opening of the sealed wrap 3.

[0017] According to a different embodiment not illustrated, the wrap 3 is not of the sealed type, it is devoid of the extraction openings 6 and of the respective closing labels 7 and has (at least) one removable upper portion, which is separated from the rest of the wrap 3 by a pre-weakened tearable line to be removed by tearing upon the first opening of the wrap 3.

[0018] The sealed wrap 3 is obtained by directly folding a wrapping sheet around two groups 5 of cigarettes placed side-by-side so as to be in direct contact with the cigarettes. Once the wrapping sheet has been folded around two groups 5 of cigarettes placed side-by-side to form the sealed wrap 3, the shape of the sealed wrap 3 is stabilized by heat-sealing the overlapping portions of the wrapping sheet.

[0019] If the wrap 3 is of the unsealed type, it is obtained in a similar way, that is, by directly folding a wrapping sheet around two groups 5 of cigarettes placed side-by-side so as to be in direct contact with the cigarettes; in this case the shape of the wrap 3 is either not stabilized or glue is used.

[0020] As illustrated in Figures 4 and 5, the sealed wrap 3 comprises an inner frame 8 (namely, a reinforcing element), which is made of cardboard or rigid paperboard, is shaped like a double "U", and is arranged inside of the sealed wrap 3 in contact with the two groups 5 of cigarettes thus forming a division (separation) between the two groups 5 of cigarettes. A function of the inner frame 8 is to give greater stiffness and greater shape stability to the sealed wrap 3 so as to prevent the sealed wrap 3 from collapsing after having extracted a part of the cigarettes contained in the sealed wrap 3 making the extraction of the remaining cigarettes complicated and in particular making the opening and subsequent re-closing of the closing label 7 extremely complicated. A further function of the inner frame 8 is to provide mechanical protection to the cigarettes during the folding of the wrapping sheet, mechanical and thermal protection to the cigarettes during the heat-sealing of the overlapping portions of the wrapping sheet, and mechanical protection to the cigarettes during the handling of the sealed wrap 3. A final function of the inner frame 8 is to divide the inner space of the sealed wrap 3 into two distinct and separate chambers, each containing a corresponding group 5 of cigarettes.

[0021] As illustrated in Figures 4 and 5, the inner frame 8 comprises a (first) front (or main) wall 9 arranged in contact with the cylindrical side walls of the cigarettes of a (first) group 5 of cigarettes, a (second) front (or main) wall 10 arranged in contact with the cylindrical side walls of the cigarettes of a (second) group 5 of cigarettes, two side walls 11 arranged at opposite ends of the two front walls 9 and 10, and two dividing walls 12 which are interposed between the two front walls 9 and 10. The two side walls 11 are folded by 90° relative to the corresponding front walls 9 and 10 and similarly the two dividing walls 12 are folded by 90° relative to the corresponding front walls 9 and 10 and one against the other; in this way two *"chambers"* are formed which are mutually separated by the two dividing walls 12 (overlapping one another and perpendicular to the front walls 9 and 10) and each housing a corresponding group 5 of cigarettes.

[0022] According to an alternative embodiment not illustrated, the inner frame 8 has no two side walls 11. In said embodiment, therefore, the inner frame 8 comprises a (first) front (or main) wall 9 arranged in contact with the cylindrical side walls of the cigarettes of a (first) group 5 of cigarettes, a (second) front (or main) wall 10 arranged in contact with the cylindrical side walls of the cigarettes of a (second) group 5 of cigarettes and two dividing walls 12 that are interposed between the two front walls 9 and 10. The two dividing walls 12 are folded by 90° relative to the corresponding front walls 9 and 10 and against one another; in this way two *"chambers"* are formed which are mutually separated by the two dividing walls 12 (overlapping one another and perpendicular to the front walls 9 and 10) and each housing a corresponding group 5 of cigarettes.

[0023] The pack 1 of cigarettes described above is made by means of a packer machine which, in at least some of its parts, works with intermittent motion (namely, with a motion which provides for a cyclical alternation of motion steps and stop steps). The packer machine comprises a forming unit 13 (illustrated in Figure 6) in which two pairs of groups 5 of cigarettes are formed in succes-

sion, each coupled to a corresponding inner frame 8, a wrapping unit 14 (schematically illustrated in Figure 6) in in which a respective wrapping sheet is wrapped around each pair of groups 5 of cigarettes to form a sealed wrap 3, and a further wrapping unit in which a blank is wrapped around each sealed wrap 3 to form the container 2 provided with the lid 4.

[0024] As illustrated in Figure 6, the forming unit 13 comprises a forming conveyor 15, which supports a plurality of supporting bodies 16, each comprising two side-by-side seats 17 (illustrated empty in Figures 8 and 9) each designed to house a group 5 of cigarettes and a seat 18 (illustrated empty in Figures 8 and 9) arranged below the seats 17 and designed to receive a partially folded inner frame 8. In particular, the forming conveyor 15 comprises a belt, which supports the supporting bodies 16, is wound around two end pulleys (one of which is motorized) and moves in a step like manner along a path closed in a loop.

[0025] The forming unit 13 comprises a hopper 19 provided with (at least) two output mouths for simultaneously feeding two groups 5 of cigarettes to the two seats 17 of a respective supporting body 16 of the forming conveyor 15 in a feeding station S1.

[0026] Furthermore, the forming unit 13 comprises a feeding device 20 for the reinforcing elements 8, which is arranged along the forming conveyor 15 and upstream of the hopper 13 relative to the moving direction of the forming conveyor 15. The feeding device 20 is designed to feed an inner frame 8 to the seat 18 of a supporting body 16 of the forming conveyor 15 in a feeding station S2 before two groups 5 of cigarettes are fed into the two seats 17 of the supporting body 16 by the hopper 19.

[0027] According to an alternative embodiment not illustrated, the feeding station S2 is arranged downstream of the feeding station S1. In this case, the feeding device 20 is designed to feed an inner frame 8 to the seat 18 of a supporting body 16 of the forming conveyor 15 in a feeding station S2 after two groups 5 of cigarettes are fed into the two seats 17 of the supporting body 16 by the hopper 19.

[0028] As previously stated, each supporting body 16 of the forming conveyor 15 comprises two seats 17, each designed to contain a respective group 5 of cigarettes, and a seat 18, which is designed to contain an inner frame 8 and is separate with respect to the seats 17. Consequently, the hopper 19 feeds two groups 5 of cigarettes into the seats 17 of a supporting body 16, while the feeding device 20 feeds an inner frame 8 into the seat 18 of a supporting body 16.

[0029] According to a preferred embodiment, a control station is arranged along the forming conveyor 15, where the completeness of each group 5 of cigarettes and/or the correct filling of the cigarette tips of each group 5 of cigarettes is optically checked, and a subsequent reject station, in which any defective group 5 of cigarettes signalled by the control station is rejected together with the respective inner frame 8 and with the other group 5 of cigarettes arranged alongside (for example by means of a mechanical or pneumatic ejection from the respective supporting body 16).

[0030] A transfer station S3 is defined between the forming unit 13 and the wrapping unit 14, in which the pairs of groups 5 of cigarettes side-by-side and coupled to the respective inner frame 8 are transferred from the forming unit 13 to the wrapping unit 14. In particular, the transfer station S3 comprises an extractor device, which extracts together the two respective groups 5 of cigarettes and the respective inner frame 8 from each supporting body 16 so as to couple the inner frame 8 to the groups 5 of cigarettes; it is important to note that the extractor device is common to all the seats 17 and 18 of the same supporting body 16, that is, a single extractor device simultaneously extracts the two respective groups 5 of cigarettes and the respective inner frame 8 from each supporting body 16.

[0031] As illustrated in Figure 10, the feeding device 20 comprises a conveyor 21 which supports a plurality of seats 22, each designed to hold (for example by means of suction) a corresponding spread inner frame 8, namely, an inner frame 8 completely plane (flat) as it (still) has no folds (therefore as illustrated in Figure 4). The conveyor 21 moves each seat 22 along a feeding path P1 closed in a loop, which passes through an input station S4, configured to feed the spread inner frames 8 in succession to the corresponding seats 22 of the conveyor 21, and passes through a transfer station S5 configured to transfer the inner frames 8 from the corresponding seats 22 of the conveyor 21. The transfer station S5 is arranged along the feeding path P1 downstream of the input station S4.

[0032] In the embodiment illustrated in the attached figures, the conveyor 21 comprises a conveyor belt which supports the seats 22 and is closed in a loop around two end pulleys (at least one of which is motorized); according to an alternative embodiment not illustrated, the conveyor 21 comprises a drum which supports the seats 22 and is mounted to rotate around a central rotation axis.

[0033] As illustrated in Figure 10, the feeding device 20 comprises a conveyor 23 which supports a plurality of pockets 24, each designed to house the inner frame 8 at least partially folded into a double "U" shape (as illustrated in Figures 10 and 16), in which the two side walls 11 are folded (approximately) by 60-90° relative to the two main walls 9 and 10 and the two dividing walls 12 are folded (towards one another) by (approximately) 60-90° relative to the two main walls 9 and 10. Each pocket 24 is designed to hold (for example by means of suction) a corresponding inner frame 8 at least partially folded, in particular into a double "U" shape.

[0034] The conveyor 23 moves each pocket 24 along a feeding path P2 closed in a loop, which passes through the transfer station S5 configured to insert an inner frame 8, folded into a double "U" shape, into the pocket 24. Furthermore, said pocket 24 moves along feeding path P2 and passes through the feeding station S1 configured

to transfer the inner frame 8 folded into a double "U" shape from the pocket 24 to a seat 18 of a corresponding supporting body 6. The feeding station S1 is arranged along the feeding path P2 downstream of the transfer station S5.

[0035] According to a different embodiment not illustrated, a single pocket 24 is provided, which does not move, is interposed between the transfer station S5 and the feeding station S1, receives in succession the inner frames 8 folded into a double "U" shape from the conveyor 21, and then successively transfers the inner frames 8 folded into a double "U" shape to the forming conveyor 15.

[0036] Each seat 22 of the conveyor 21 is designed only hold the inner frame 8 in a spread condition, so that each inner frame 8 reaches (completely) in a spread condition (therefore without any fold) the transfer station S5; namely, each inner frame 8 is arranged (completely) in a spread condition in the corresponding seat 22 in the input station S4 and still leaves the corresponding seat 22 in a (completely) spread condition in the transfer station S5.

[0037] The transfer station S5 comprises a transfer device 25 (illustrated in Figures 11-17) configured to transfer, in the transfer station S5, an inner frame 8 from the corresponding seat 22 to the corresponding pocket 24 simultaneously performing a partial folding, in particular a (at least partial) double "U" fold, of the inner frame 8. In particular, the aforementioned folding of the inner frame 8 is aimed at arranging at least the dividing walls 12 in an angled arrangement relative to one another. In other words, the dividing walls 12 are intended to be mutually arranged into a "V" shape while the inner frame 8 is transferred from the seat 22 to the pocket 24.

[0038] In other words, the inner frame 8 does not undergo any type of folding until the transfer station S5 and, therefore, remains (completely) in a spread condition up to the transfer station S5, where the inner frame 8 leaves the seat 22.

[0039] As illustrated in Figures 11-17, each pocket 24 is U-shaped and in particular comprises a bottom wall 26 and two side walls 27, which are inclined relative to the bottom wall 26 to give the pocket 24 a "U" shape. According to a preferred embodiment illustrated in the attached figures, the side walls 27 of each pocket 24 form an obtuse angle (of about 100-120°) with the bottom wall 26 of the pocket 24; in this way, in a pocket 24 (and therefore in the seat 18 of a supporting body 16), an inner frame 8 does not have the final configuration (in which the walls 11 and 12 are perpendicular to the main walls 9 and 10), but reaches the final configuration only in the wrapping unit 14 (in this way, the inner frame 8 is more "open" and therefore offers more space for the two corresponding groups 5 of cigarettes to enter). In other words, when an inner frame 8 enters the corresponding pocket 24 it does not yet have the final configuration (in which the walls 11 and 12 are perpendicular to the main walls 9 and 10), but has an intermediate configuration (in which the walls 11 and 12 are not yet perpendicular to the main walls 9 and 10) obtained by only a partial fold which will have to be completed later in the wrapping unit 14.

[0040] The transfer device 25 comprises a pushing member 28 which reproduces in negative the shape of the pocket 24 and has, at the centre, a cavity 29 sized to allow to house the two dividing walls 12 at least partially folded into a "V" shape one relative to the other (as illustrated in the Figures 13, 14 and 15). Namely, the presence of the cavity 10 gives the pushing member 28 a fork shape having two prongs. The transfer device 25 comprises an actuator 30 (e.g., an electric motor) which is configured to move the pushing member 28 back and forth along a transfer direction D which is perpendicular to both feeding paths P1 and P2 so that the pushing member 28 performs a forward stroke, which brings the pushing member into a pocket 24 stopped in the transfer station S5 together with a corresponding inner frame 8 and a subsequent return stroke in the opposite direction.

[0041] When an inner frame 8 is pushed by the pushing member 28 into a corresponding pocket 24, the side walls 11 of the inner frame 8 fold relative to the main walls 9 and 10 of the inner frame 8 against the side walls 27 of the pocket 24 and simultaneously the two dividing walls 12 of the inner frame 8 fold towards one another and relative to the central walls 9 and 10 of the inner frame 8. The folding of the two dividing walls 12 of the inner frame 8 takes place because the size of the pocket 24 is such that it forces the two main walls 9 and 10 of the inner frame 8 to be brought closer (therefore further folding the two dividing walls 12 towards one another) so that the inner frame 8 can be contained inside the pocket 24.

[0042] In particular, each seat 22 has a through opening 31 through which the pushing member 28 is inserted during the forward stroke in order to allow the pushing member 28 (which starts behind the seat 22) to reach the inside of a pocket 24 stopped in the transfer station S5.

[0043] The transfer device 25 comprises a folding element 32 which is aligned with the pushing member 28, is arranged on the opposite side of the seat 22 relative to the pushing member 28, and is configured to come into contact with the dividing walls 12 so as to facilitate (especially at the beginning) a "V" fold of the dividing walls 12. In particular, the folding element 32 is "V"-shaped, namely, it is pointed-shaped, and has its apex oriented towards the two dividing walls 12; namely, the apex of the folding element 32 is aligned along the transfer direction D with the folding line that connects the two dividing walls 12.

[0044] The transfer device 25 comprises an actuator 33 (for example an electric motor) which is configured to move the folding element 32 back and forth along the transfer direction D so as to make the folding element 32 perform a forward stroke, which brings the pushing member in contact with a corresponding inner frame 8 still in a spread condition before the inner frame 8 enters a cor-

responding pocket 24 stopped in the transfer station S5 and a subsequent return stroke in the opposite direction. According to a preferred embodiment, the actuator 33 is configured to move the folding element 32 towards the pocket 24 as (that is, while) the inner frame 8 gets closer to the pocket 24.

[0045] In particular, each pocket 24 has a through opening 34 through which the folding element 32 is inserted during the forward stroke to allow the folding element 32 (which starts behind the pocket 24) to come into contact with a corresponding inner frame 8 still in a spread condition before the inner frame 8 enters the pocket 24.

[0046] As illustrated in Figure 10, the feeding device 20 comprises a hopper 35 which contains a stack of (fully) spread inner frames 8 and a pick-up device 36 which picks up a (fully) spread inner frame 8 from the bottom of the hopper 35 and it lays the inner frame 8 (completely) in a spread condition on a seat 22 stopped at the input station S4.

[0047] With reference to Figures 11-16, the transfer of an inner frame 8 in the transfer station S5 from a seat 22 of the conveyor 21 to a pocket 24 of the conveyor 23 is described in the following.

[0048] Initially and as illustrated in Figure 11, in the transfer station S5 a seat 22 of the conveyor 21 is provided, which supports a spread inner frame 8 and an empty pocket 24 of the conveyor 23.

[0049] Subsequently and as illustrated in Figure 12, the actuator 30 moves the pushing member 28 along the transfer direction D and towards the pocket 24 passing through the through opening 31 of the seat 22; simultaneously, the actuator 33 moves the folding element 32 along the transfer direction D and towards the seat 22 passing through the through opening 34 of the pocket 24 to bring the folding element 32 into contact (or substantially in contact, that is, in proximity) with the inner frame 8 on the opposite side of the pushing member 28.

[0050] As illustrated in Figure 13, by moving along the transfer direction D, the pushing member 28 comes into contact with the inner frame 8 and therefore pushes the inner frame 8 towards the pocket 24, lifting the inner frame 8 from the seat 22; contextually, the presence of the folding element 32 causes a "V" fold of the two dividing walls 12.

[0051] As illustrated in Figure 14, the pushing member 28 and the folding element 32 move together along the transfer direction D to bring the inner frame 8 towards the pocket 24, progressively increasing the "V" folding of the two dividing walls 12.

[0052] As illustrated in Figure 15, the pushing member 28 enters the pocket 24 together with the inner frame 8 (while the folding element 32 returns behind the pocket 24 again crossing the through opening 34 of the pocket 24) to cause the side walls 11 of the inner frame 8 to fold against the side walls 27 of the pocket 24 and the simultaneous folding of the dividing walls 12 of the inner frame 8 towards one another.

[0053] As illustrated in Figure 16, once the inner frame 8 has been inserted into the pocket 24, the pushing member 28 completes its return stroke to return behind the seat 22 and thus allow the conveyor 21 to move by one step along the feeding path P1 to bring a new seat 22 carrying a further spread inner frame 8 to the transfer station S5 and allow the conveyor 23 to move by one step along the feeding path P2 to bring a new empty pocket 24 to the transfer station S5.

[0054] The embodiment illustrated in the attached figures refers to the production of a pack of cigarettes, but the present invention can also be applied without substantial modifications to the production of any other type of pack of smoking articles (for example a pack of cigars, a pack of electronic cigarettes of the liquid vaporization type, a pack of new generation cigarettes without tobacco combustion...).

[0055] The embodiments described herein can be combined with one another without departing from the scope of the present invention.

[0056] The packer machine described above has numerous advantages.

[0057] In the first place, the packer machine described above allows to produce the contents of each sealed wrap 3 (namely, two groups 5 of cigarettes coupled to an inner frame 8 preferably folded into a double "U" shape) with extreme precision and without damaging the cigarettes (which are delicate and much weaker than the inner frame 8) even when operating at a high production speed (measured as packs 1 of cigarettes produced per time unit).

[0058] In particular, the packer machine described above allows to avoid damage to the cigarettes when coupled to the inner frame 8, since the cigarettes are very delicate, particularly at the tips where the visible tobacco filaments are located.

[0059] Furthermore, the packer machine described above has high accessibility to all its components and due to this characteristic it is possible to quickly perform the format change operations (namely, the adaptation operations to modify the characteristics of the pack 1 of cigarettes to be produced) .

LIST OF REFERENCE NUMBERS OF THE FIGURES

[0060]

1	pack of cigarettes
2	container
3	sealed wrap
4	lid
5	group of cigarettes
6	extraction opening
7	closing label
8	inner frame
9	front wall
10	front wall
11	side walls

12 dividing walls
13 forming unit
14 wrapping unit
15 forming conveyor
16 supporting bodies
17 seat
18 seat
19 hopper
20 feeding device
21 conveyor
22 seat
23 conveyor
24 pocket
25 transfer device
26 bottom wall
27 side walls
28 pushing member
29 cavity
30 actuator
31 through opening
32 folding element
33 actuator
34 through opening
35 hopper
36 pick-up device
D transfer direction
P1 feeding path
P2 feeding path
S1 feeding station
S2 feeding station
S3 transfer station
S4 input station
S5 transfer station

Claims

1. A packer machine to couple an inner frame (8) to two groups (5) of smoking articles, wherein the inner frame (8) has two main walls (9, 10), two dividing walls (12) interposed between the main walls (9, 10) and, preferably, two side walls (11) arranged on the opposite sides of the main walls (9, 10); the packer machine comprises:

a seat (22) designed to hold the inner frame (8) in a spread condition;
a conveyor (21), which moves the seat (22) along a feeding path (P1) ;
a pocket (24) designed to house the inner frame (8) in an at least partially folded condition, preferably folded into a double "U" shape;
an input station (S4) arranged along the feeding path (P1) and
configured to feed the spread inner frame (8) to the seat (22) of the conveyor (21); and
a transfer station (S5) arranged along the feeding path (P1) and
configured to transfer the inner frame (8) from the seat (22) to the pocket (24);
the packer machine is **characterized in that:**
the seat (22) of the conveyor (21) is designed to only hold the inner frame (8) in a spread condition, so that the inner frame (8) reaches the transfer station (S5) in a spread condition; and
the transfer station (S5) comprises a transfer device (25) configured to transfer the inner frame (8) from the seat (22) to the pocket (24), simultaneously folding the inner frame (8), preferably into a double "U" shape.

2. The packer machine according to claim 1, wherein the pocket (24) is "U"-shaped and the transfer device (25) comprises a pushing member (28), which reproduces the shape of the pocket (24) in negative.

3. The packer machine according to claim 2, wherein the pushing member (28) has, at the centre, a cavity (29) sized so as to be able to accommodate the two dividing walls (12) at least partially folded into a "V" shape relative to one another.

4. The packer machine according to claim 2 or 3, wherein the transfer device (25) comprises a folding element (32), which is arranged on the opposite side of the seat (22) relative to the pushing member (28) and is configured to come into contact with the dividing walls (12) so as to make it easier for the dividing walls (12) to be folded into a "V" shape.

5. The packer machine according to claim 4, wherein the folding element (32) is "V"-shaped.

6. The packer machine according to claim 4 or 5, wherein the transfer device (25) comprises a first actuator (33), which is configured to move the folding element (32) so that it comes into contact with the still spread inner frame (8) before the inner frame (8) enters the pocket (24).

7. The packer machine according to claim 6, wherein the first actuator (33) is configured to move the folding element (32) towards the pocket (24) while the inner frame (8) gets closer to the pocket (24).

8. The packer machine according to claim 6 or 7, wherein the pocket (24) has a through opening (34) through which the folding element (32) is inserted.

9. The packer machine according to one of the claims from 2 to 8 and comprising a second actuator (30), which is configured to move the pushing member (28) into the pocket (24) together with the inner frame (8).

10. The packer machine according to claim 9, wherein

the seat (22) has a through opening (31) and the pushing member (28) through which the pushing member (28) is inserted.

11. The packer machine according to one of the claims from 1 to 10, wherein the pocket (24) has a bottom wall (26) and two side walls (27), which are inclined relative to the bottom wall (26) in order to give the pocket (24) a "U" shape.

12. The packer machine according to claim 11, wherein the side walls (11) of the inner frame (8) are folded, relative to the main walls (9, 10) of the inner frame (8), against the side walls (27) of the pocket (24), when the inner frame (8) enters the pocket (24).

13. The packer machine according to claim 11 or 12, wherein the side walls (27) of the pocket (24) form an obtuse angle with the bottom wall (26) of the pocket (24).

14. The packer machine according to one of the claims from 1 to 13, wherein the inner frame (8) does not undergo any type of folding until the transfer station (S5) and, therefore, remains in a spread condition up to the transfer station (S5), where the inner frame (8) leaves the seat (22).

15. A wrapping method to couple an inner frame (8) to two groups (5) of smoking articles, wherein the inner frame (8) has two main walls (9, 10), two dividing walls (12) interposed between the main walls (9, 10) and, preferably, two side walls (11) arranged on the opposite sides of the main walls (9, 10); the wrapping method comprises the steps of:

moving, by means of a conveyor (21) and along a feeding path (P), a seat (22) designed to hold the inner frame (8) in a spread condition;
feeding the spread inner frame (8) to the seat (22) of the conveyor (21) in an input station (S4) arranged along the feeding path (P1); and
transferring the inner frame (8), in a transfer station (S5) arranged along the feeding path (P1), from the seat (22) to a pocket (24) designed to house the inner frame (8) in an at least partially folded condition, preferably folded into a double "U" shape;
the wrapping method is **characterized in that:**
the seat (22) of the conveyor (21) is designed to only hold the inner frame (8) in a spread condition, so that the inner frame (8) reaches the transfer station (S5) in a spread condition; and
in the transfer station (S5), the inner frame (8) is transferred from the seat (22) to the pocket (24), simultaneously folding the inner frame (8), preferably into a double "U" shape.

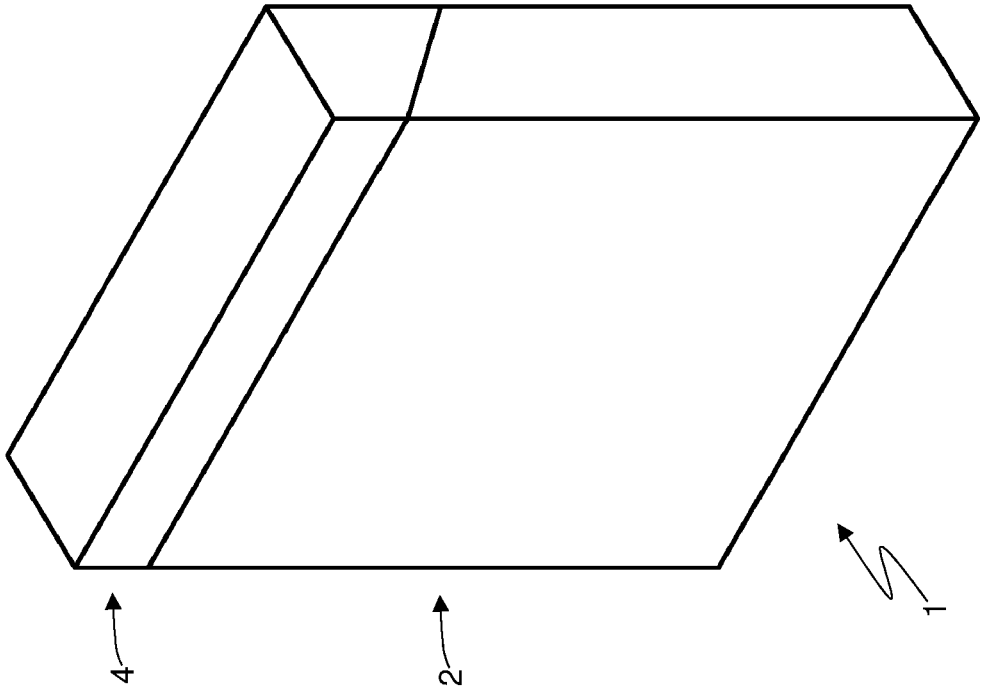


Fig. 2

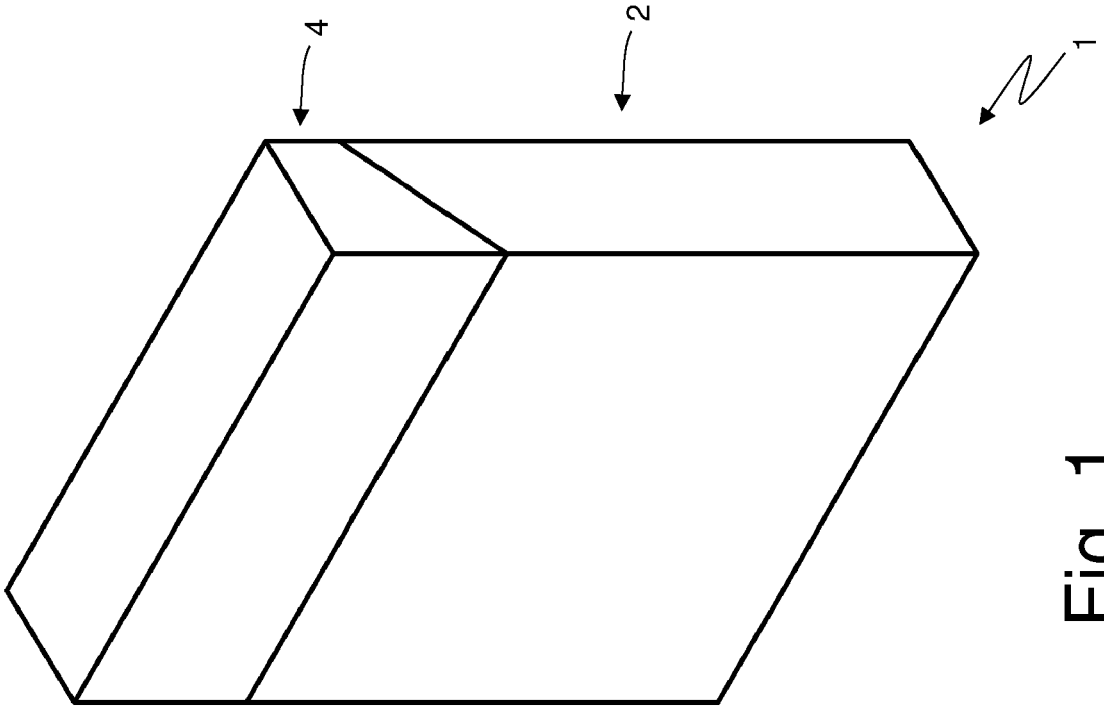


Fig. 1

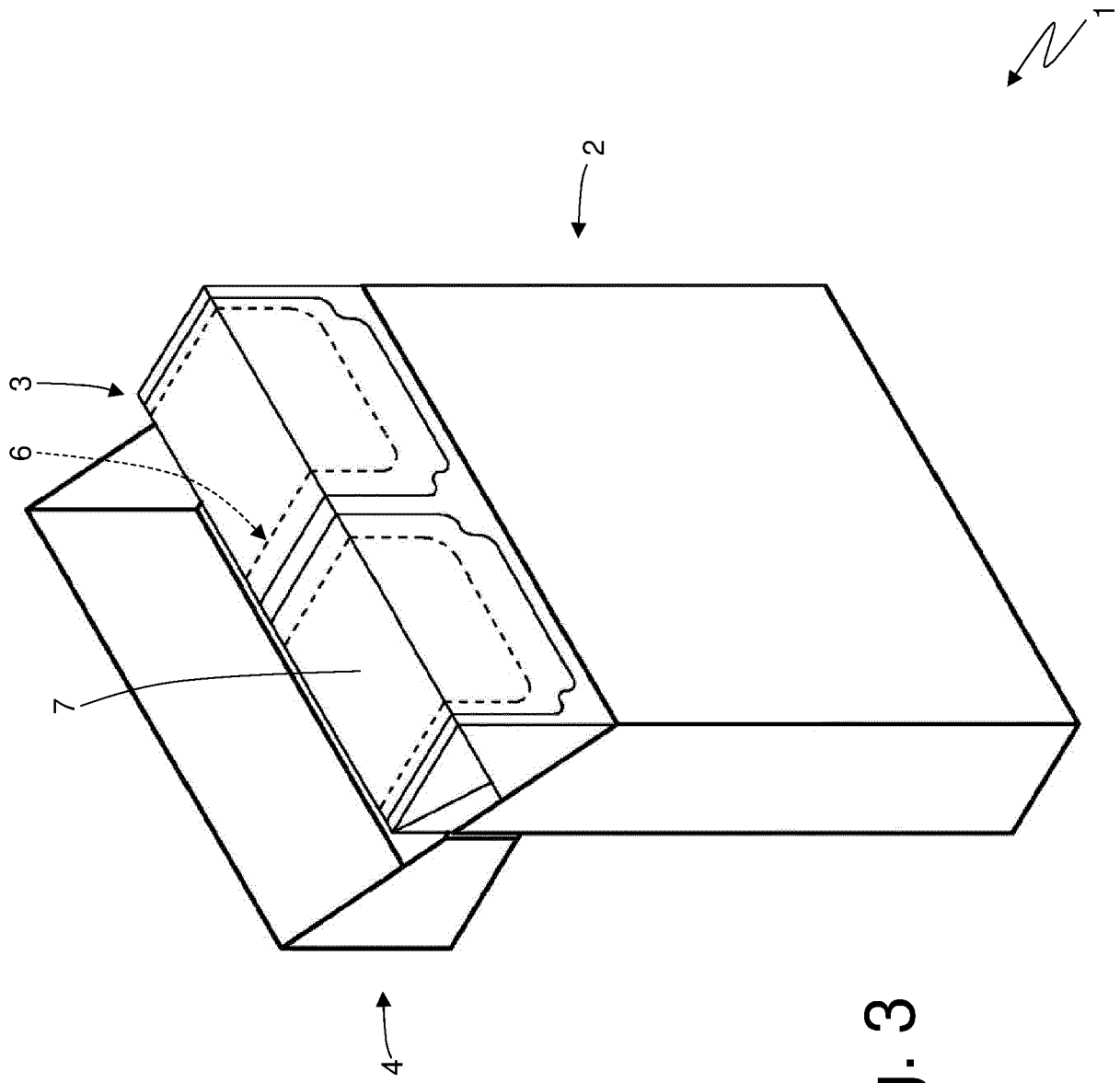


Fig. 3

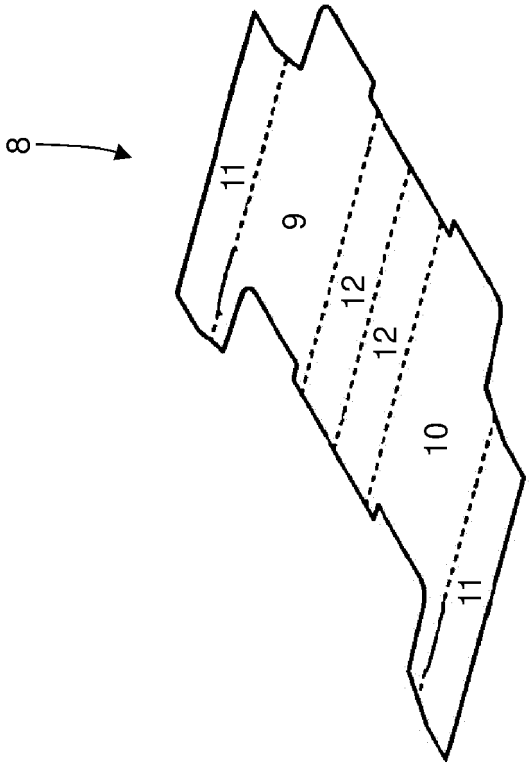


Fig. 4

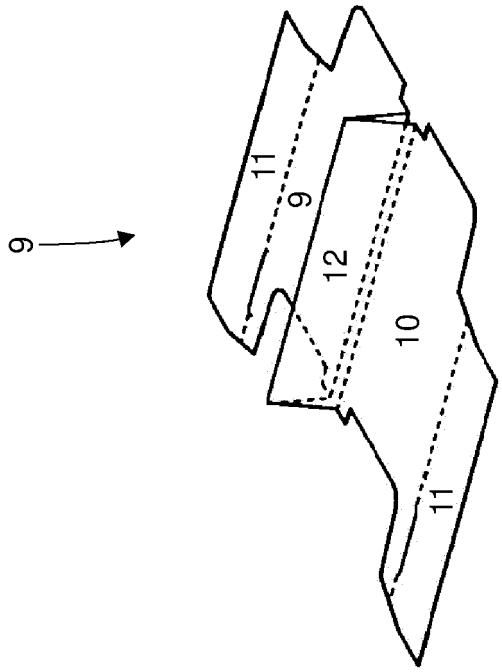


Fig. 5

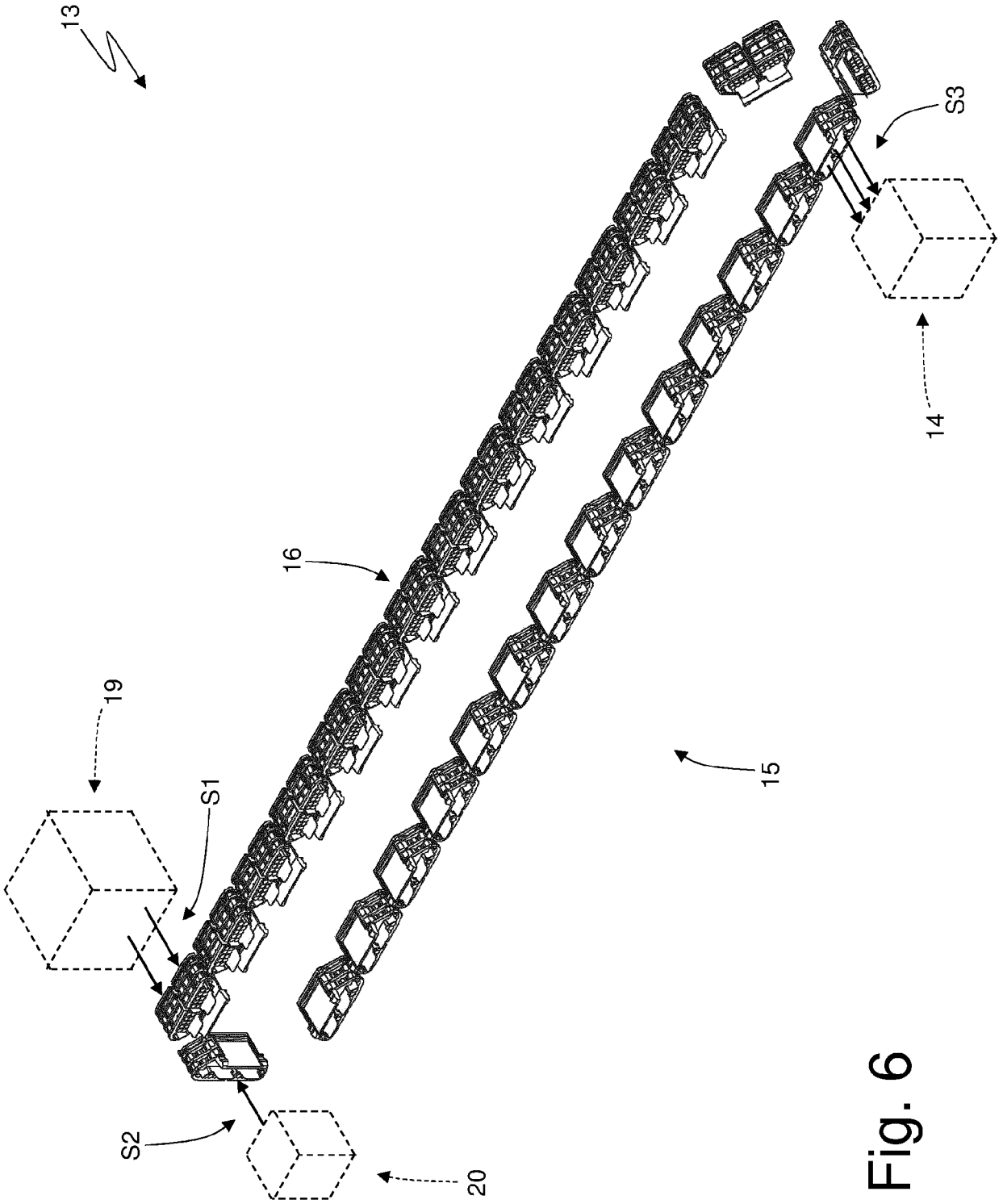
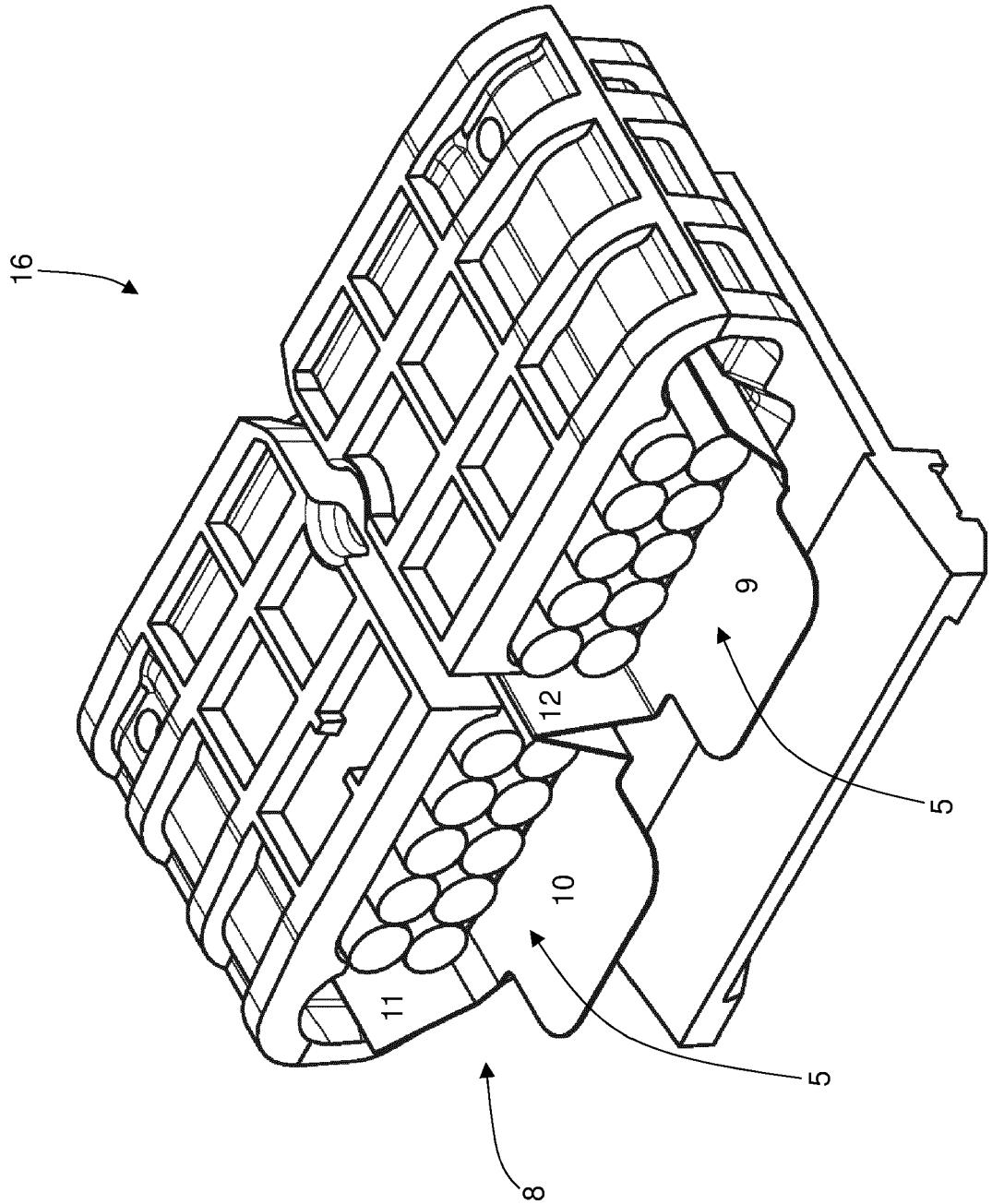


Fig. 6

Fig. 7



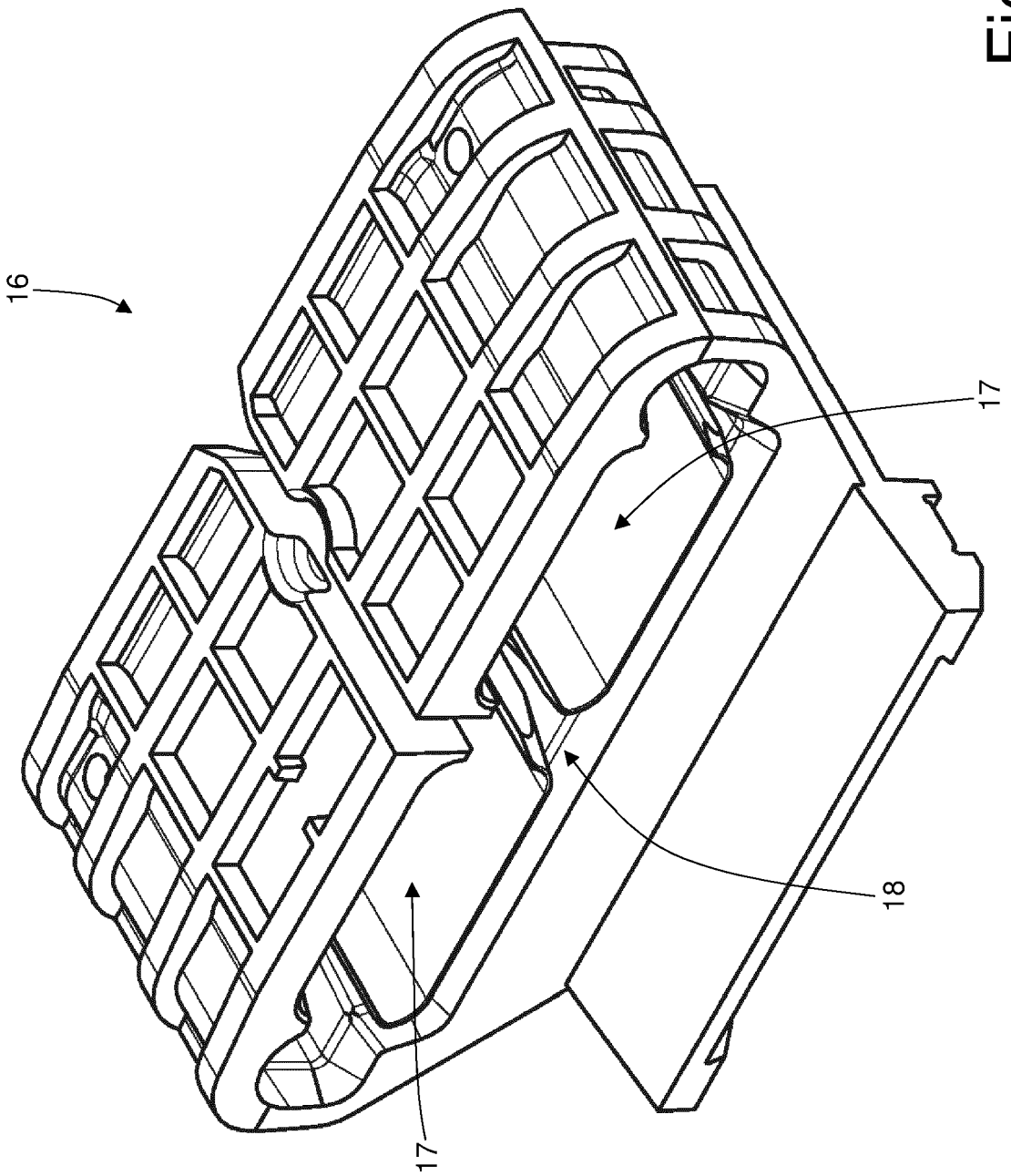


Fig. 8

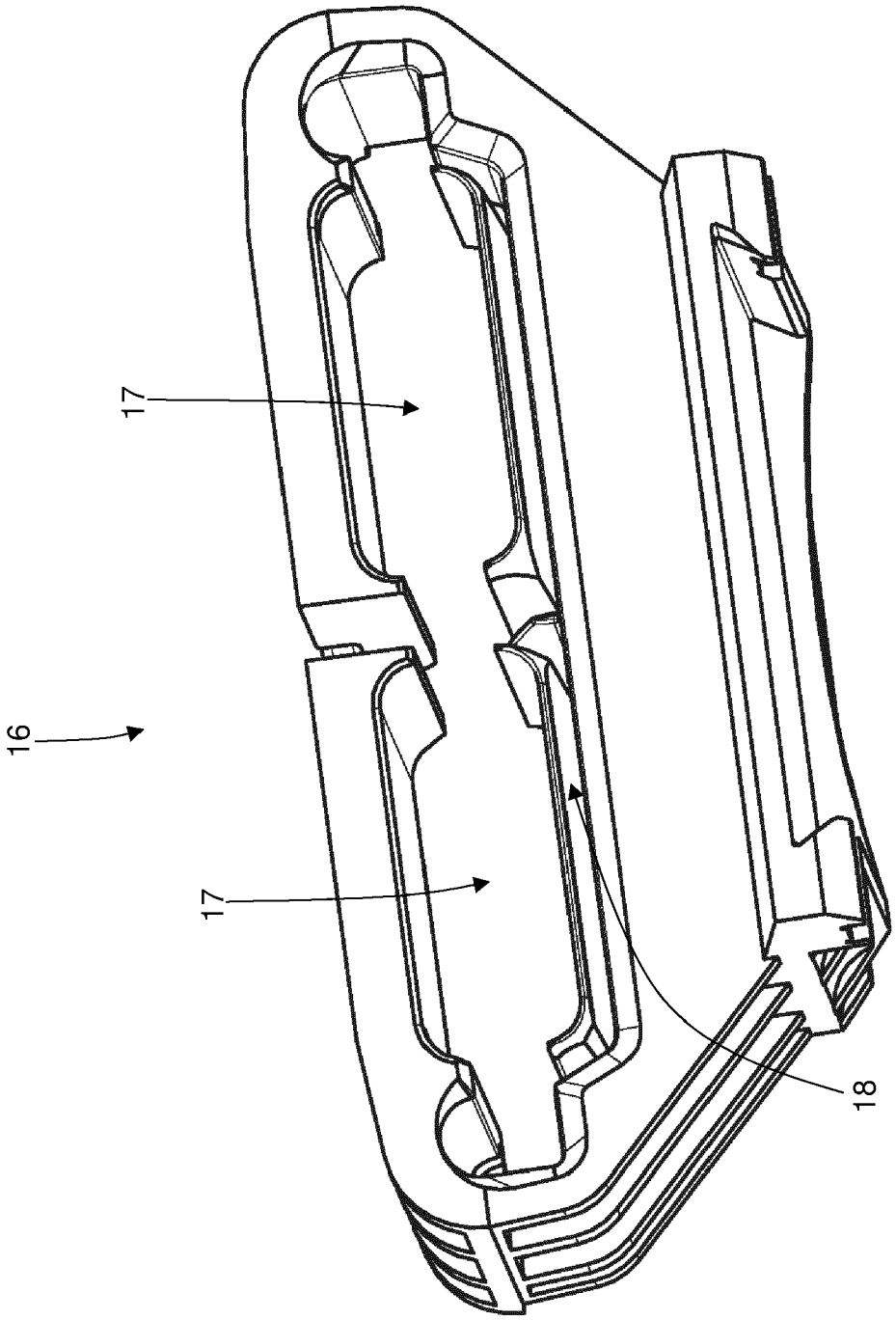


Fig. 9

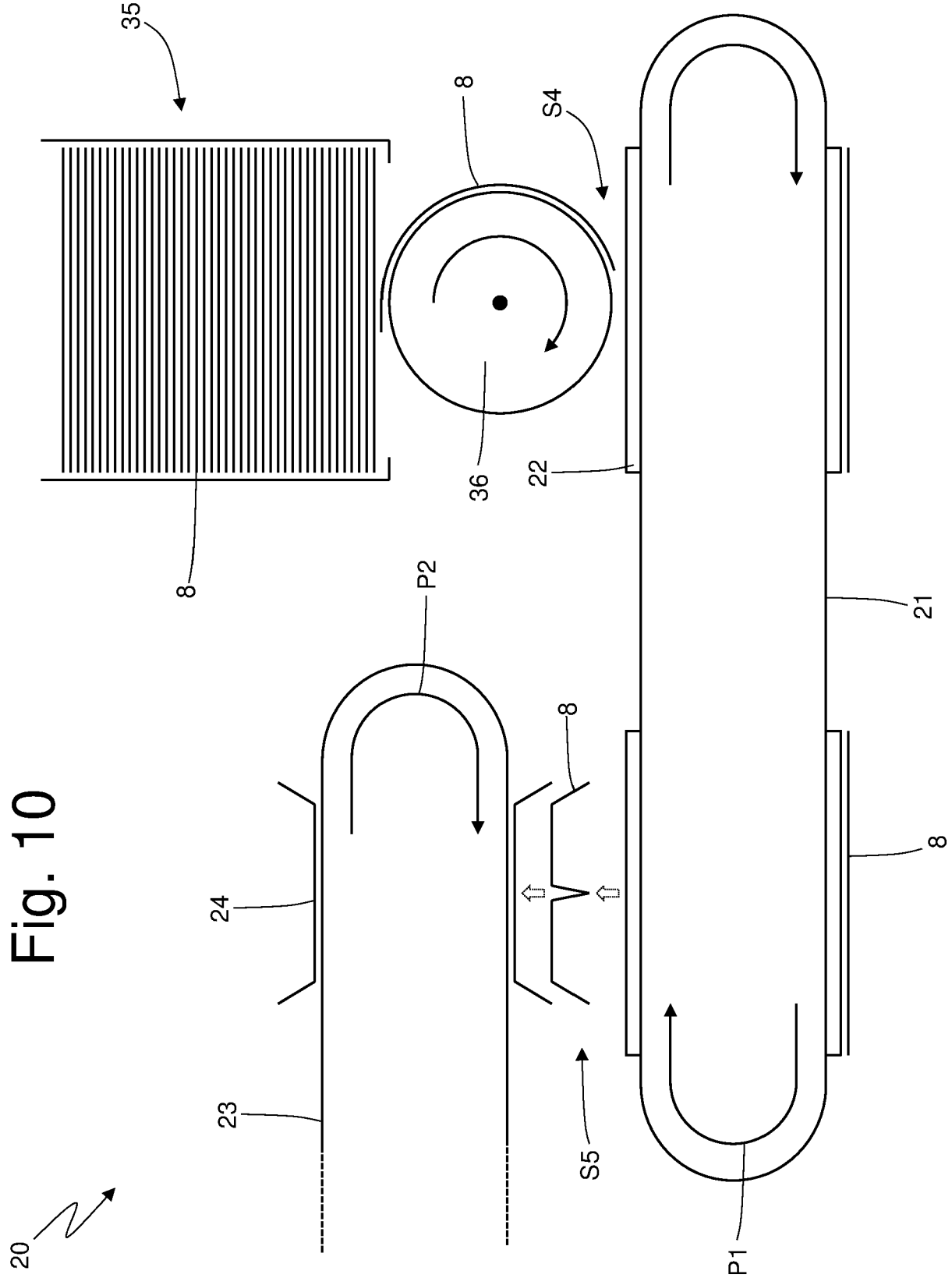


Fig. 10

Fig. 11

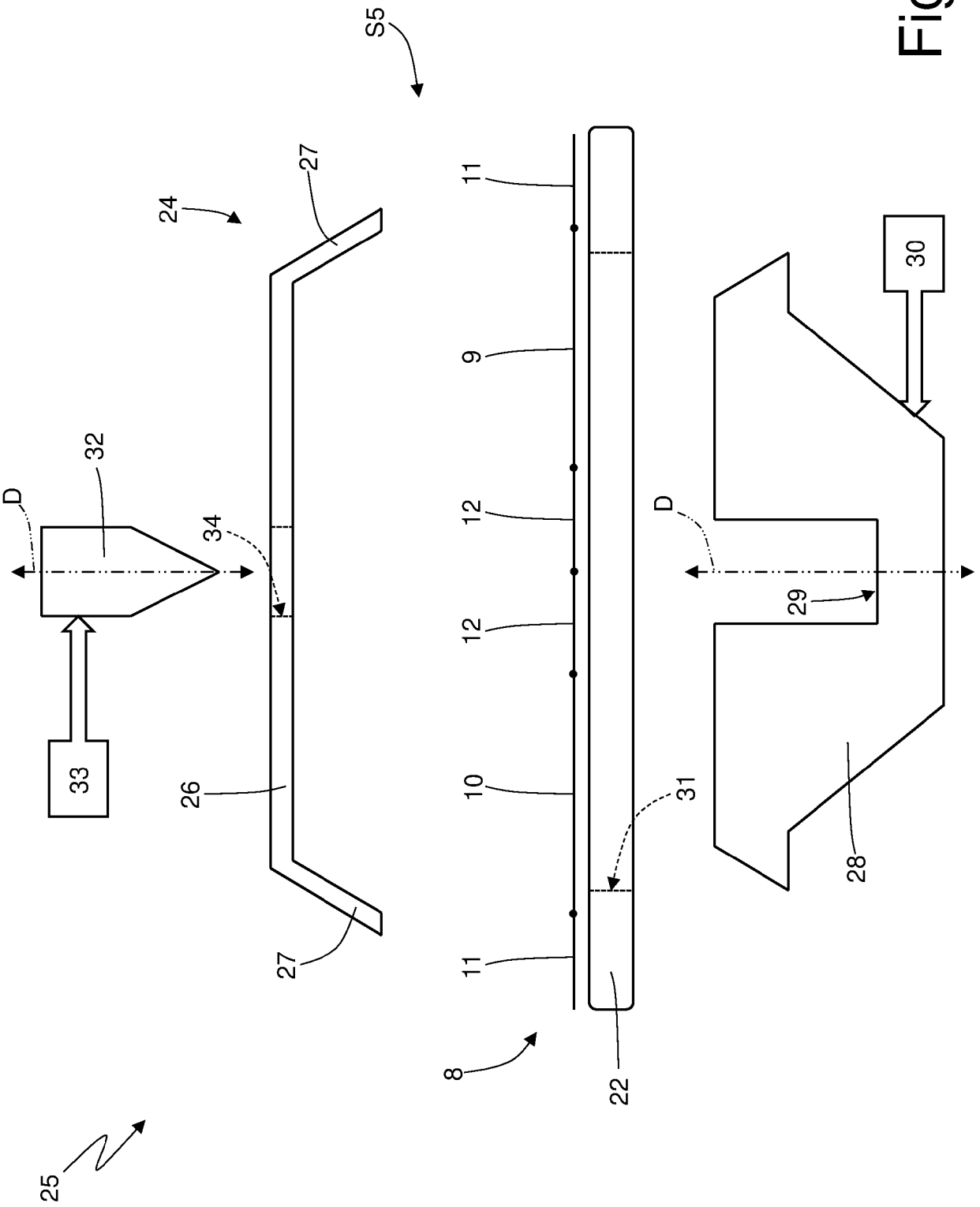


Fig. 12

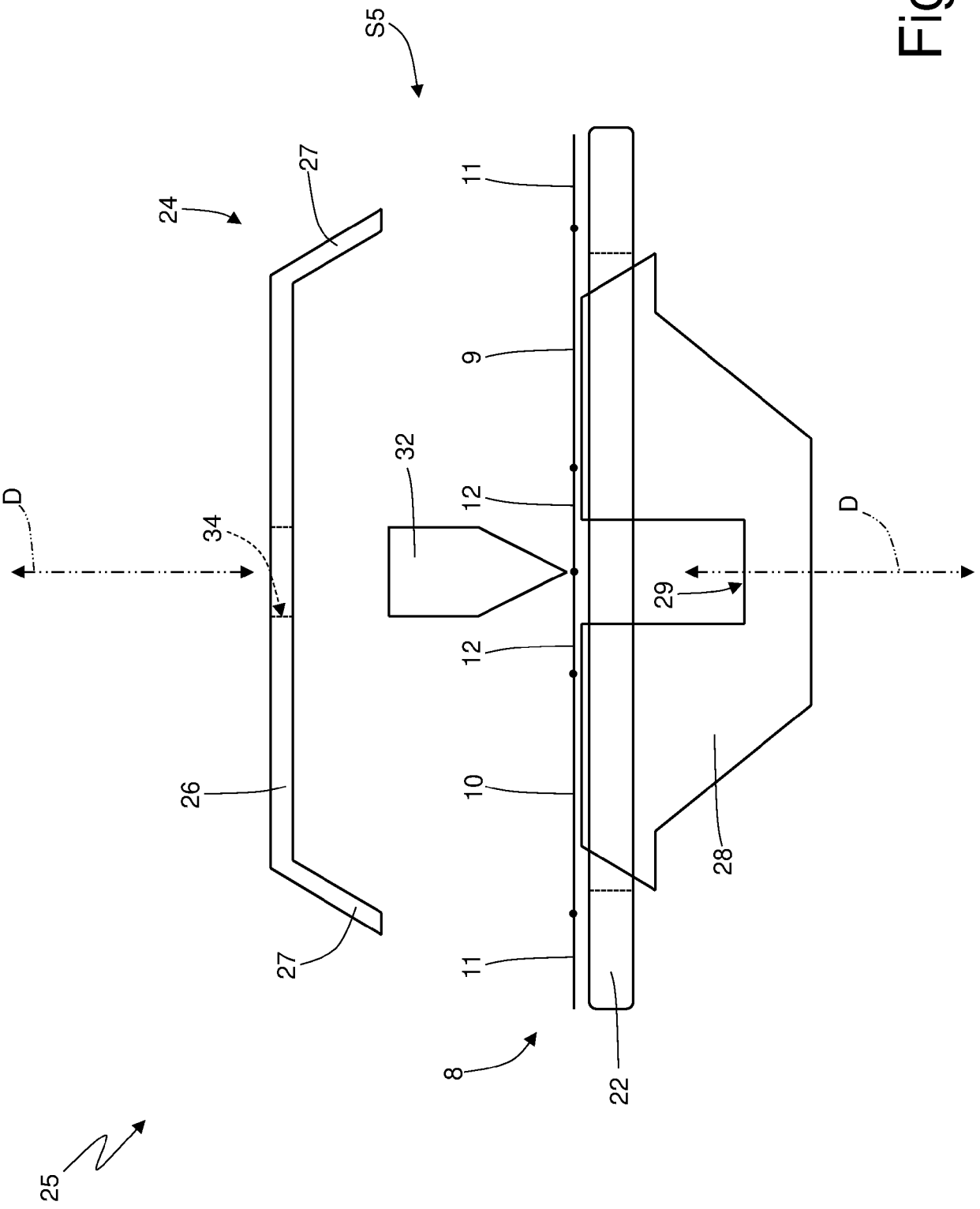


Fig. 13

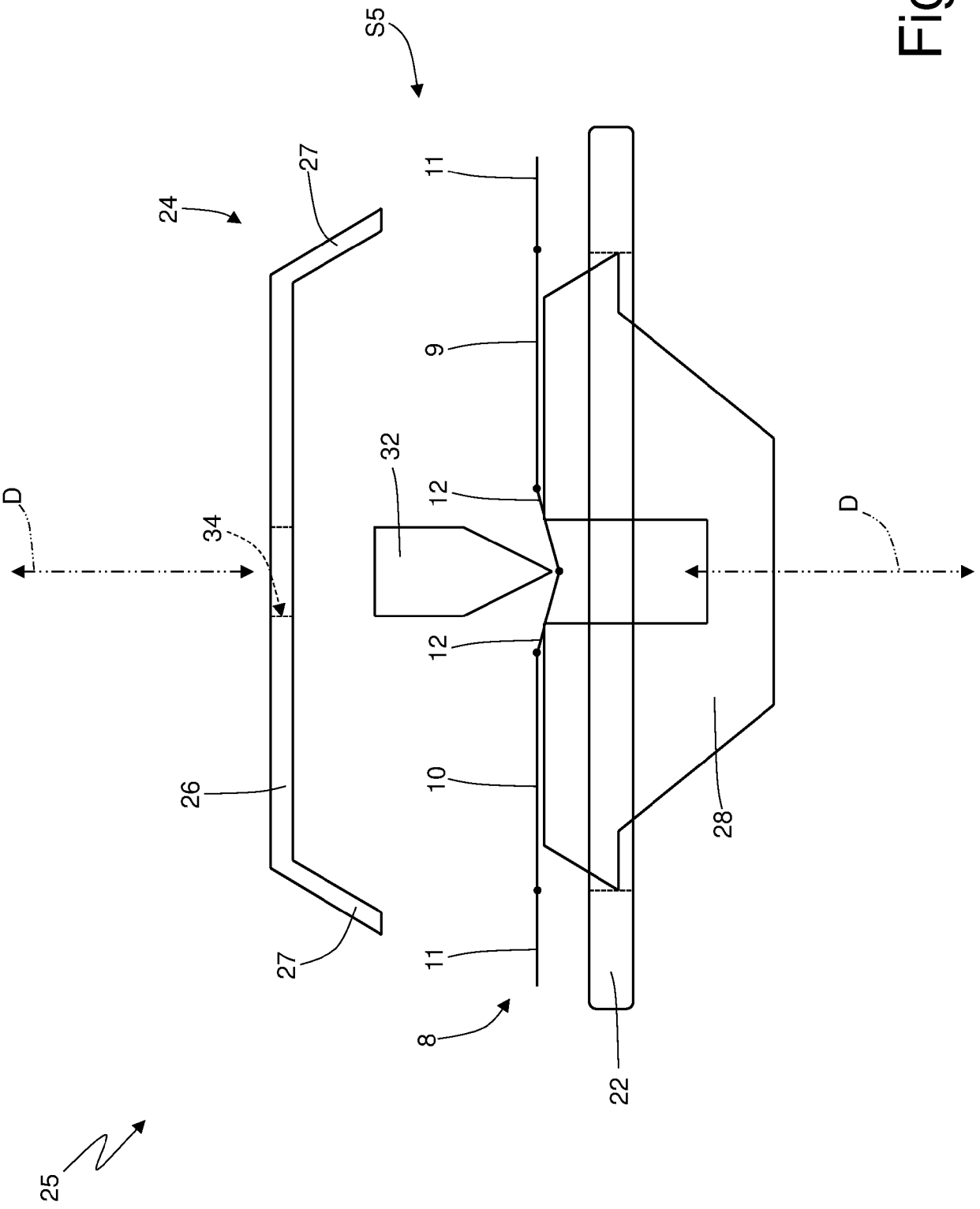


Fig. 14

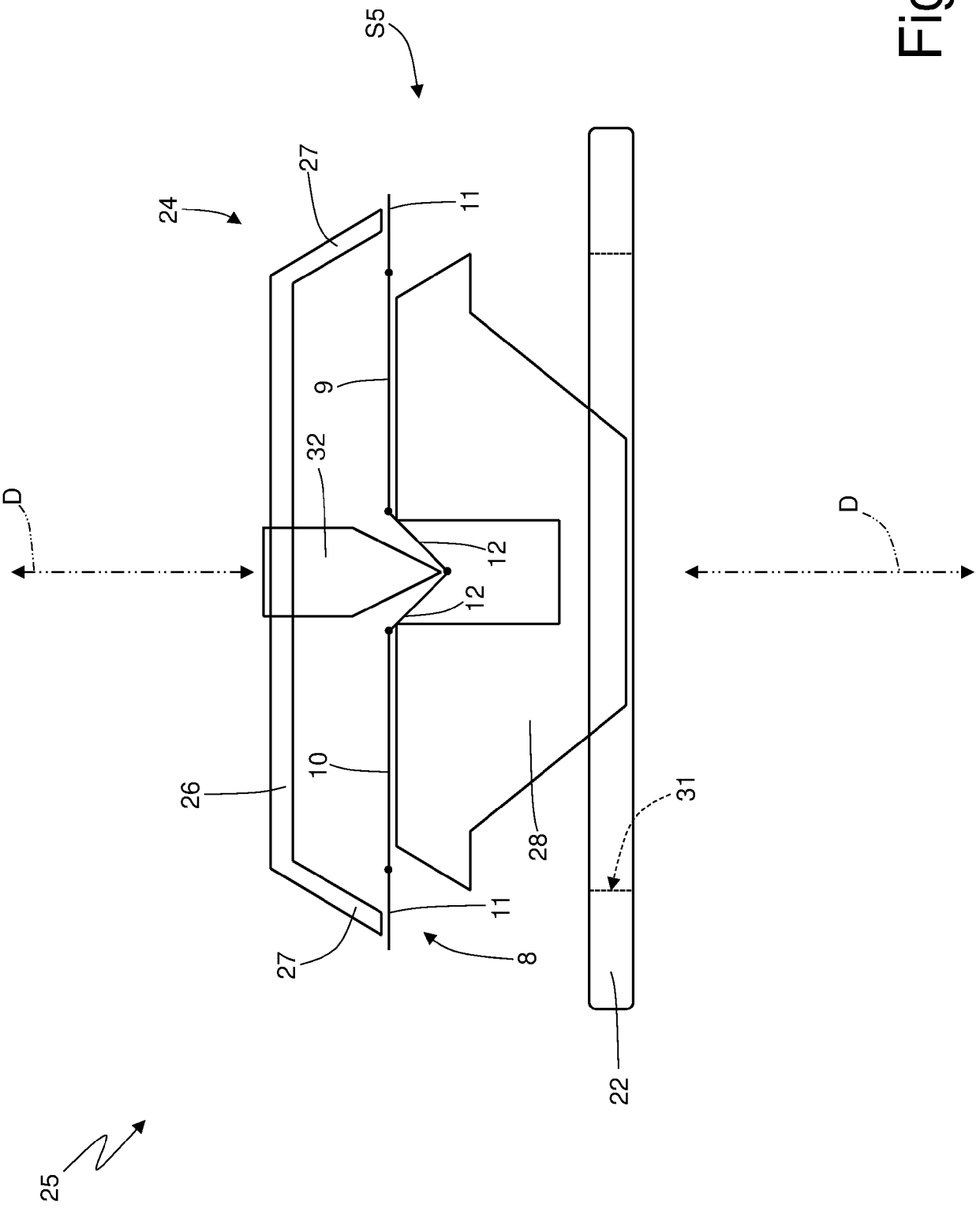


Fig. 15

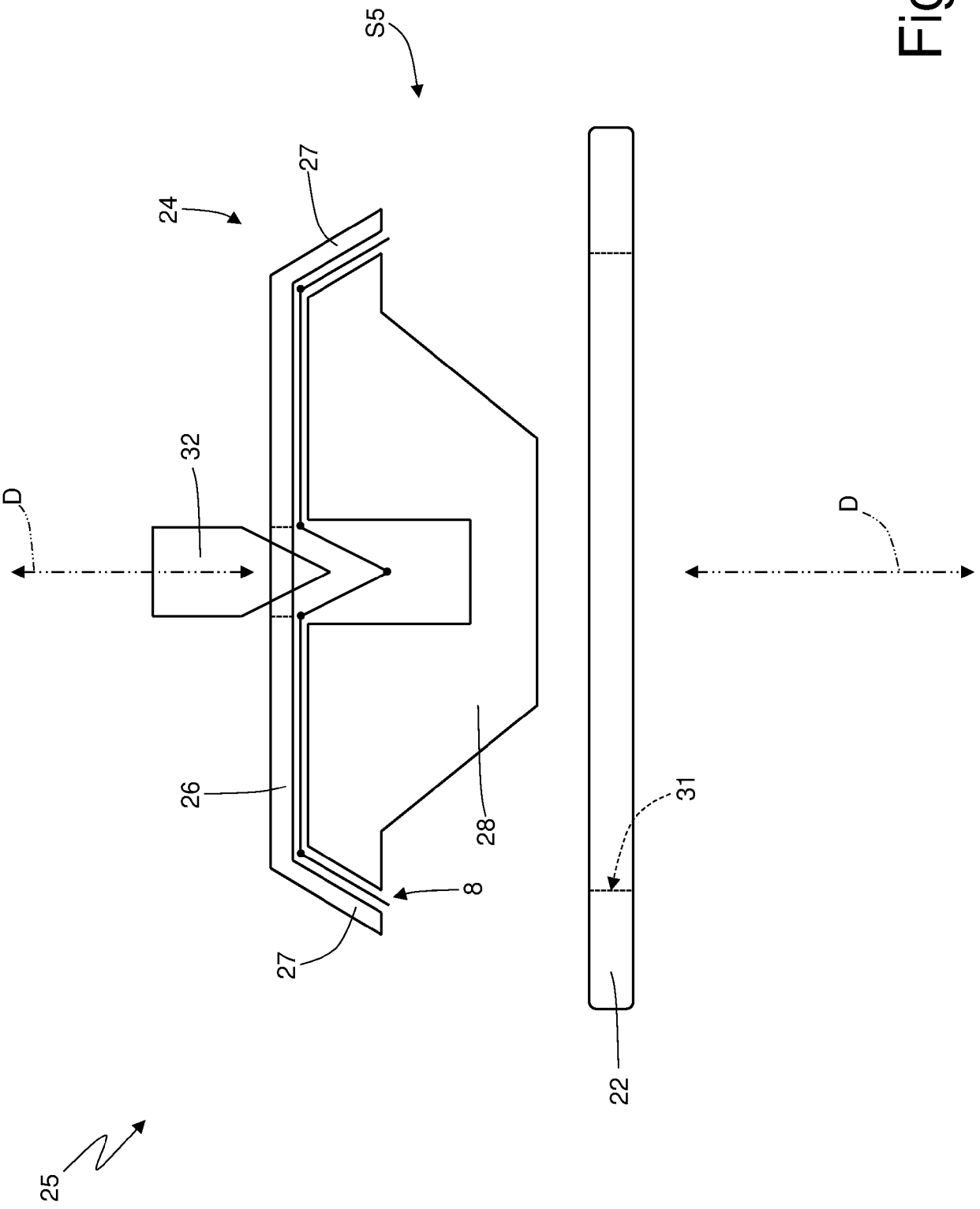


Fig. 16

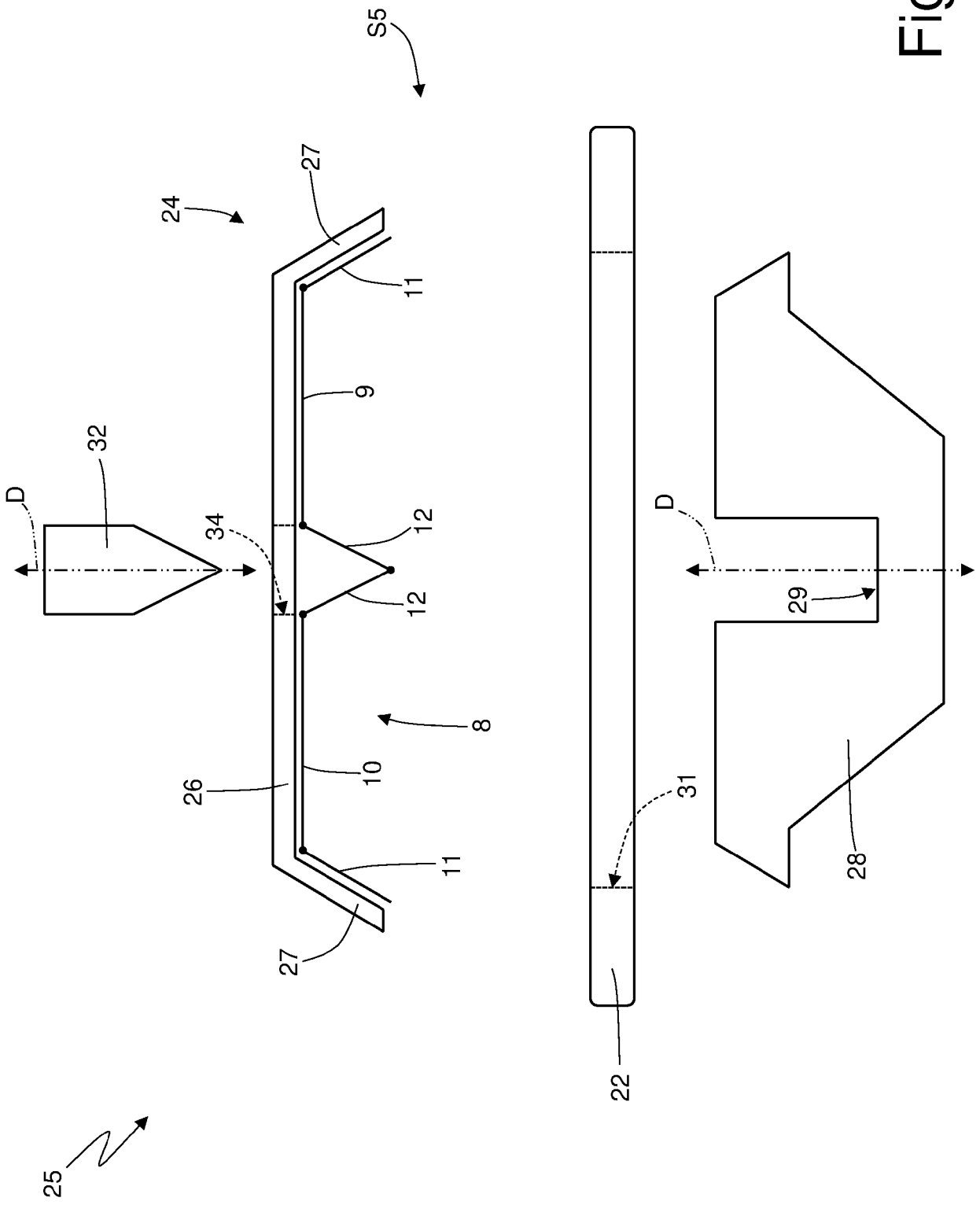
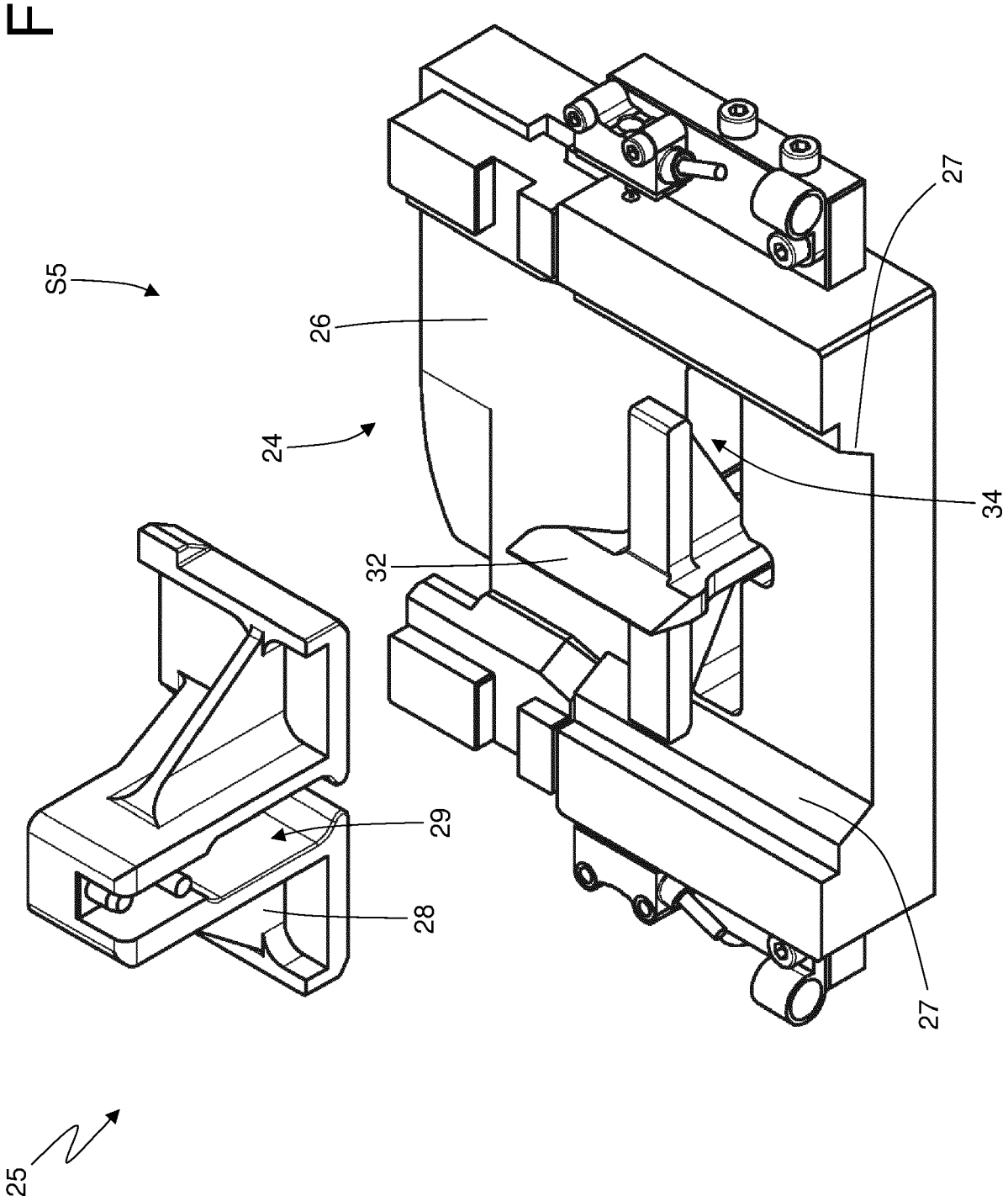


Fig. 17



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EUROPEAN SEARCH REPORT

Application Number
EP 23 17 7280

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B65B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	3 November 2023	Ungureanu, Mirela

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