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(54) FEEDING METHOD AND UNIT TO FEED TWO WRAPPING SHEETS IN A PACKING MACHINE

(57) Feeding method and unit (8) to feed two wrapping sheets (5) in a packing machine (6), in particular for smoking articles. The following steps are provided: feeding an initial wrapping sheet (15) with a double width; making a pre-weakened separation line (13) in the initial wrapping sheet (15); and dividing the initial wrapping sheet (15) with a double width into two so as to obtain two final wrapping sheets (5) with a single width by applying a force that causes a tear along the pre-weakened separation line (13) .

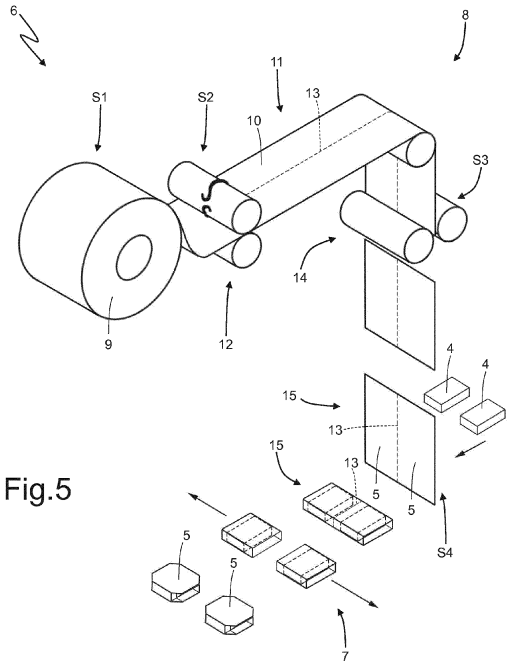

Fig.5

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Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This Patent Application claims priority from Italian Patent Application No. 102018000010313 filed on November 14, 2018.

TECHNICAL FIELD

[0002] The present invention relates to a feeding method and to a feeding unit to feed two wrapping sheets in a packing machine. The present invention finds advantageous application to a cigarette packing machine which produces packets of cigarettes known as *"twin"* each containing two distinct groups of cigarettes, wrapped in respective separate wraps, to which the following disclosure will make explicit reference without thereby losing generality.

PRIOR ART

[0003] A packet of cigarettes commercially known as *"twin"* has been known for several years and comprises a rigid outer container which houses two groups of identical cigarettes therein (namely *"twin"* from which the commercial name of the packet of cigarettes), which are arranged beside one another and wrapped in corresponding wrapping sheets.

[0004] Italian patent application 102015000062561 describes a packing machine for producing a *"twin"* packet of cigarettes comprising: a forming unit where the groups of cigarettes are formed in succession, a first wrapping unit where, around each group of cigarettes, a wrapping sheet is folded to form a corresponding inner wrap, a coupling unit where the inner wraps are coupled two-by-two so as to form the content of the packets of cigarettes, and a second wrapping unit where a collar and a blank are folded around each pair of inner wraps so as to form an outer container.

[0005] A first feeding unit is coupled to the first wrapping unit, which, at each machine cycle, feeds two side-by-side twin wrapping sheets which are folded around two groups of cigarettes so as to form two inner wraps.

[0006] According to a possible embodiment, the wrapping unit comprises two unwinding stations supporting two respective separate and distinct reels from which two separate and distinct tapes of wrapping material are unwound, and two transversal cutting stations in which each tape of wrapping material is cut transversely to separate a wrapping sheet from the tape of wrapping material. In other words, in this embodiment, the two wrapping sheets that are fed together with the first wrapping unit are separate from one another and independent from the outset. However, this embodiment is expensive and bulky (since it requires the presence of two separate unwinding stations supporting two respective reels and two independent paths for two separate and distinct tapes of wrapping material) and above all it makes the management of the wrapping material complicated as it is necessary to cyclically replace the exhausted reel in two distinct unwinding stations.

[0007] According to an alternative embodiment, inspired by what is described for example in patent applications EP0309818A2 and EP0787651A1, the wrapping unit comprises a single unwinding station supporting a single reel from which a single tape of wrapping material with a double width is unwound; a longitudinal cutting station is arranged between the unwinding station and the two transversal cutting stations in which the tape of wrapping material with a double width is divided into two separate and distinct tapes of wrapping material. However, this embodiment is still relatively expensive and bulky (since it requires the presence of two independent paths for two separate and distinct tapes of wrapping material).

[0008] US Patent US4617780 describes a feeding method to feed two wrapping sheets in a cigarette packing machine; the feeding method comprises the steps of: feeding an initial wrapping sheet with a double width; making a partial cutting line in the initial wrapping sheet; folding the initial wrapping sheet around two groups of cigarettes by using the partial cutting line for folding; and finally cutting the already folded initial wrapping sheet in half by means of a rotating blade to divide the initial wrapping sheet into two wrapping sheets (obviously already folded around respective groups of cigarettes) . However, cutting the already folded initial wrapping sheet in half by means of the rotating blade is particularly complex since it requires the folding of the initial wrapping sheet to be performed with very high precision so that the partial cutting line is perfectly aligned with the rotating blade; in fact, if the partial cutting line is not aligned with the rotating blade, when the rotating blade arrives in proximity of the partial cutting line, uncontrolled (and clearly unwanted) tears can occur in the initial wrapping sheet.

DESCRIPTION OF THE INVENTION

[0009] The object of the present invention is to provide a feeding method and unit to feed two wrapping sheets in a packing machine, the which feeding method and unit are free from the drawbacks described above and in particular make it easier and cheaper to manufacture the packing machine.

[0010] According to the present invention, a feeding method and a unit to feed two wrapping sheets in a packing machine are provided, according to what is claimed in the attached claims.

[0011] The claims describe preferred embodiments of the present invention forming an integral part of the present disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The present invention will now be described

with reference to the attached drawings, which illustrate a non-limiting example of embodiment, wherein:

- Figure 1 is a front perspective view and in a closed configuration of a *"twin"* packet of cigarettes;
- Figure 2 is a front perspective view and in an open configuration of the *"twin"* packet of cigarettes of Figure 1;
- Figure 3 is a perspective view of an inner wrap contained in the *"twin"* packet of cigarettes of Figure 1;
- Figure 4 is a perspective view of a group of cigarettes contained in the inner wrap of Figure 3;
- Figure 5 is a schematic, perspective and partial view of a packing machine which produces the *"twin"* packet of cigarettes of Figure 1;
- Figure 6 is a schematic view of a wrapping wheel of the packing machine of Figure 5;
- Figures 7, 8 and 9 are three schematic, perspective and partial views of two corresponding alternatives of a packing machine of Figure 5;
- Figure 10 is a plan view of an initial wrapping sheet which is centrally provided with a pre-weakened separation line that separates two final wrapping sheets;
- Figures 11-14 schematically illustrate four different manners of separating the two final wrapping sheets of Figure 7; and
- Figures 15-20 are respective plan views of alternatives of the two wrapping sheets of Figure 6.

PREFERRED EMBODIMENTS OF THE INVENTION

[0013] In Figures 1 and 2, number 1 denotes, as a whole, a *"twin"* rigid packet of cigarettes comprising a rigid outer container 2 provided with a hinged lid and a pair of inner wraps 3, which are arranged beside one another and are housed inside the outer container 2. Each inner wrap 3 (better illustrated in Figure 3) encloses a group 4 of cigarettes (illustrated in Figure 4) having a parallelepiped shape and having a removable tear-off portion at the top, which is removed so as to allow access to the cigarettes.

[0014] Each inner wrap 3 is made by folding, in a known manner, a final wrapping sheet 5 (schematically illustrated in Figure 5), which has a rectangular shape, around the group 4 of cigarettes. Each inner wrap 3 can be devoid of stabilization (i.e. the corresponding final wrapping sheet 5 has no connections between the overlapping parts and therefore must always be firmly held to prevent the folds from unfolding due to elastic return), it can be stabilized by using glue, or it can be stabilized by heat-sealing (in the latter case the inner wrap 3 is normally hermetically sealed).

[0015] Each rigid outer container 2 provided with the hinged lid is made by folding, in a known manner, a blank having an elongated rectangular shape around a pair of side-by-side inner wraps 3.

[0016] In Figure 5, number 6 denotes as a whole a packing machine (only partially illustrated in Figure 5) which is designed for producing the packet 1 of cigarettes described above (in particular in the version in which the inner wrap 3 is sealed and stabilized by heat-sealing).

[0017] The packing machine 6 comprises a forming unit (not illustrated in Figure 5) in which groups 4 of cigarettes are formed in succession, a wrapping unit 7 (only partially illustrated in Figures 5 and 6) in which around each group 4 of cigarettes the final wrapping sheet 5 is folded to form the corresponding inner wrap 3. The packing machine 6 comprises a coupling unit (not illustrated in Figure 5) in which the inner wraps 3 (i.e. the groups 4 of cigarettes contained in the inner wraps 3) are joined two at a time to form the content of the packets 1 of cigarettes. The packing machine 6 comprises a wrapping unit (not illustrated in Figure 5) in which at least one collar (eventually also two distinct collars) and one blank is folded around each pair of inner wraps 3 (i.e. each pair of groups 4 of cigarettes contained in the inner wraps 3) to form the corresponding outer container 2 (according to another embodiment, no collars are provided).

[0018] As illustrated in Figure 5, the packing machine 6 comprises a feeding unit 8 which is coupled to the wrapping unit 7 and is designed to feed, to the wrapping unit 7 itself and at each cycle, two final wrapping sheets 5 (still joined to one another as described in the following).

[0019] The feeding unit 8 comprises an unwinding station S1 in which a tape 10 of wrapping material having a double width with respect to the width of the final wrapping sheets 5 is unwound from a reel 9; that is, the width of the tape 10 of wrapping material is equal to the width of two final wrapping sheets 5 placed side by side.

[0020] The feeding unit 8 comprises a feeding line 11 which feeds the tape 10 of wrapping material from the reel 9 (from which the tape 10 of wrapping material is unwound) to the wrapping unit 7; the feeding line 11 is made up of idle return drums (known and partially illustrated) and pairs of motorized rollers (between which the tape 10 of wrapping material is *"stretched"* and that are also known and not illustrated).

[0021] A weakening station S2 is arranged along the feeding line 11, where a weakening device 12 is provided, which performs a pre-weakened separation line 13 on the centreline plane of the tape 10 of wrapping material; the separation line 13 locally weakens the initial wrapping sheet 15 to facilitate and guide the subsequent tearing of the initial wrapping sheet 15 (as will be better described in the following) and maintains the unity and integrity of the wrapping sheet 15.

[0022] Furthermore, a separation station S3 is arranged along the feeding line 11, where a cutting device 14 is provided, which cyclically performs a transversal cut of the tape 10 of wrapping material to separate, from the tape 10 of wrapping material itself, a series of initial wrapping sheets 15. Each initial wrapping sheet 15 (exactly like the tape 10 of wrapping material) is twice the width of the width of the final wrapping sheets 5; that is, the width of the initial wrapping sheet 15 is equal to the width of two final wrapping sheets 5 placed side by side

(as better illustrated in Figure 7). Furthermore, each initial wrapping sheet 15 (exactly like the tape 10 of wrapping material) centrally has the pre-weakened separation line 13 (made by the weakening device 12) which divides the initial wrapping sheet 15 into two equal halves, each of which corresponds to a final wrapping sheet 5; in other words, each initial wrapping sheet 15 is formed by two final wrapping sheets 5 placed side by side and separate from one another by the pre-weakened separation line 13 (as better illustrated in Figure 7).

[0023] The feeding line 11 terminates in an interception station S4 (which is part of the wrapping unit 7), in which each initial wrapping sheet 15 is coupled (in the manner described below) to two corresponding groups 4 of cigarettes which advance together side by side and spaced apart from one another.

[0024] As illustrated in Figure 6, the wrapping unit 7 comprises an advancing conveyor 16 (schematized by a pusher) for advancing together a pair of groups 4 of cigarettes along a straight forward path which passes through the interception station S4 and ends at a wrapping wheel 17. In the interception station S4, the final wrapping sheet 15 is advanced along a feeding path perpendicular to, and intersecting with, an advancing path of the two groups 4 of cigarettes; in this way, the final wrapping sheet 15 is advanced in front of the two groups 4 of cigarettes so that the two groups 4 of cigarettes in their advancement intercept the final wrapping sheet 15 and determine the progressive "U" folding of the final wrapping sheet 15.

[0025] The wrapping wheel 17 rotates, with intermittent motion, around a rotation axis 18 perpendicular to the plane of Figure 6 and supports four peripheral pockets 19, each of which is designed to receive and house two groups 4 of cigarettes wrapped in a final wrapping sheet 15. Upon entering a pocket 19, a final wrapping sheet 15 folds in a "U"-shape around two groups 4 of cigarettes; folding devices (known and not illustrated) are arranged around the periphery of the wrapping wheel 17 which fold the final wrapping sheet 15 into a tube-shape around two groups 4 of cigarettes forming a tubular wrap having two open opposite ends.

[0026] The wrapping unit 7 comprises a dividing device 20 (schematically illustrated in Figure 6) which is designed to divide the initial wrapping sheet 15 into two by applying a traction (force) which causes a tear along the pre-weakened separation line 13; in other words, the dividing device 20 applies a traction (force) to the initial wrapping sheet 15 (folded in a tube-shape around two groups 4 of cigarettes) to tear the initial wrapping sheet 15 along the pre-weakened separation line 13 and therefore obtain two final wrapping sheets 5 (each of which is folded into a tube-shape around a corresponding group 4 of cigarettes). In particular, the dividing device 20 applies a traction (force) to the initial wrapping sheet 15 which causes a tear along the pre-weakened separation line 13 and therefore allows to move a final wrapping sheet 5 away from the other final wrapping sheet 5. In other words, the dividing device 20 is nothing more than a diverter which moves the two groups 4 of cigarettes partially wrapped in the respective final wrapping sheets 5 away from one another, causing a consequent tearing of the initial wrapping sheet 15 along the pre-weakened separation line 13.

[0027] The dividing device 20 generates a tear along the pre-weakened separation line 13 of each initial wrapping sheet 15 by applying to the two halves of the initial wrapping sheet 15 (i.e. to the two final wrapping sheets 5 which make up the initial wrapping sheet 15 and which are divided by the pre-weakened separation line 13) a traction (force) in opposite directions; this traction (force) in opposite directions can be directed transversely (i.e. perpendicular to the pre-weakened separation line 13) as illustrated in Figure 8, it can be directed longitudinally (i.e. parallel to the pre-weakened separation line 13) as illustrated in the Figure 10, or it can be directed obliquely (i.e. both with a transverse component and with a longitudinal component) as illustrated in Figure 11. In the embodiments illustrated in Figures 11, 12 and 13, the traction (force) in opposite directions lies in a horizontal plane; alternatively, the traction (force) could lie in a vertical plane (as illustrated in Figure 14) or in an inclined plane (i.e. neither perfectly horizontal nor perfectly vertical).

[0028] According to a possible embodiment illustrated in Figure 7, the traction (force) that separates the two final wrapping sheets 5 from the initial wrapping sheet 15 (i.e. the traction that causes the tearing along the pre-weakened separation line 13) could also be (at least partially) caused by a contrasting element C (fixed or mobile) against which the initial wrapping sheet 15 impacts during its advancement; in particular the area of the separation line 13 of the initial wrapping sheet 15 impacts against the contrasting element C during the advancement of initial wrapping sheet 15 itself. In other words, the dividing device 20 could comprise a contrast element C (fixed or mobile) against which the initial wrapping sheet 15 impacts during its advancement. The contrasting element C creates a division (a tear) by breaking through the initial wrapping sheet 15 along the separation line 13.

[0029] According to a further embodiment which is not part of the present invention, the initial wrapping sheet 15 does not have the separation line 13 and the two final wrapping sheets 5 are divided from one another by means of a cut (i.e. a cut instead of the tear along the pre-weakened separation line 13).

[0030] Finally, the wrapping unit 7 comprises folding devices (known and not illustrated) which are arranged downstream of the dividing device 20 and complete the folding of each final wrapping sheet 5 around the corresponding group 4 of cigarettes to form an inner wrap 3; said folding devices operate in parallel to produce two inner wraps 3 in parallel starting from the division of the initial wrapping sheet 15 folded around two groups 4 of cigarettes.

[0031] In the embodiment illustrated in Figures 5, 6 and

7, the dividing device 20 is arranged downstream of the wrapping wheel 17 and divides each initial wrapping sheet 15 into two when the initial wrapping sheet 15 itself has been folded in a tube-shape around the two groups 4 of cigarettes; alternatively, the dividing device 20 could be arranged further downstream (and therefore the dividing device 20 divides each initial wrapping sheet 15 into two after further folding operations of the initial wrapping sheet 15 have been performed) or it could be arranged further upstream (and therefore the dividing device 20 divides each initial wrapping sheet 15 into two when the initial wrapping sheet 15 itself is folded only in a "U"-shape around two groups 4 of cigarettes or has not yet been folded around two groups 4 of cigarettes). For example, according to the embodiment illustrated in Figure 8, each initial wrapping sheet 15 could be divided into the two corresponding final wrapping sheets 5 even before coupling the initial wrapping sheet 15 (i.e. the two corresponding final wrapping sheets 5) to two groups 4 of cigarettes. As previously mentioned, also in the embodiment illustrated in Figure 8, the inner wrap 3 is preferably (but not necessarily) sealed and stabilized by heat-sealing.

[0032] In the embodiment illustrated in Figure 9, the inner wrap 3 is sealed and stabilized by heat-sealing and is made according to what is described in the patent application WO2010136968A1 (incorporated herein for reference) and in the patent application EP2008935A1 (incorporated herein for reference). In particular, the formation of the tubular wrap occurs by forming in the initial wrapping sheet 15 (folded around both groups 4 of cigarettes) a transversal welding fin at the rear wall (as described in the patent application WO2010136968A1); at the end of the welding the transversal welding fin is folded by 90° against the rear wall (also in this case as described in the patent application WO2010136968A1). Once the tubular wrap has been formed, the two opposite open ends are folded by means of the so-called *"gift-wrap"* described in patent application EP2008935A1.

[0033] According to a preferred embodiment illustrated in Figure 9, when the initial wrapping sheet 15 is still intact (and folded in a tube-shape around the two groups 4 of cigarettes), i.e. before completely separating the two final wrapping sheets 5 by tearing along the separation line 13, all eight of the so-called *"nibs"* (i.e. the front and rear edges of the tubular wrap) are folded by 90° and against the respective groups 4 of cigarettes; obviously the folding of the *"nibs"* which are located between the two groups 4 of cigarettes, i.e. next to the separation line 13, involves a partial tearing of the separation line 13 itself. Once the *"nibs"* are folded, the initial wrapping sheet 15 is torn along the separation line 13 (in one of the manners described above) to divide and then remove the two final wrapping sheets 5 (i.e. the two inner wrap 3) and the folding of the final wrapping sheets 5 (i.e. of the two inner wraps 3) is completed by folding the upper and lower edges of each open side end of the tubular wrap one above the other and above the previously folded *"nibs"*.

[0034] According to a possible embodiment, the tube-like folding of the initial wrapping sheet 15 (hence the formation of the transversal welding fin) and the 90° folding of the four front *"nibs"* takes place in the wrapping wheel 17 (which can be shaped like the wrapping wheel described in the patent application WO2010136968A1) while the 90° folding of the four rear *"nibs"* takes place downstream of the wrapping wheel 17 (before the dividing device 20). Downstream of the dividing device 20, the folding of the upper and lower edges and therefore the stabilization thereof by heat-sealing takes place in another wrapping wheel or in a straight and horizontal folding beam.

[0035] For the correct manufacturing of the transversal welding fin, it is important that in the end portions of the initial wrapping sheet 15, forming the transversal welding fin itself, connections (breakable, as part of the separation line 13) are provided between the right part of the initial wrapping sheet 15 (forming a final wrapping sheet 5) and the left part of the initial wrapping sheet 15 (forming the other final wrapping sheet 5); the function of said connections in the end portions of the initial wrapping sheet 15 forming the transversal welding fin is to guarantee the clear separation between the transversal welding fin of a final wrapping sheet 5 and the transversal welding fin of the other final wrapping sheet 5 (i.e. ensuring that part of a transversal welding fin of a final wrapping sheet 5 does not *"invade"* the area of the transversal welding fin of the other final wrapping sheet 5).

[0036] According to a possible embodiment, the pre-weakened separation line 13 of each initial wrapping sheet 15 comprises a non-through incision which is obtained through the initial wrapping sheet 15 and extends without interruptions from one end to the other of the initial wrapping sheet 15 (i.e. said incision 21 is continuous and devoid of interruptions from one end to the other of initial wrapping sheet 15); in this case, the division of initial wrapping sheet 15 into two involves tearing the residual wrapping material present within the non-through incision.

[0037] According to a different and preferred embodiment illustrated in Figure 10, the separation line 13 comprises a plurality of through incisions 21 which are obtained through the initial wrapping sheet 15, are aligned with one another, and are separated from one another, i.e. between a through incision 21 and the subsequent (adjacent) through incision 21 there is a section in which the initial wrapping sheet 15 is still intact; in this case, the division of the initial wrapping sheet 15 into two involves tearing the wrapping material remaining between two successive (adjacent) through incisions 21.

[0038] According to a preferred embodiment illustrated in Figure 10, the through incisions 21 arranged at opposite ends of the initial wrapping sheet 15 extend until the edge of the initial wrapping sheet 15. According to a different embodiment not illustrated, the through incisions 21 arranged at opposite ends of the initial wrapping sheet 15 do not extend up to the edge of the initial wrapping

sheet 15, that is, they end a little before the edge of the initial wrapping sheet 15.

[0039] In the embodiment illustrated in Figure 10, it can happen that the tearing of the wrapping material between the through incisions 21 occurs in an irregular manner, that is, it develops along breakage directions that are not aligned and not parallel to the through incisions 21; to solve this drawback, the embodiments illustrated in Figures 15-20 have been proposed, in which each through incision 21 has a central portion 22 with a straight shape and at least an end portion 23 with a curved shape (i.e. the two peripheral through incisions 21 have only one curved end portion 23, while the central through incisions 21 have two curved end portions 23).

[0040] In the embodiments illustrated in Figures 15-19, in each through incision 21 the central portion 22 is connected without interruptions to (at least one) end portion 23; in the embodiment illustrated in Figure 20, in each through incision 21 the central portion 22 is separated and spaced from (at least one) end portion 23, i.e. the central portion 22 does not touch the (at least one) end portion 23.

[0041] In the embodiments illustrated in Figures 16 and 17, in each through incision 21 the central portion 22 connects to (at least one) end portion 23 without forming sharp edges, i.e. with connecting curves devoid of sharp edges (i.e. of discontinuity) .

[0042] In the embodiments illustrated in the attached Figures, each end portion 23 has a curvilinear shape which can be an arc of a circle (as illustrated in Figures 16-20) or a circle, or a complete circumference (as illustrated in Figure 15). The disadvantage of the embodiment illustrated in Figure 15, which provides a circle shape for each end portion 23, is that the manufacturing of the end portion 23 produces a scrap (i.e. a residue of the processing consisting of a small segment of wrapping material which detaches from the initial wrapping sheet 15 and must be somehow recovered and disposed of).

[0043] In the embodiments illustrated in Figures 16-20, each end portion 23 has an arc of a circle-like shape and extends over at least 180°: in the embodiments illustrated in Figures 17, 19 and 20 each end portion 23 has an arc of a circle-like shape and extends for about 180 °, while in the embodiments illustrated in Figures 16 and 18 each end portion 23 has an arc of a circle-like shape and extends for about 270 °.

[0044] In the embodiment illustrated in Figure 18, each end portion 23 has an arc of a circle-like shape and the arc of a circle is facing the opposite side of the central portion 22. In the embodiment illustrated in Figures 19 and 20, each end portion 23 has an arc of a circle-like shape and the arc of a circle faces the central portion 22.

[0045] It is important to note that in each final wrapping sheet 5 the inner edge (corresponding to the edge where the pre-weakened separation line 13 was located) is completely hidden from view as it is completely covered during the folding of the final wrapping sheet 5 around the corresponding group 4 of cigarettes; consequently, the tearing of the wrapping sheet 5 along the pre-weakened separation line 13 does not entail any aesthetic penalty to the inner wrap 3 obtained by folding the wrapping sheet 5 around the corresponding group 4 of cigarettes.

[0046] In the embodiment illustrated in the attached Figures, the initial wrapping sheets 15 come from the tape 10 of wrapping material unwound from the reel 9 (i.e. they are cyclically separated from the tape 10 of wrapping material unwound from the reel 9); according to a different and perfectly equivalent embodiment not illustrated, the initial wrapping sheets 15 are, from the beginning, separated from one another and come from a stack housed in a hopper.

[0047] In the embodiment illustrated in the attached Figures, each initial wrapping sheet 15 has a double width and is divided into two final wrapping sheets 5; according to other embodiments not illustrated, each initial wrapping sheet 15 has a greater width (for example triple or quadruple) and is therefore divided into three or four final wrapping sheets 5.

[0048] From the above, it is evident that initial wrapping sheet 15 is divided into two only and solely by tearing along the pre-weakened separation line 13 and without any type of cutting performed by a cutting tool, i.e. without any cutting tool touching the initial wrapping sheet 15. Consequently, no cutting tool is required to divide the initial wrapping sheet 15 into two.

[0049] The embodiment illustrated in the attached Figures refers to the manufacturing of a packet of cigarettes, but the present invention is applicable, without substantial modifications, also to the manufacturing of any other type of cylindrical-shaped packet of smoking articles (for example a packet of cigars, a packet of electronic cigarettes of the liquid vaporization type, a packet of new generation cigarettes without tobacco combustion...) or even any other type of packet of articles, including non-smoking ones (for example, medicinal products, food products, hygiene products ...).

[0050] The embodiments described herein can be combined with one another without departing from the scope of the present invention.

[0051] The packing machine 6 described above has numerous advantages.

[0052] In the embodiment illustrated in Figures 5, 6 and 7, the separation of the initial wrapping sheet 15 can take place even when the folding of the initial wrapping sheet 15 has not been very precise, since by applying the separation force to the initial wrapping sheet 15 the initial wrapping sheet 15 itself divides into the two wrapping sheets 5 always and only along the initial pre-weakened separation line 13 regardless of the exact position of the pre-weakened separation line 13.

[0053] The packing machine 6 described above is particularly simple to implement in that it provides a single feeding line 11 to feed the tape 10 of wrapping material (and therefore the initial wrapping sheets 15) which reaches the wrapping unit 7 and, in some embodiments,

also continues in the first part of the wrapping unit 7. In this way, the number of parts forming both the feeding unit 8 to feed the final wrapping sheets 5, and the wrapping unit 7 is minimized.

[0054] Furthermore, the dividing device 20 is nothing more than a diverter which separates the two groups 4 of cigarettes partially wrapped in the respective final wrapping sheets 5 (or, in some embodiments, moves the two final wrapping sheets 5 apart from one another before the coupling with the two groups 4 of cigarettes) causing a consequent tearing of the initial wrapping sheet 15 along the pre-weakened separation line 13; consequently, also the dividing device 20 is simple and inexpensive to manufacture and of modest dimensions.

[0055] Finally, also the management of the wrapping material for the packing machine 6 is facilitated, since it is necessary to cyclically replace the exhausted single reel 9 in the only unwinding station S1.

Claims

1. A method to feed two wrapping sheets (5) in a packing machine (6), in particular for smoking articles; the feeding method comprises the steps of:

feeding an initial wrapping sheet (15) with a double width; and

dividing the initial wrapping sheet (15) with a double width into two so as to obtain two final wrapping sheets (5) with a single width;

the feeding method is **characterized in that** it comprises the further steps of:

making a pre-weakened separation line (13) in the initial wrapping sheet (15); and

dividing the initial wrapping sheet (15) into two by applying only and solely a force, which causes a tear along the pre-weakened separation line (13).

2. The feeding method according to claim 1 and comprising the further step of applying to the initial wrapping sheet (15) a force, which tends to move a final wrapping sheet (5) away from the other final wrapping sheet (5).

3. The feeding method according to claim 1 or 2, wherein:

the separation line (13) comprises a non-through incision, which is obtained through the initial wrapping sheet (15) and extends without interruptions from one end to the other of the initial wrapping sheet (15); and

the division of the initial wrapping sheet (15) into two involves tearing the residual wrapping material present within the non-through incision.

4. The feeding method according to claim 1 or 2, wherein:

the separation line (13) comprises a plurality of through incisions (21), which are obtained through the initial wrapping sheet (15), are aligned with one another, and are separate from one another; and

the division of the initial wrapping sheet (15) into two involves tearing the wrapping material present between two adjacent through incisions (21).

5. The feeding method according to claim 4, wherein the through incisions (21) arranged at opposite ends of the initial wrapping sheet (15) extend up to the edge of the initial wrapping sheet (15).

6. The feeding method according to claim 4 or 5, wherein each through incision (21) has a central portion (22) with a straight shape and at least one end portion (23) with a curved shape.

7. The feeding method according to claim 6, wherein, in each through incision (21) the central portion (22) is connected to the end portion (23) without interruptions.

8. The feeding method according to claim 7, wherein in each through incision (21) the central portion (22) is joined to the end portion (23) without forming sharp edges.

9. The feeding method according to claim 6, wherein in each through incision (21) the central portion (22) is separated and spaced apart from the end portion (23).

10. The feeding method according to one of claims from 6 to 9, wherein the end portion (23) has the shape of a circle.

11. The feeding method according to one of claims from 6 to 9, wherein the end portion (23) has the shape of an arc of a circle and extends over at least 180°.

12. The feeding method according to claim 11, wherein the arc of a circle faces the opposite side from the central portion (22).

13. The feeding method according to claim 11, wherein the arc of a circle faces the central portion (22).

14. A wrapping method according to one of claims from 1 to 13, wherein the force causing the tear along the pre-weakened separation line (13) is generated by a device (20) comprising a contrasting element, which is hit by the initial wrapping sheet (15).

15. The wrapping method according to one of claims from 1 to 14, wherein the separation line (13) locally weakens the initial wrapping sheet (15) to facilitate and guide the subsequent tearing of the initial wrapping sheet (15) and maintains the unity and integrity of the wrapping sheet (15).

16. A wrapping method according to one of claims from 1 to 15, wherein the initial wrapping sheet (15) is divided into two only and solely by tearing along the pre-weakened separation line (13) and without any type of cutting performed by a cutting tool, i.e. without any cutting tool touching the initial wrapping sheet (15).

17. A unit (8) to feed two wrapping sheets (5) in a packing machine (6), in particular for smoking articles; the feeding unit (8) comprises:

a feeding line (11) to feed an initial wrapping sheet (15) with a double width; and
a dividing device (20) to divide the initial wrapping sheet (15) with a double width into two so as to obtain two final wrapping sheets (5) with a single width;
the feeding unit (8) is **characterized in that:**

a weakening device (12) is provided to make a pre-weakened separation line (13) in the initial wrapping sheet (15); and
the dividing device (20) is designed to divide the initial wrapping sheet (15) into two by applying a force, which causes a tear along the pre-weakened separation line (13).

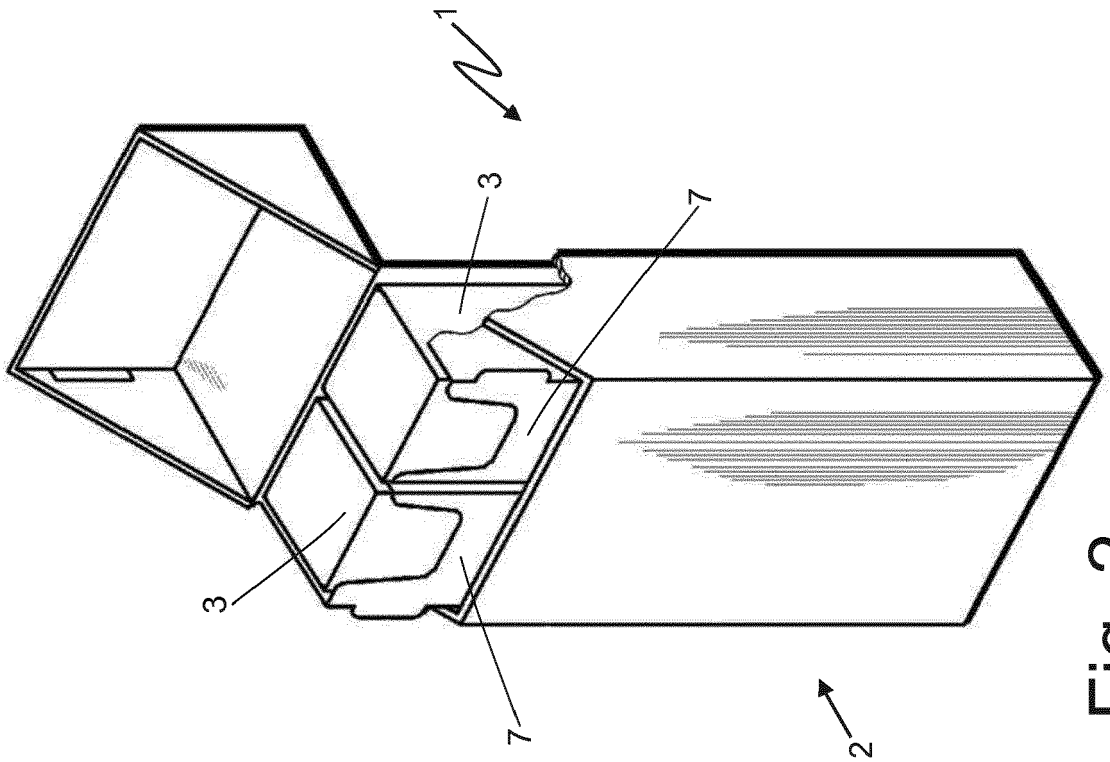


Fig. 2

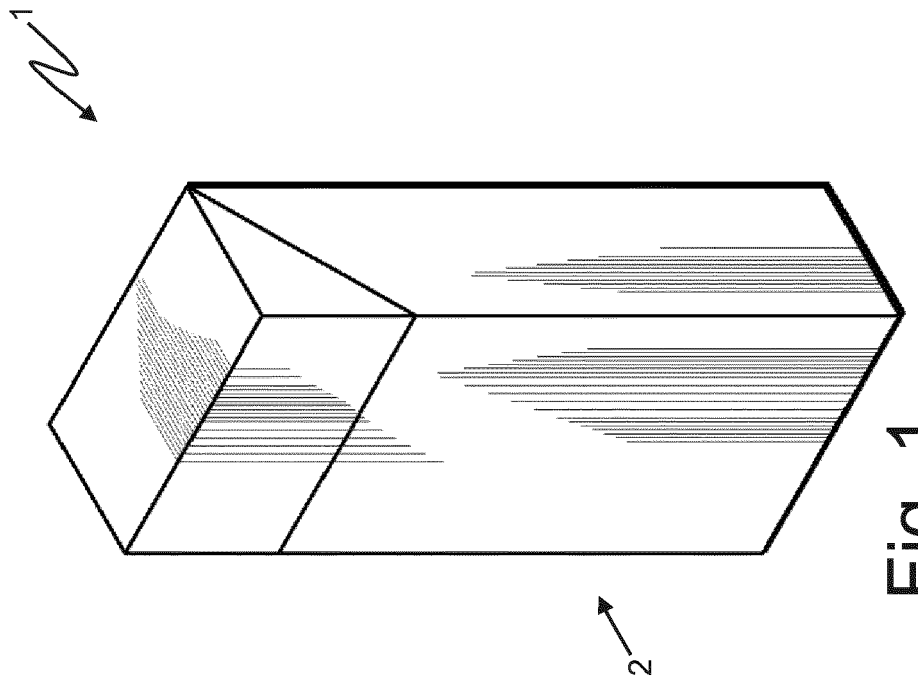


Fig. 1

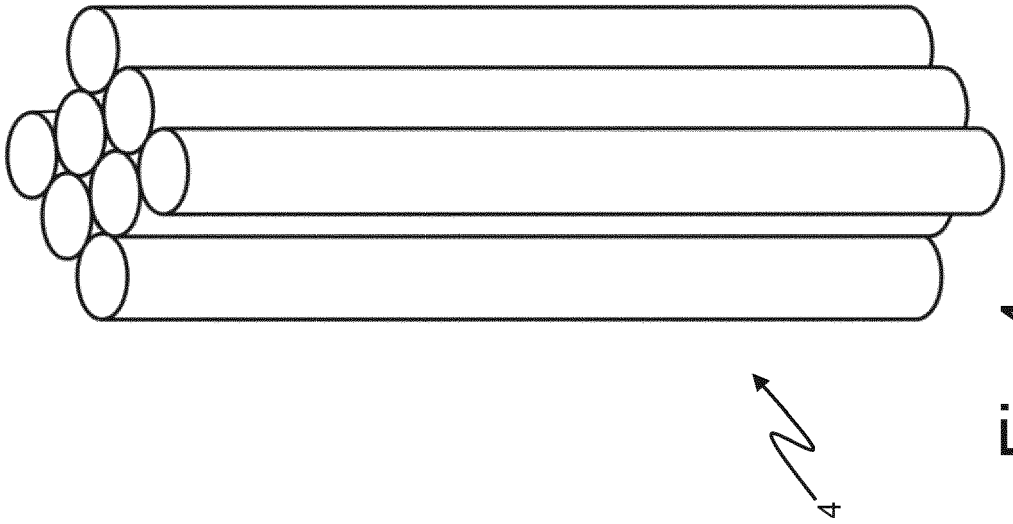


Fig.4

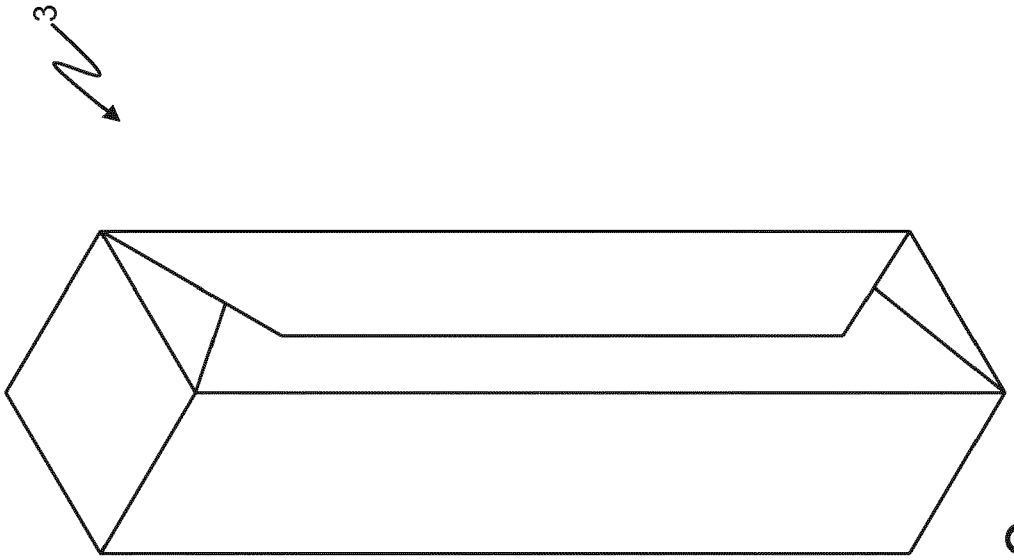


Fig. 3

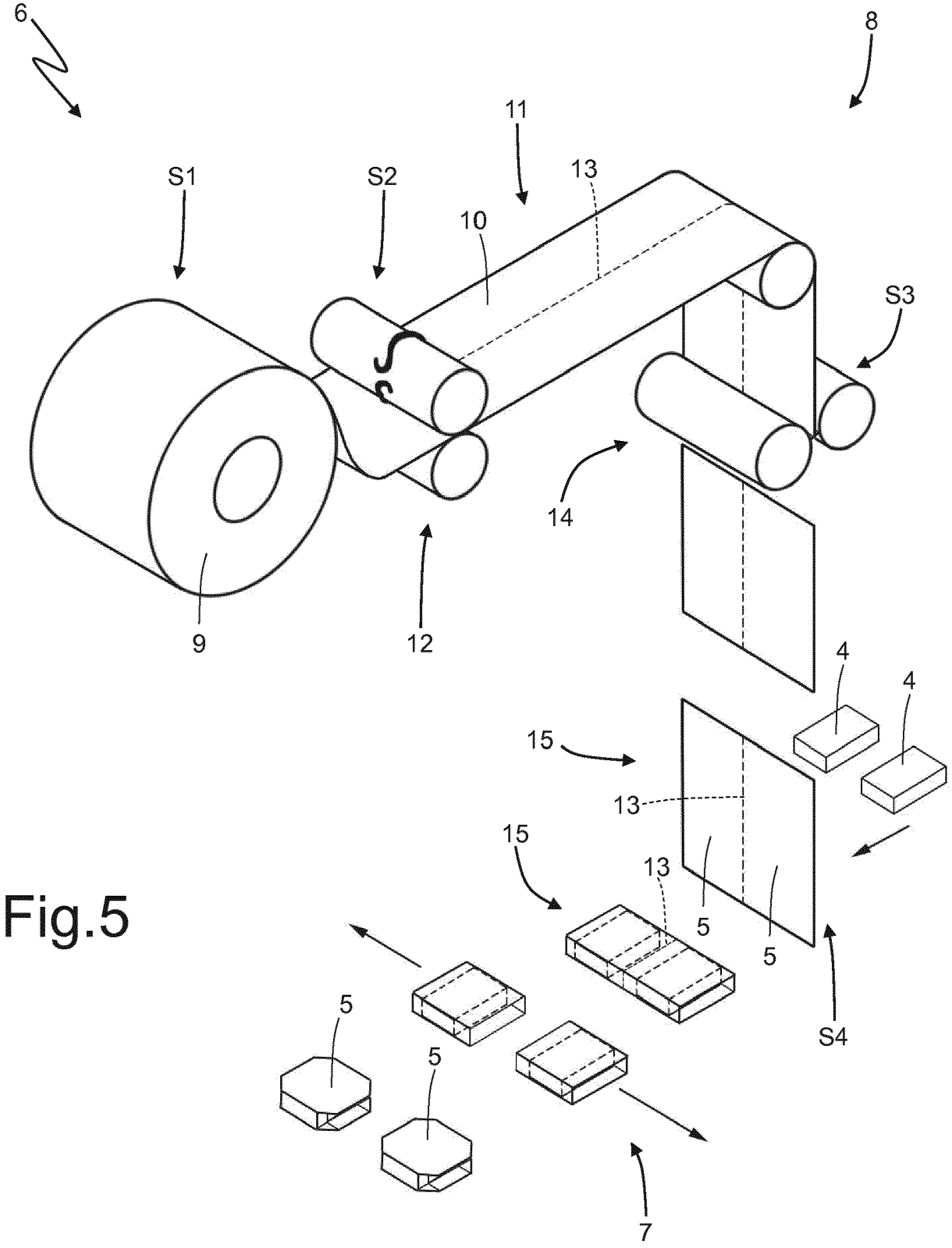
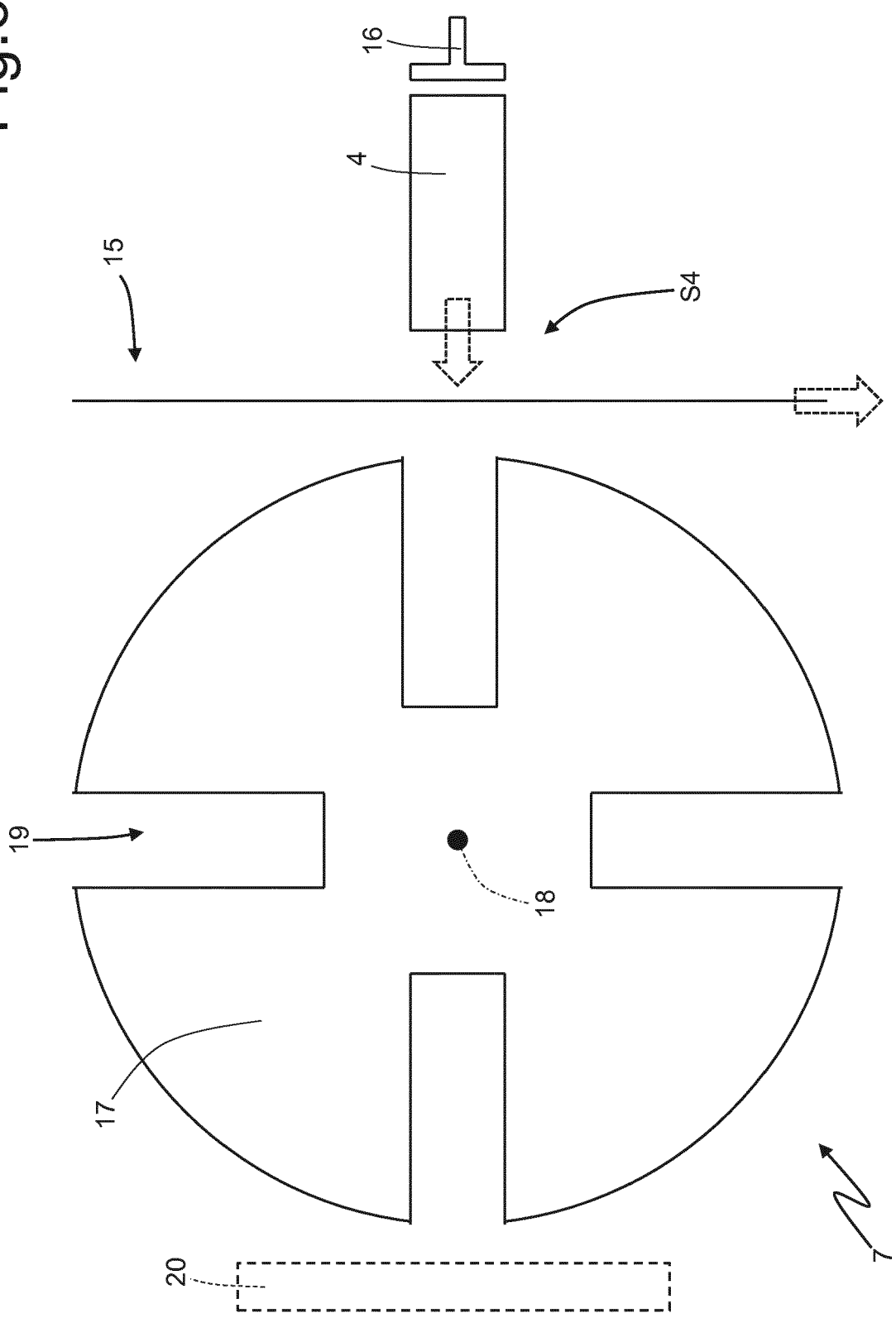


Fig.5

Fig.6



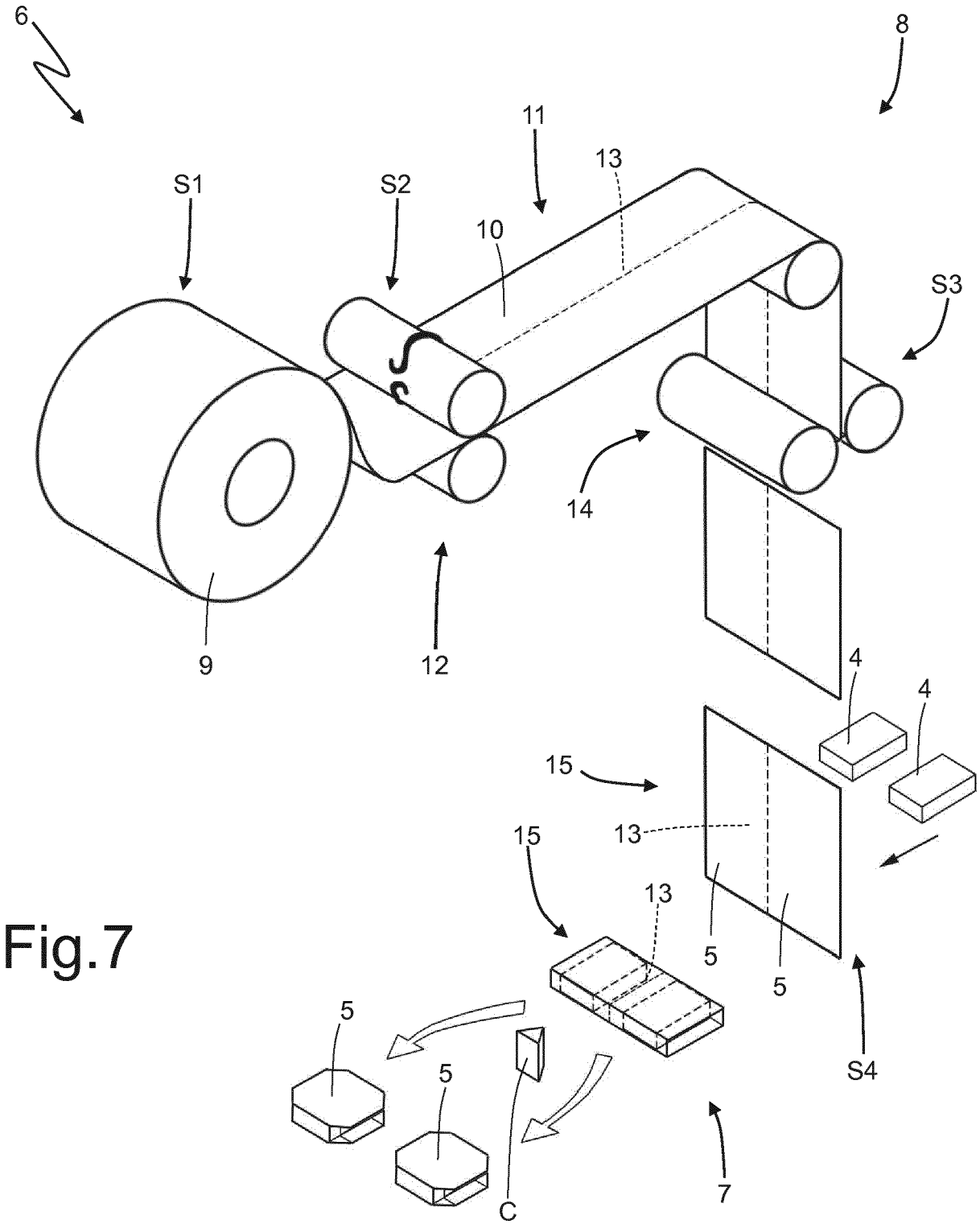


Fig.7

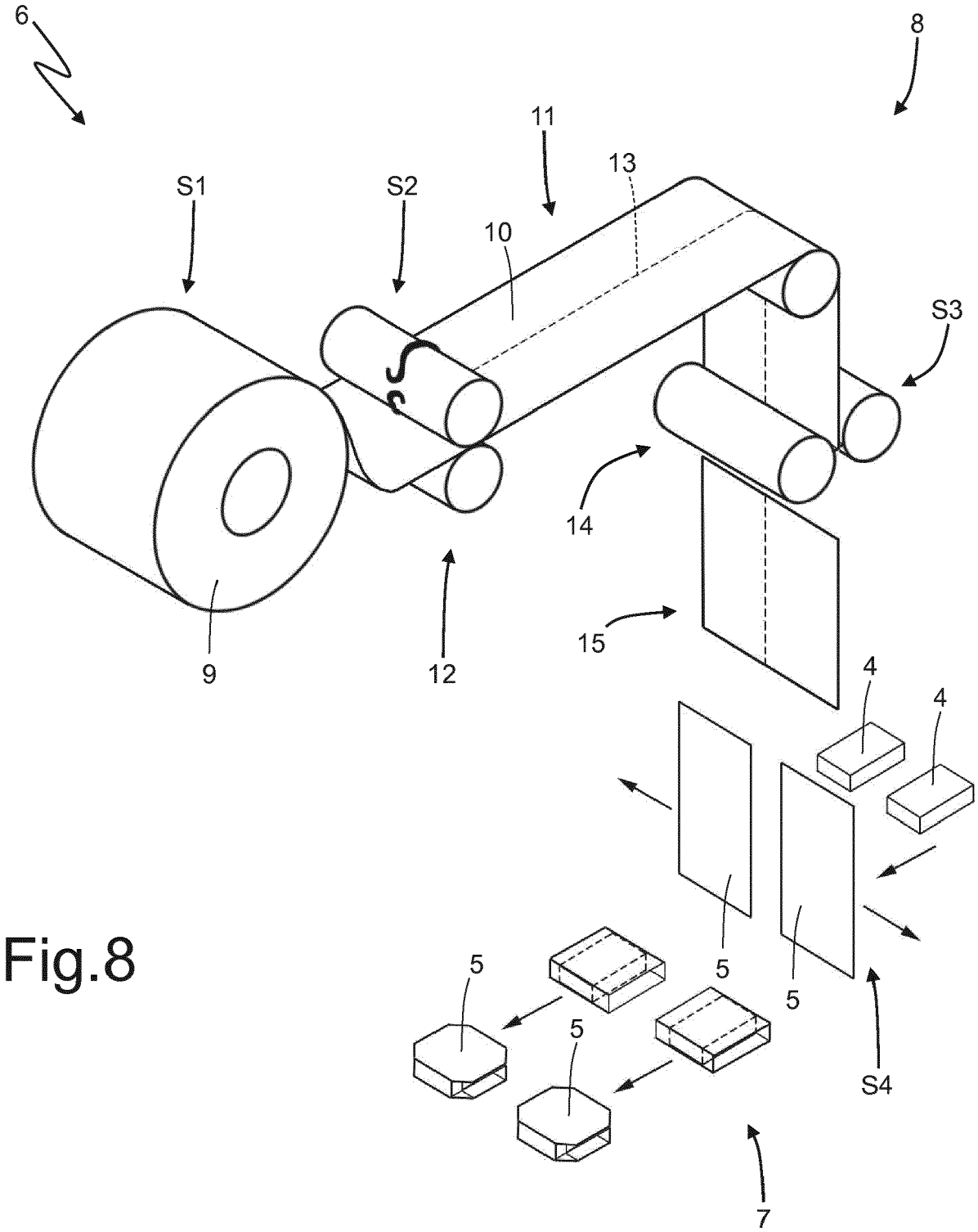


Fig.8

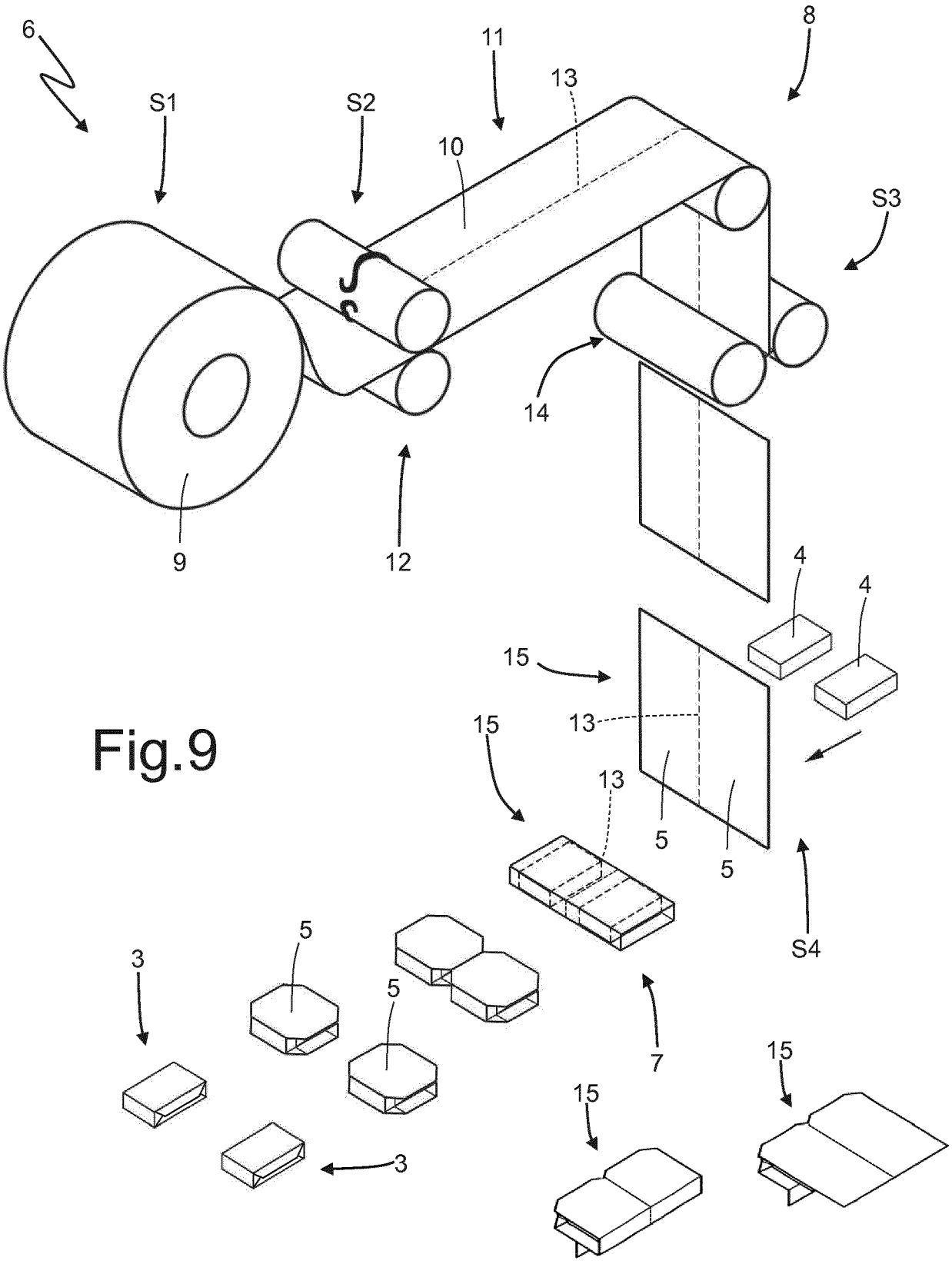


Fig.9

Fig.10

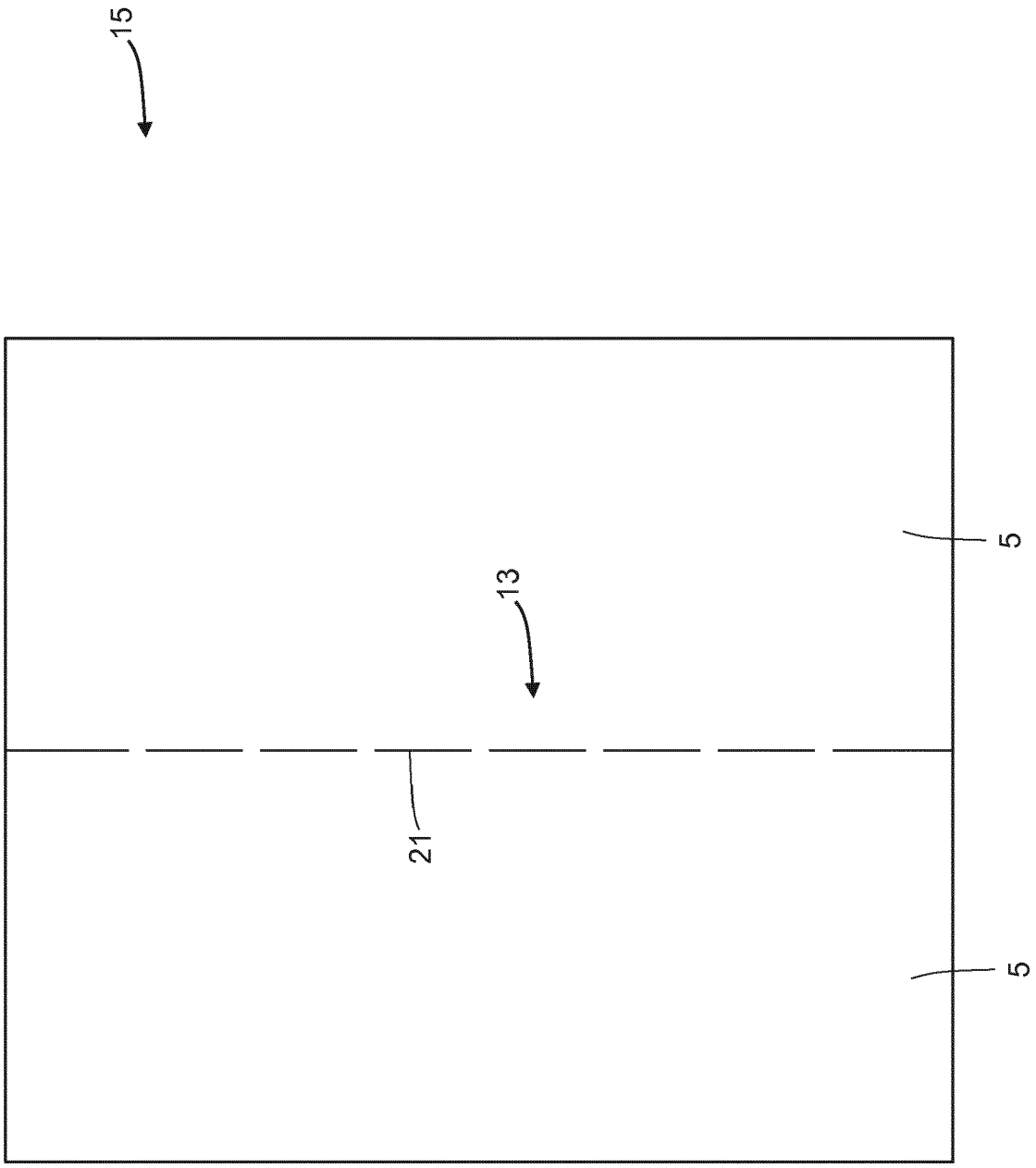


Fig.11

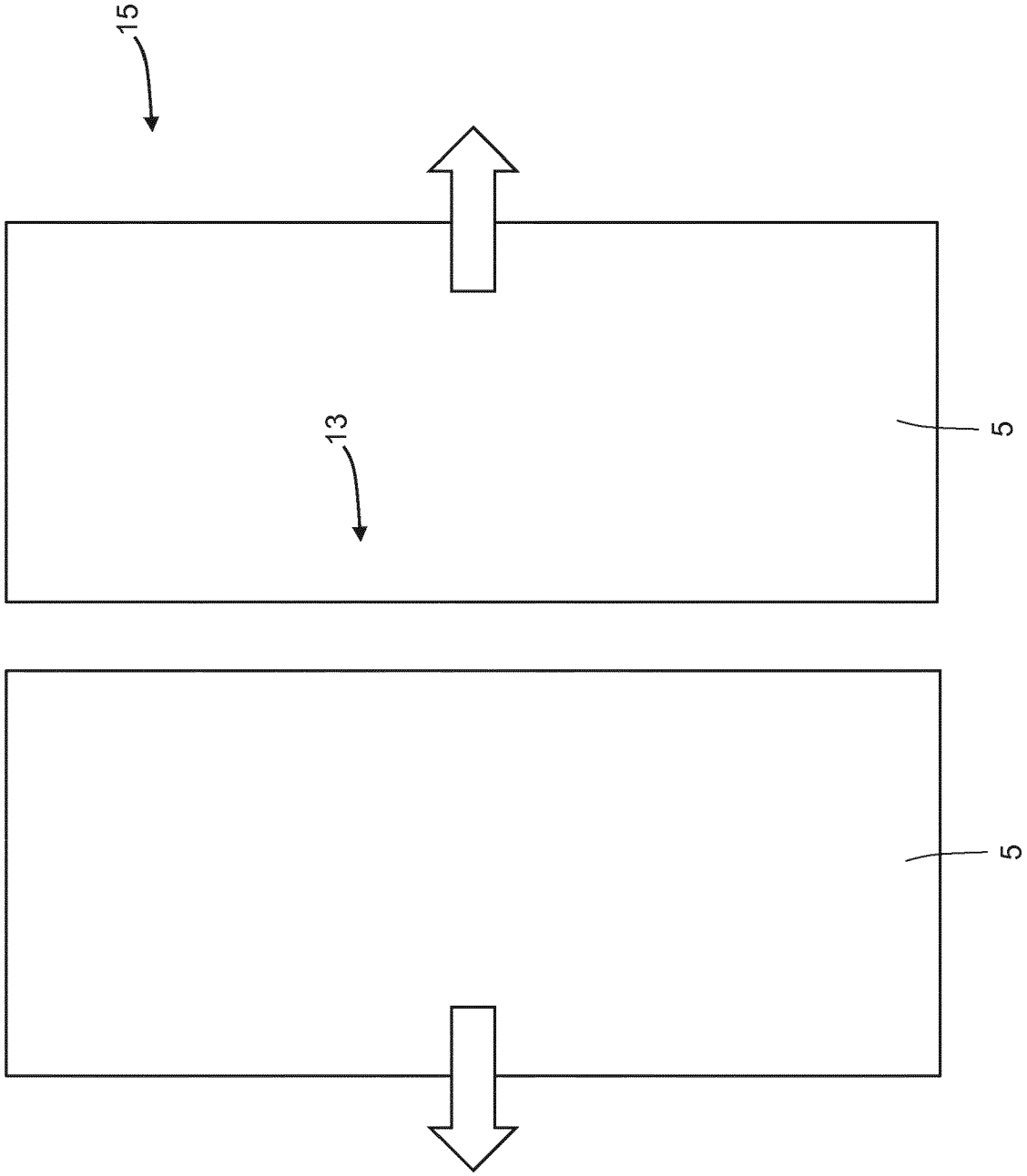


Fig.12

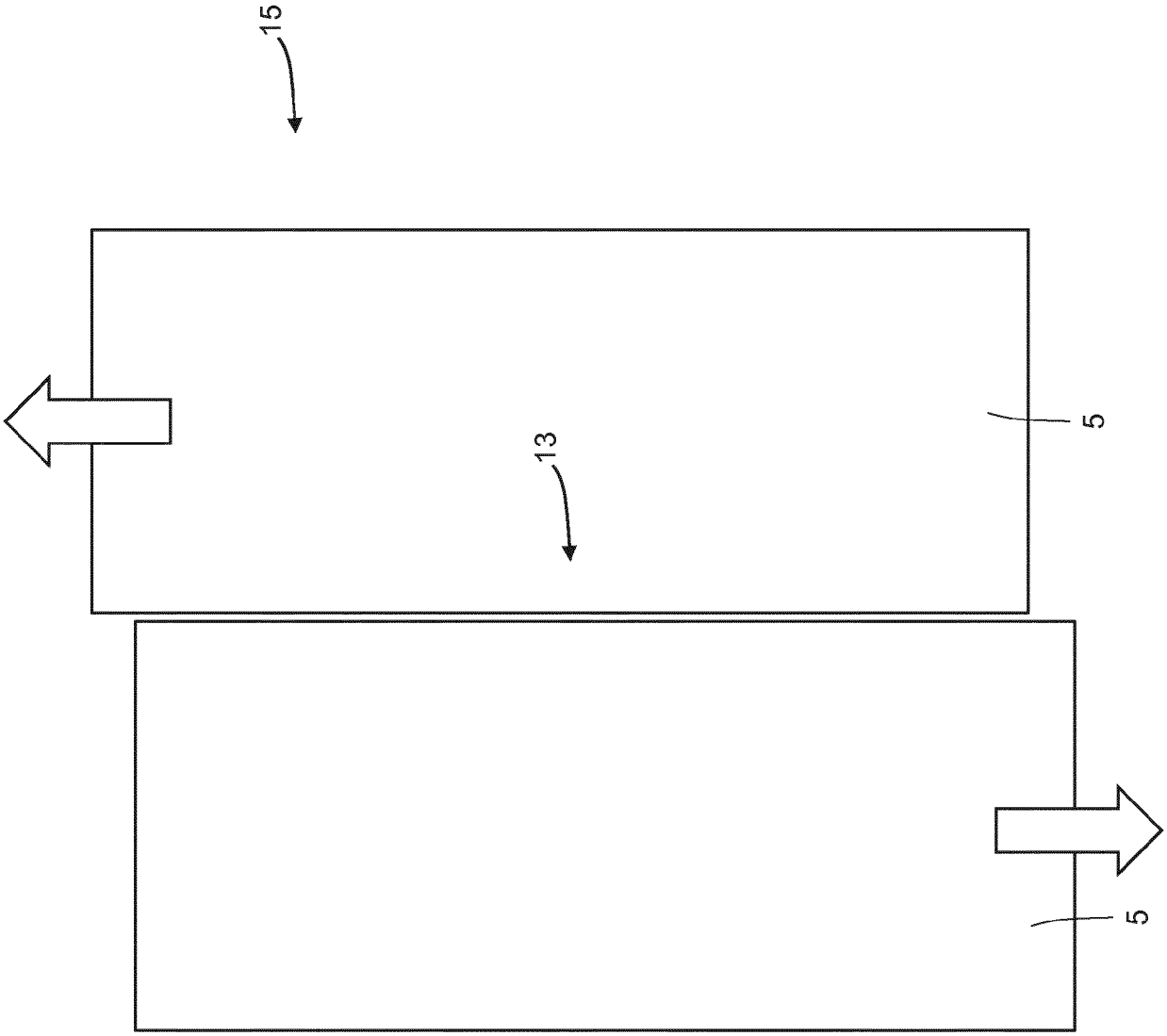
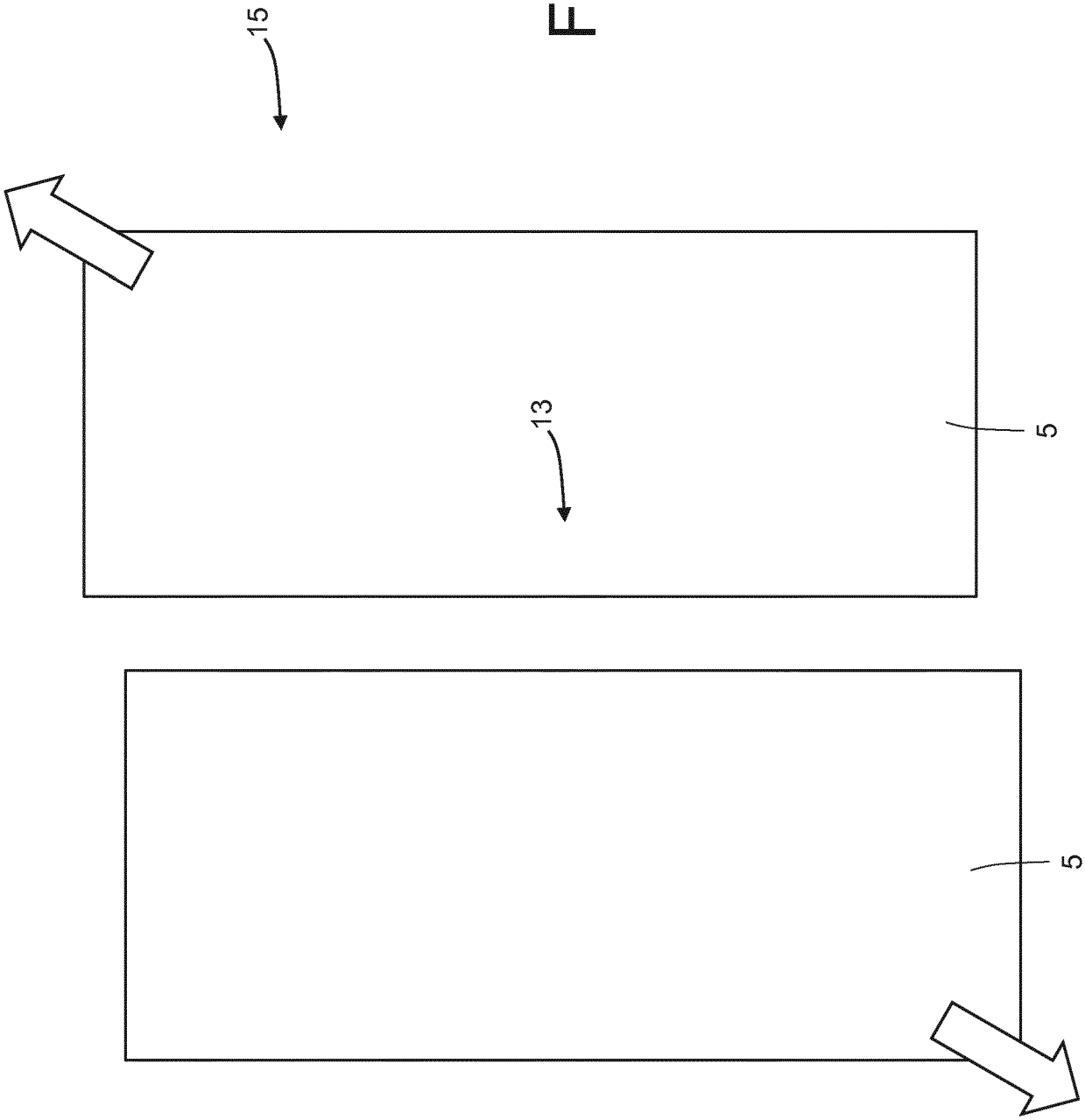


Fig.13



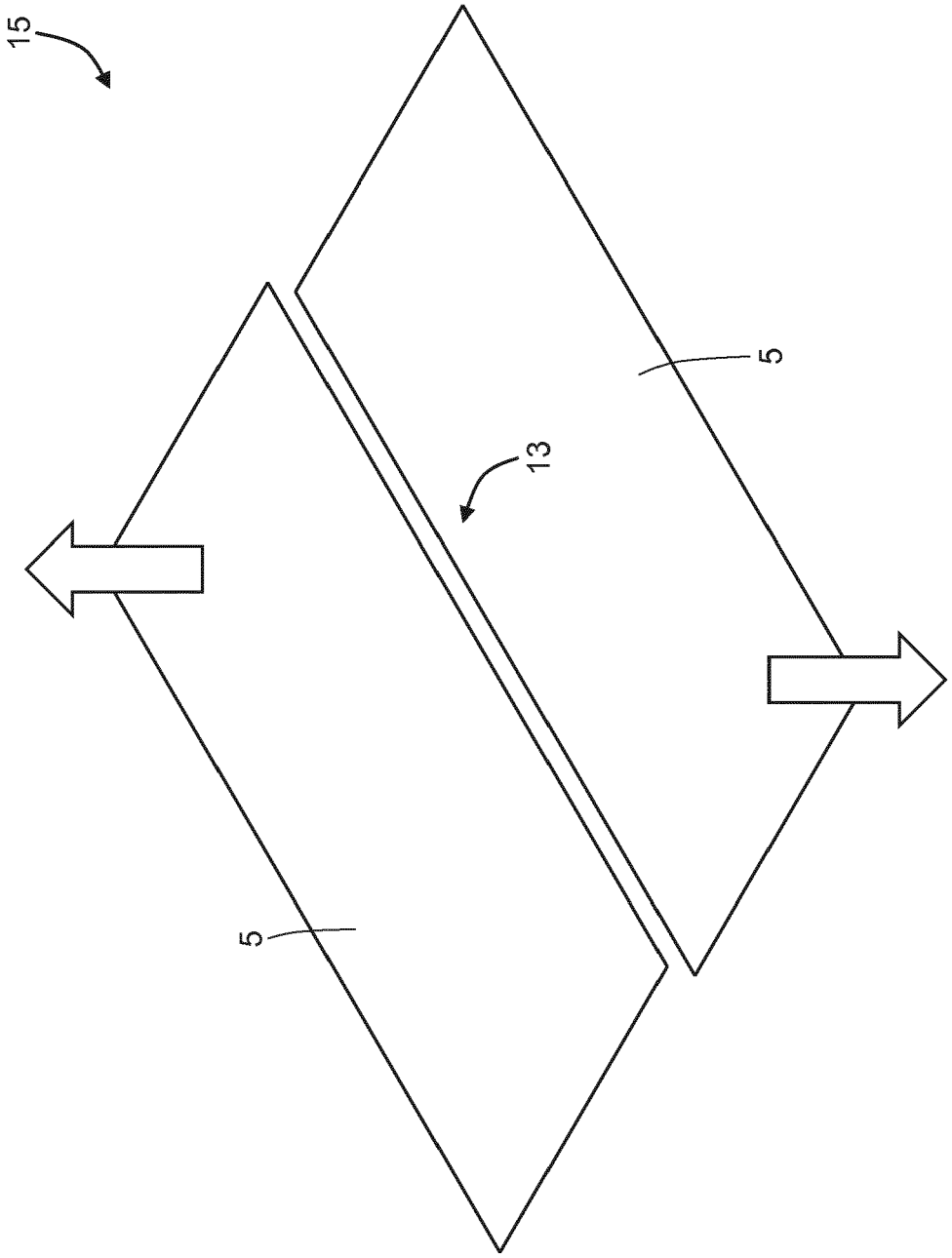


Fig.14

Fig.15

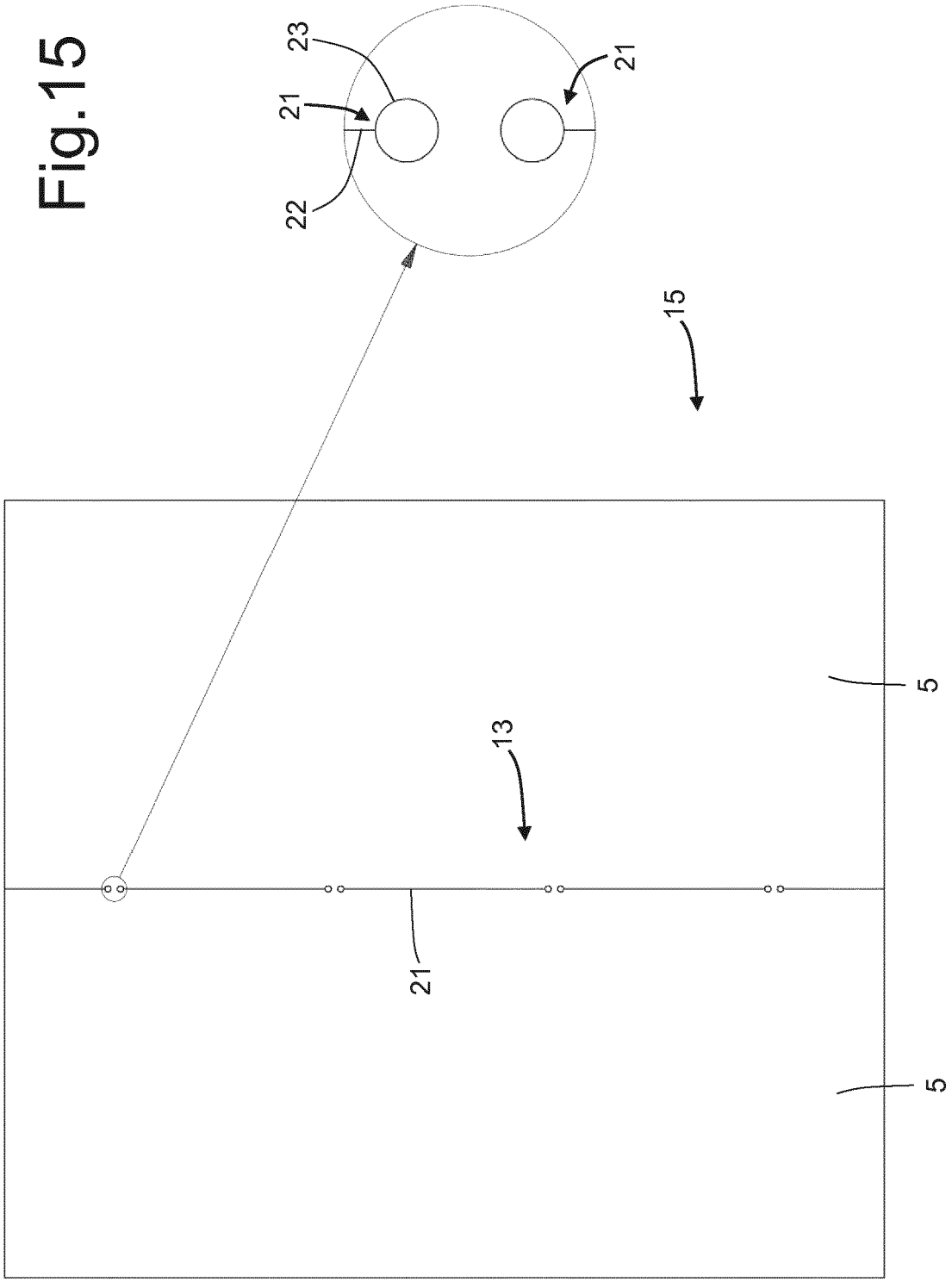


Fig.16

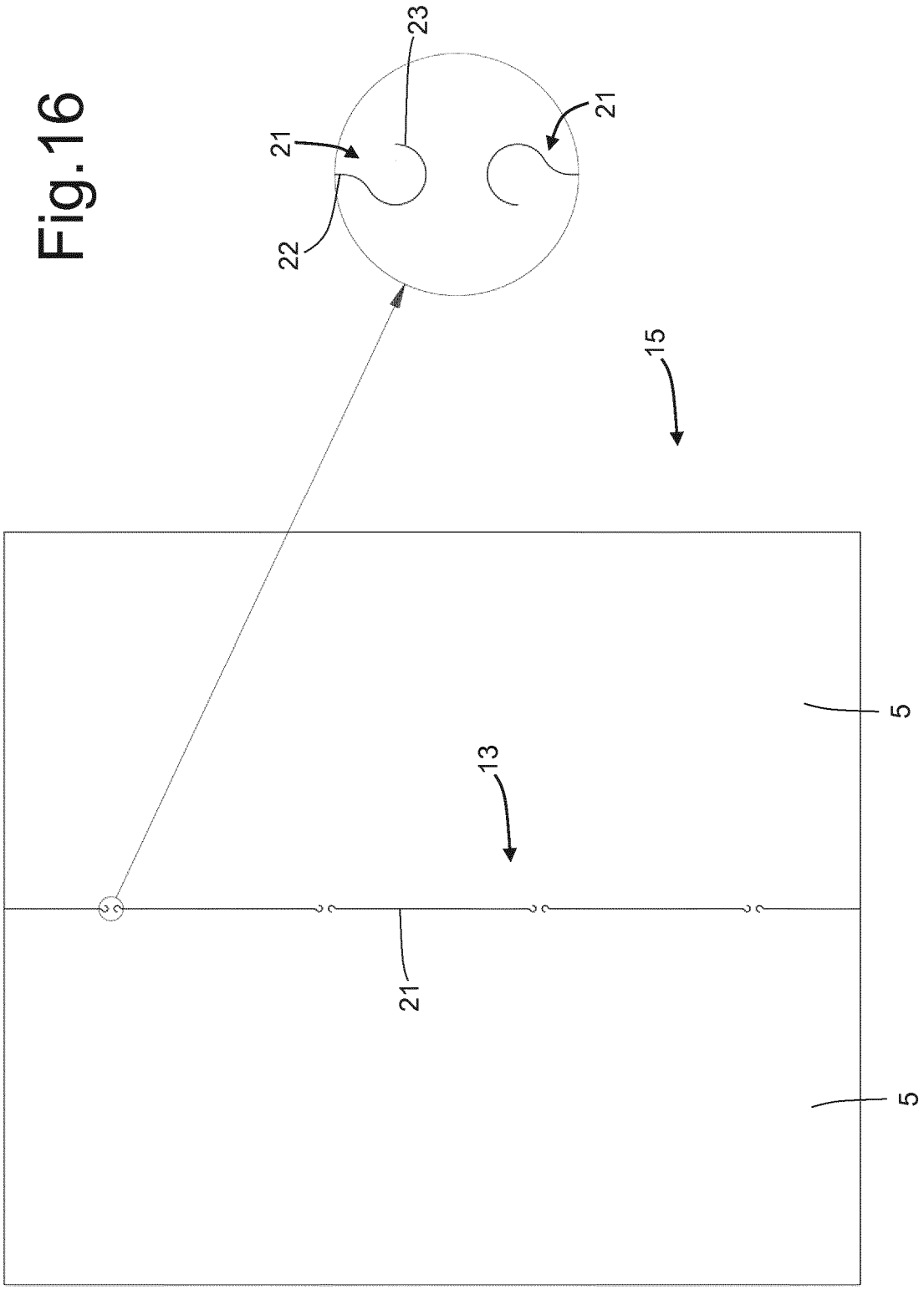


Fig.17

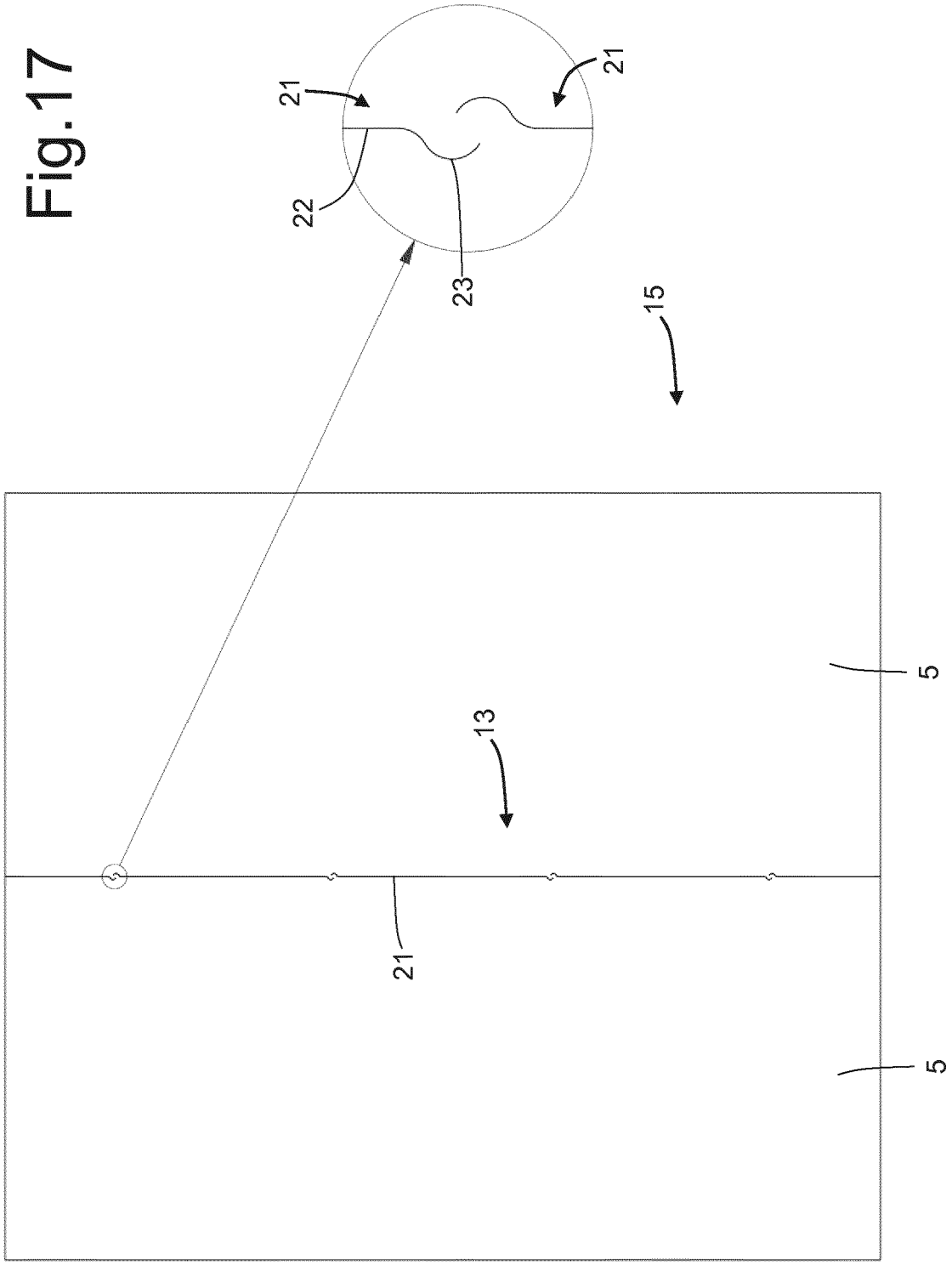


Fig.18

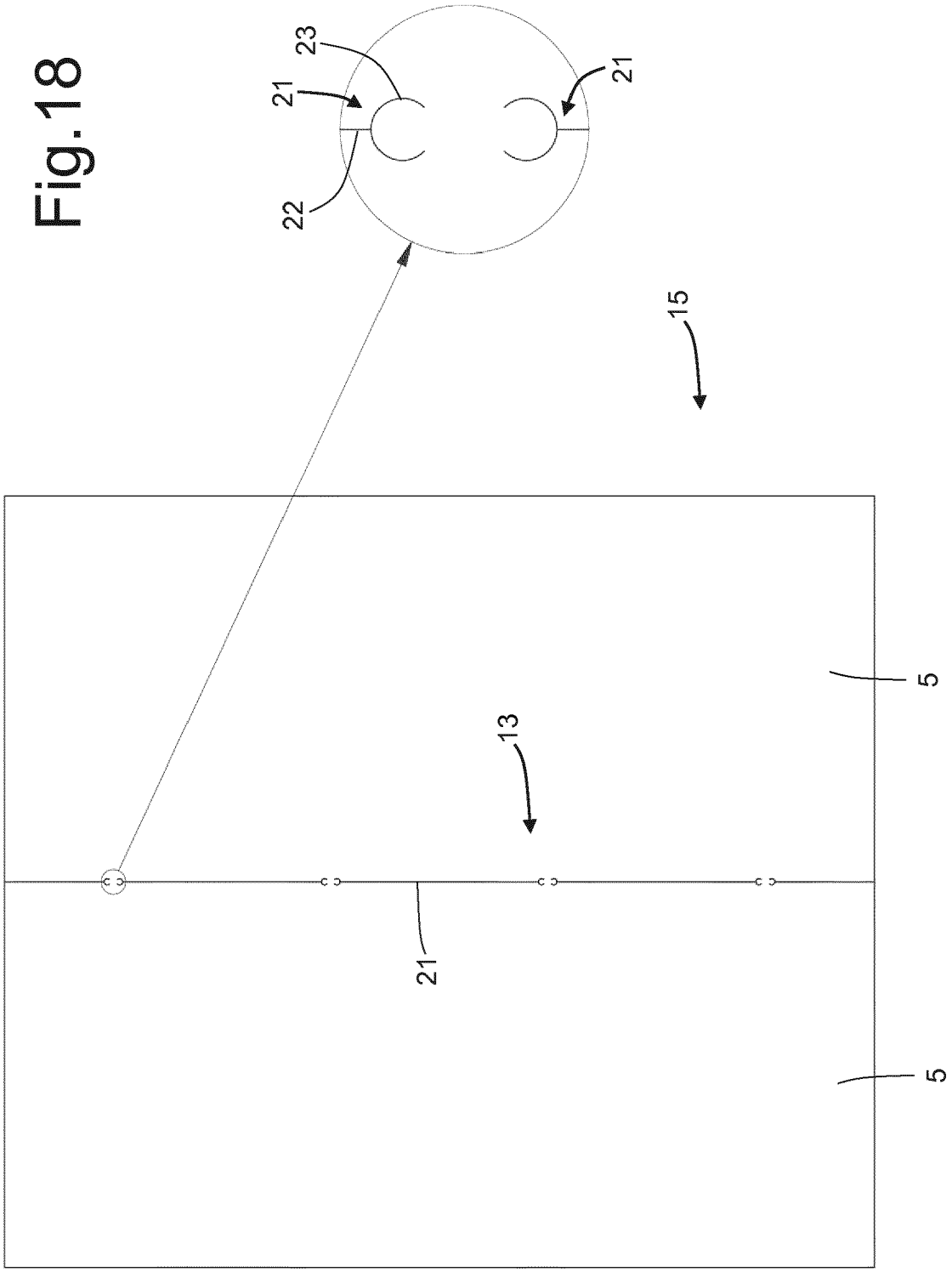


Fig.19

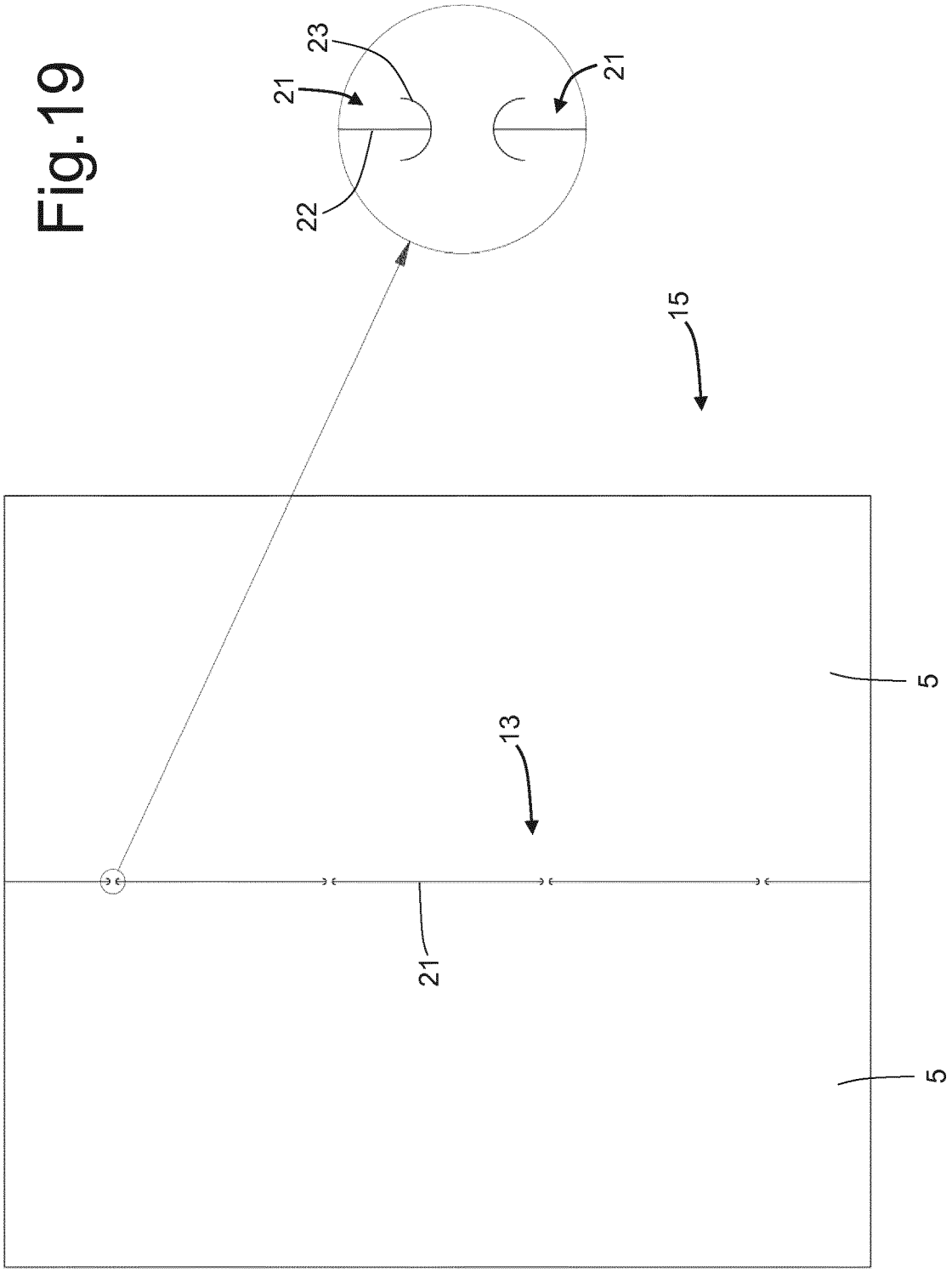
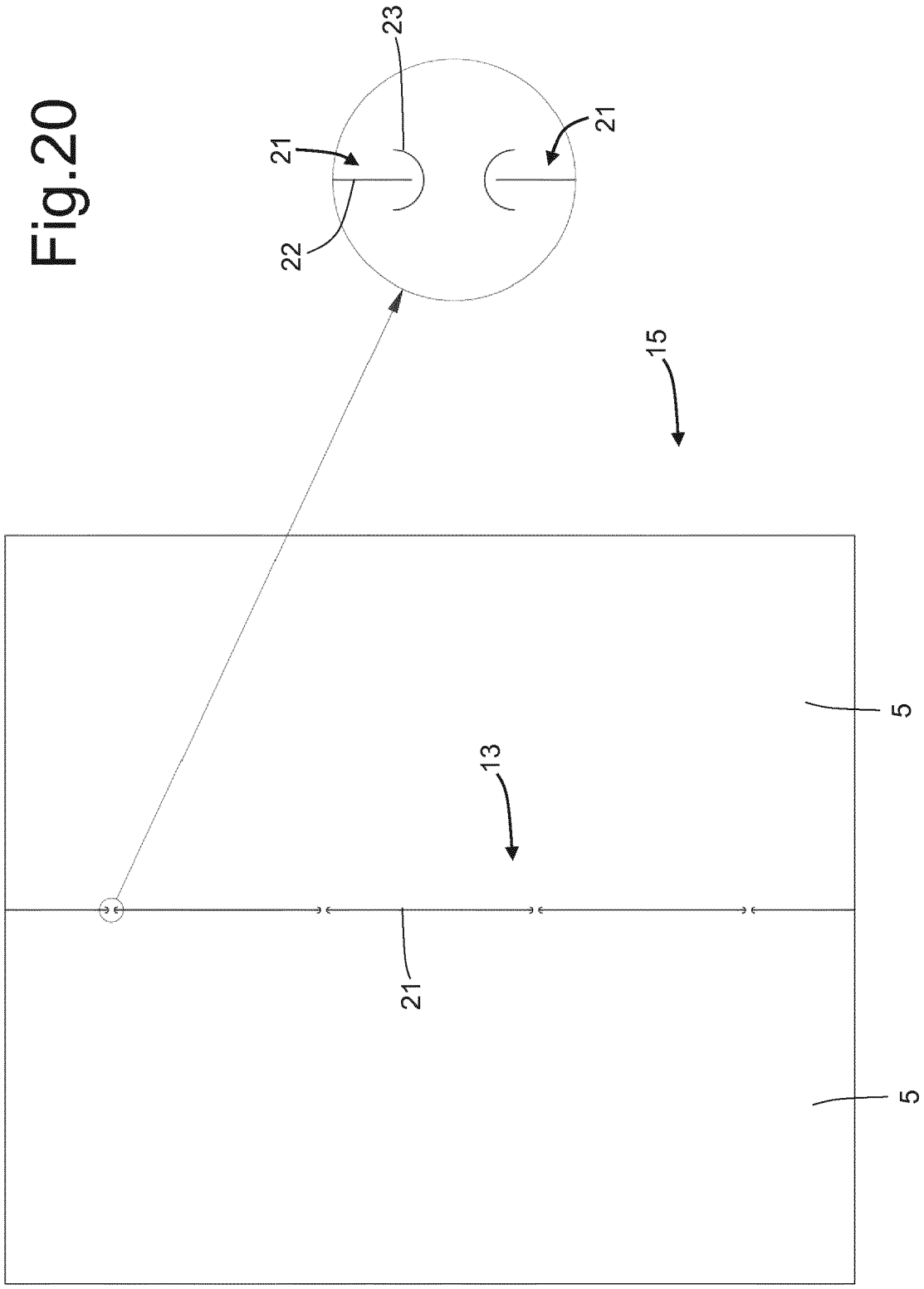


Fig.20



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EUROPEAN SEARCH REPORT

Application Number
EP 19 20 9270

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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B65B
B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	11 March 2020	Ungureanu, Mirela

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