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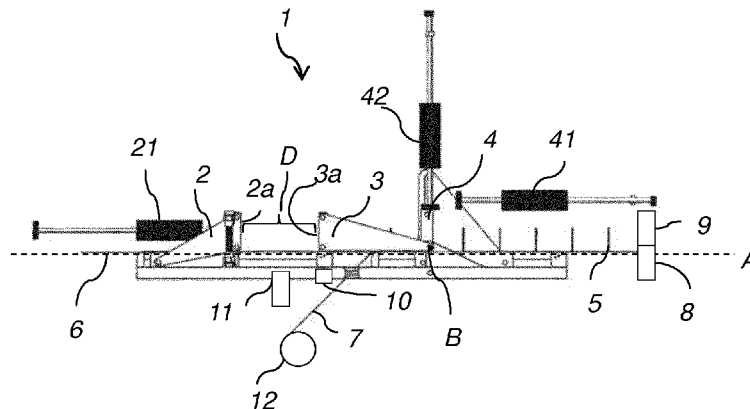


Fig. 2

(57) Abstract: The present disclosure relates to a machine (1) and a method (100) for producing packaging inserts. The method comprising the steps of transporting (102) an insert material (6), holding (104) the insert material in a fixed position, moving (106) a first pressing device (2), and holding (108) and moving (110) the insert material toward the second pressing device (3) such that a partition wall (5) is formed. The machine 1 comprising a first pressing device and a second pressing device, wherein an insert material is transportable, the second pressing device is configured to hold the insert material, the first pressing device is configured to be moved along an axis A and to hold and move the insert material toward the second pressing device such that a partition wall is formed.

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MACHINE AND METHOD FOR PRODUCING PACKAGING INSERTS

Technical Field

The present disclosure relates to a machine and a method for producing packaging inserts, and especially to an arrangement related to the components and method for forming the partition walls of the packaging insert.

Background

In the field of machines and methods for producing packaging inserts, a common way is to produce a base part and mount the separately produced partition walls thereto at a specified distance from each other.

10 In this field of production, it is sometimes desirable to create the partition walls using one piece of material. Prior art solutions, such as described in GB764458A or US4200032A use pre-marked or pre-cut top portions marking the folding regions to fold the partition walls.

Hence, a particular problem with this type of production of packaging inserts is the complexity of steps and the limited flexibility of size of the partition wall and/or folding region. Therefore, there is a need for a method and a machine which enables a reduction in steps while being able to produce packaging inserts of different sizes from the same material without need of pre-marking the folding regions or need of multiple machines.

Summary

20 It is an object of the present invention to provide an improved solution that alleviates the mentioned drawbacks with present devices.

According to a first aspect of the invention, this is achieved by a method for producing a packaging insert by forming at least one partition wall from an insert material using a first pressing device and a second pressing device, the method comprising the steps of transporting the insert material

along an axis A, holding the insert material in a fixed position by the second pressing device, moving the first pressing device along axis A to a distance D from the second pressing device corresponding to the double intended height of the partition wall, and holding and moving the insert material by means of
5 the first pressing device toward the second pressing device along axis A such that the insert material is pressed between the first and the second pressing device into an erect position forming a partition wall.

With this arrangement, the method for producing a packaging insert may be performed using only one piece of insert material to produce
10 packaging inserts of different sizes using only one machine and with a limited amount of production steps.

By holding and moving the insert material by means of the first pressing device, it is implied that the first pressing device may take hold of the insert material by pressing and thereby push the insert material along axis A
15 as it moves along this axis.

By holding the material in a fixed position by the second pressing device, it is implied that the second pressing device may be in a fixed position such that when the first pressing device moves the insert material toward the second pressing device, the insert material is pressed between the two
20 pressing devices into an erect position.

When taking hold of the insert material, the first pressing device may be fully retracted from the second pressing device, at a distance D corresponding to the double intended height of the partition wall to be formed. This position will further be referred to as an open position of the pressing
25 devices. As the distance D of the open position may be adjusted between each partition wall formed, partition walls of different height may be formed on the same packaging insert using the same machine and the same insert material.

Correspondingly, the position where the first pressing device presses
30 toward the second pressing device with the insert material in-between, will further be referred to as the pressing position.

The second pressing device may further be in a holding position when it holds the insert material in a fixed position and in an open position at which the insert material may be moved relative the second pressing device.

The first pressing device may comprise a planar surface, perpendicular
5 to axis A and facing the second pressing device. The second pressing device
comprises a corresponding planar surface, perpendicular to axis A, facing the
first pressing device. The distance between the planar surfaces may
correspond to the distance D in the open position. In the pressing position the
planar surfaces may be pressed toward each other with the partition wall in
10 between.

The second pressing device may be provided with perforating teeth at
a lower edge in contact with the insert material when the second pressing
device holds the insert material. Such perforating teeth may provide a
perforation at the base of the partition wall to be formed, which may facilitate
15 the formation. Such perforation may hence be performed when the second
pressing device holds the insert material. The perforating teeth may be
removable and/or retractable to facilitate replacement of the perforating teeth
and/or to facilitate the formation process of the partition wall so as to avoid
that the insert material stick to the teeth. The lower edge may be at a lower
20 edge of the planar surface of the second pressing device.

The first pressing device may also be provided with similar perforating
teeth at a lower edge in contact with the insert material when the first pressing
device holds the insert material.

The insert material may be of paper, cardboard, or other suitable sheet
25 material.

Further, when the insert material is transported along axis A, the
distance between a previously formed partition wall and the second pressing
device, corresponding to the position of the next partition wall to be formed,
may be set. Such movement of the insert material and the formed partition
30 wall may thereby be selected independently for each formed partition wall.

Hence, the distances between partition walls in the formed packaging insert may be individually selected.

When the partition wall is formed, glue or adhesive may be applied between the wall sides erecting to form the partition wall in order to keep the form of the wall. An alternative way to keep the form of the wall after it has
5 been formed may be to use an embossing unit to emboss at least one erecting side or top side of the wall. As a further alternative, a sewing unit may be used for sewing the two wall sides to each other. All these alternatives may provide formation of the wall in such ways that no metallic
10 parts are used which could negatively affect goods intended to be placed in the packaging insert.

According to a one embodiment, the method may comprise a step of lifting or moving the second pressing device as to allow a formed partition wall to pass underneath the second pressing device. The lifting step may
15 comprise an act of pivoting the second pressing device around an axis B, where axis B may extend perpendicular to axis A and in parallel to an extension plane of the insert material. An alternative may be lifting the second pressing device upwards, in a direction perpendicular to axis A and B. Alternatively, the second pressing device may be lifted or moved to the side
20 from the insert material in order to be out of way for the formed partition wall.

As the second pressing device may allow for the formed partition wall to pass underneath, this in turn may allow for the partition walls for a packaging insert to be formed consecutively from the same piece of insert material. The distance which a formed partition wall is moved passed the
25 second pressing device may further set a distance between the formed partition wall and a subsequently formed partition wall. Such movement of the insert material and the formed partition wall may thereby be selected independently for each formed partition wall. Hence, the distances between partition walls in the formed packaging insert may be individually selected.

30 In a further embodiment, the method may comprise a step of blowing or poking the insert material in a direction perpendicular to the axis A to

facilitate the forming of the partition wall into the erect position. A blow or poke may assure that the wall forms into an erect position forming the partition wall. The insert material may also be applied with a fastening means, such as glue or adhesive, so that the partition wall sides may be further fixed in position, adhering to each other. The position along axis A at which the blowing or poking occurs may be selected depending on the distance D setting the height of the partition wall to be formed and depending on the thickness of the insert material. Preferably, the blowing or poking is performed at half the distance D between the first and the second pressing devices. The step of blowing or poking may comprise a step of moving a blowing or poking unit to a location corresponding to half the distance D. The blowing or poking may thereby facilitate the insert material to be folded at the correct location to form the partition wall. Further, the blowing or poking may comprise or be replaced by a step of perforating the insert material as a complement to or in replacement of blowing or poking in order to facilitate the forming of a partition wall into an erect position. The perforating of the insert material may be performed by a perforating means configured to perforate the insert material from below, from above or moving from the side across the insert material. Applying vacuum or pulling the insert material towards the erect position may be other example means for facilitating the movement of the insert material into an erect position. The applying of vacuum or pulling may be performed from above the insert material. Applying vacuum may be used for holding the insert material and pulling the insert material towards the erect position. The perforation may be made at a location of half the distance D from the second pressing device, at the location corresponding to the top of the partition wall to be formed. A puff of air or a poke from, for example, a steel plate, are further examples of facilitating the movement of the insert material into an erect position.

The method may in one embodiment comprise a step of facilitating the formation of the partition wall by physically acting on the insert material. Such step may comprise one of the above described steps of poking the insert

material, blowing on the insert material, lifting the insert material using vacuum, pulling the insert material and/or perforating the insert material at a partition wall top location and/or partition wall base location.

According to another embodiment, the method may further comprise a
5 step of moving a previously formed partition wall along the axis A, using a gripping device, such that the insert material is moved a distance along the axis A, wherein the moved distance sets the distance between a next partition wall to be formed and a preceding partition wall. The gripping device grasping and pulling the insert material along the axis A may allow for different size
10 partition inserts as the distance of movement may be adjusted between each formed wall. That is, the distance between each partition wall may vary. Partition inserts of varying sizes and distance between the partition walls may thereby be formed using the same machine and insert material. By using the gripping device to move the insert material, the need of further components in
15 the machine for transporting the insert material may be avoided. In an initial stage, until the first partition wall or walls has been formed, the insert material may be fed manually or by an initial material transportation means.

In one embodiment, the second pressing device may, after formation of a partition wall, be moved away from the formed partition wall such that the
20 gripping device may grasp the newly formed partition wall and move the insert material by pulling said partition wall. The movement of the second pressing device may be made to enable the gripping device to access said partition wall.

In yet another embodiment, the method may comprise a step of
25 feeding a bottom material from a paper tray and fixing the bottom material to the insert material by sewing, punching or stapling or by using glue or adhesive.

Adding a bottom material to the packaging insert may further stabilize the construction and may help keeping the partition wall in an erect position.
30 By fixing the bottom material to the insert material, the insert material and bottom material may be forced into a fixed position relative each other.

Applying fastening means, such as glue or adhesive, to the bottom material may further fix the bottom material to the insert material assuring that the bottom and insert material are in fixed position relative each other. A punching may be performed to achieve folded flaps or tabs of the bottom material and insert material. The bottom material and the insert material may be punched together in a single operation. The shape of the punch may be designed to provide a foldable flap or tab. For instance, a U-shaped punch may be performed. The two materials may each provide a flap or tab, and the two flaps or tabs may be folded together to extend perpendicular to the plane of the materials. In one embodiment, the materials may be punched at two locations, each location providing a folding of flaps or tabs. The flaps or tabs may preferably be folded upwards, such that the flap or tab of the bottom material may be folded through the punched opening in the insert material.

The stapling may be performed in connection to a cutting of the packaging inserts. In the stapling step, at least one staple may be stapled, facing toward the bottom material, to each side of a partition wall. The staples may keep the partition walls in an erect position if other fixation means should fail. The staples may further keep the insert material and the bottom material in fixed position relative each other in case other fixation means should fail.

The bottom material may in one embodiment be slightly wider than the insert material to facilitate the transportation of the bottom material and insert material.

According to a further embodiment, the method may comprise a step of pressing the insert material toward a bottom material using the gripping device. The pressure from the gripping device may further stabilize the form of the partition walls.

According to another embodiment, the method may comprise a step of cutting the packaging insert at a desired length by a cutting device. The cutting-off may be performed to cut the packaging inserts at desired lengths. The packaging inserts may be cut at different lengths from the same insert

material and in the same machine. The position of the cutting device may be adjustable along the axis A.

According to a second aspect of the invention, a packaging insert is provided, which is produced according to the method in any of the
5 embodiments described above.

According to a third aspect of the invention, a machine for producing packaging inserts by forming at least one partition wall from an insert material is provided. The machine comprises a first pressing device and a second pressing device, wherein an insert material is transportable in the machine
10 along an axis A, the second pressing device is configured to hold the insert material in a fixed position, the first pressing device is configured to be moved along the axis A to a distance from the second pressing device corresponding to the double intended height of the partition wall, and the first pressing device is configured to hold and move the insert material toward the second
15 pressing device along axis A such that the insert material is pressed between the first and the second pressing device into an erect position forming a partition wall.

With this arrangement, only one machine is needed for producing a packaging insert without any need of preparation of the insert material.
20 Further the same machine can be used for producing packaging inserts of different sizes of partition walls and different spaces in-between using the same insert material.

The insert material may be of paper, cardboard, or other suitable sheet material.

25 The first pressing device may be fully retracted from the second pressing device, at a distance D corresponding to the double intended height of the partition wall to be formed when taking hold of the insert material. This position will further be referred to as an open position of the pressing devices. As the distance D of the open position may be adjusted between each
30 partition wall formed, partition walls of different height may be formed using the same machine and the same insert material.

Correspondingly, the position where the first pressing device presses toward the second pressing device with the insert material in-between, will further be referred to as the pressing position.

The second pressing device may further be in a holding position when
5 it holds the insert material in a fixed position, and in an open position at which the insert material may be moved relative the second pressing device.

Further, when the insert material is transported along axis A, the distance between a previously formed partition wall and the second pressing device, corresponding to the position of the next partition wall to be formed,
10 may be set. Such movement of the insert material and the formed partition wall may thereby be selected independently for each formed partition wall. Hence, the distances between partition walls in the formed packaging insert may be individually selected.

The first pressing device may comprise a planar surface, perpendicular
15 to axis A and facing the second pressing device. The second pressing device comprises a corresponding planar surface, perpendicular to axis A, facing the first pressing device. The distance between the planar surfaces may correspond to the distance D in the open position. In the pressing position the planar surfaces may be pressed toward each other with the partition wall in
20 between.

The second pressing device may be provided with perforating teeth at a lower edge in contact with the insert material when the second pressing device holds the insert material. Such perforating teeth may provide a perforating at the base of the partition wall to be formed, which may facilitate
25 the formation. Such perforation may hence be performed when the second pressing device holds the insert material. The perforating teeth may be removable and/or retractable to facilitate replacement of the perforating teeth and/or to facilitate the formation process of the partition wall so as to avoid that the insert material stick to the teeth. The lower edge may be at a lower
30 edge of the planar surface of the second pressing device.

The first pressing device may also be provided with similar perforating teeth at a lower edge in contact with the insert material when the first pressing device holds the insert material.

The machine may comprise a unit for applying glue or adhesive
5 between the wall sides erecting to form the partition wall in order to keep the form of the wall after it has been formed. An alternative way to keep the form of the wall after it has been formed may be that the machine comprises an embossing unit configured to emboss at least one erecting side or top side of the wall. As a further alternative, a sewing unit may be provided in the
10 machine for sewing the two wall sides to each other. All these alternatives may provide units for formation of the wall in such ways that no metallic parts are used which could negatively affect goods intended to be placed in the packaging insert.

According to a one embodiment, the second pressing device may be
15 liftable such as to allow a formed partition wall to pass underneath. The second pressing device may be liftable by rotation around an axis B, extending perpendicular to axis A and in parallel to an extension plane of the insert material. Alternatively, the second pressing device may be configured to be lifted in a direction perpendicular to axis A and B.

20 The second pressing device being liftable may allow for a partition wall to pass underneath and for the partition walls for a packaging insert to be formed consecutively from the same piece of insert material.

In a further embodiment, the machine may comprise means for blowing or poking the insert material in a direction perpendicular to the axis A
25 to facilitate the forming of the partition wall into an erect position. Means for blowing or poking may assure that the wall forms into an erect position forming the partition wall. The machine may also comprise means for applying fastening means to the insert material, such as glue or adhesive, so that the partition wall sides may be further fixed in position, adhering to each
30 other. The means for blowing or poking may be a pushing unit configured to push the insert material, at a certain location, in a direction perpendicular to

axis A. Alternatively, it may be a blowing unit configured to blow compressed air toward the insert material, at a certain location, in a direction perpendicular to axis A. A further alternative is a vacuum unit creating a vacuum and thereby lifting the insert material in the direction to form the erect position. Yet
5 another possibility is a grasping unit grasping and pulling the material to form the erect position.

Further, as a compliment to or in replacement of the means for blowing or poking, the machine may comprise a perforating unit for perforating the insert material in order to facilitate the forming of a partition wall into an erect
10 position. The perforating unit may be configured to perforate the insert material from below, from above or moving from the side across the insert material. The perforation may be made by the perforating unit at a location of half the distance D from the second pressing device, at the location corresponding to the top of the partition wall to be formed. The position along
15 axis A at which the blowing or poking occurs may be selected depending on the distance D setting the height of the partition wall to be formed and may also depend on the thickness of the insert material. Preferably, the blowing or poking is performed at half the distance D between the first and the second pressing devices. Hence, the blowing or poking means may be moveable
20 along axis A to blow or poke on the insert material at a location depending on the selected distance D. The blowing or poking may thereby facilitate the insert material to be folded at the correct location to form the partition wall. The application of fastening means to the insert material may be performed by the blowing or poking means.

25 The machine may in one embodiment comprise means for facilitating the formation of the partition wall by physically acting on the insert material. Such means may comprise one of the above described poking means, blowing means, vacuum lifting unit, pushing unit, grasping unit and/or perforating unit for perforating the insert material at a partition wall top
30 location and/or for perforation at a partition wall base location. The pushing unit may in one embodiment comprise a blade arranged in a frame. The

frame may be formed around the transportation path of the insert material. In a resting state the blade may be located under the insert material, in a bottom section of the frame. The frame may extend perpendicular to the axis A. The frame may be moveable along axis A to be placed at the location where a pushing to facilitate to formation of the partition wall may be desired. When at the desired location, the blade may be moveable to push on a bottom side of the insert material. The blade may have a sharp edge to provide a sharp folding line when the partition wall is formed. The edge of the blade may further be provided with teeth to provide a perforation at the folding line when forming a partition wall. The means providing the movement of the blade may comprise a moveable sub-frame attached to the blade. The sub-frame may extend in the frame and at least partly surround the insert material that may extend through the frame. All of the pushing unit except the bottom section of the frame may be arranged above the insert material. By arranging the main part of the pushing unit above the insert material and not below, the pushing unit may be arranged out of the way of the bottom material. A larger angle of the bottom material transportation path when being directed to be parallel to the insert material may be provided. Undesired damaged to the bottom material may thereby be avoided.

According to another embodiment, the machine further may comprise a gripping device configured to pull the insert material along the axis A by seizing a partition wall and pulling along axis A away from the second pressing device. The gripping device configured to grasp and pull the insert material along the axis A may allow for different size partition inserts as the distance of movement may be adjusted between each formed wall i.e. the distance between each partition wall may vary. The distance which a formed partition wall is moved passed the planar surface of the second pressing device may further set a distance between the formed partition wall and a subsequently formed partition wall. Such movement of the insert material and the formed partition wall may thereby be selected independently for each formed partition wall. Hence, the distances between partition walls in the

formed packaging insert may be individually selected. Partition inserts of varying sizes and distance between the partition walls may thereby be formed using the same machine and insert material. By using the gripping device to move the insert material, the need of further components in the machine for
5 transporting the insert material may be avoided. In an initial stage, until a first partition wall or walls has been formed, the insert material may be fed manually or by an initial material transportation means in the machine.

In one embodiment, the second pressing device may, after formation of a partition wall, be configured to move away from the formed partition wall
10 such that the gripping device may grasp the newly formed partition wall and move the insert material by pulling said partition wall. The gripping device may thereby be configured to grasp a latest formed partition wall. The second pressing device may be configured to move such as to enable the gripping device to access said latest formed partition wall.

15 Further, in another embodiment, the gripping device may be configured to press the insert material toward a bottom material. The gripping device pressing the insert material toward a bottom insert material may force the insert material and bottom material into a fixed position relative each other.

The gripping device may comprise two linear parts, perpendicular to
20 axis A, and may take the form of a parallel gripping device. It may be configured to have an open position, as to allow a partition wall in-between the linear parts, and a closed position, when the linear parts have moved toward each other and press the insert material toward the bottom material.

According to another embodiment, the machine may comprise a paper
25 tray configured to feed a bottom material adapted to be fastened to the insert material by sewing, punching stapling, or using glue or adhesive. A bottom material may stabilize the packaging insert and may assure the partition walls stay stable and erect. The bottom material may be applied by fastening means such as glue or adhesive to further fix the bottom material to the insert
30 material and assure that the bottom and insert material are in fixed position relative each other.

Sewing or stapling may also be used as an alternative or in addition to glue or adhesive for further fastening or in case other fastening means should fail. A stapling or sewing device may be located in connection to a cutting device. The stapling device may staple at least one staple facing toward the
5 bottom material, to each side of a partition wall. The staples may keep the partition walls in an erect position if other fixation means should fail. Glue or adhesive may be applied at a location before the bottom material comes into contact with the insert material. A punching device may further be provided to perform a punching as described above.

10 Further, in another embodiment, the machine may further comprise a cutting device configured to cut-off the packaging insert at a desired length. The cutting device may be located downstream from the pressing and gripping devices. The cutting device may comprise a 180 degree turning device to facilitate positioning of the cutting device on the packaging insert for
15 cuts in close proximity to a partition wall. The cut may be performed in a linear motion by a knife, such as a rolling knife. The cutting device position may also be adjusted along axis A.

Brief Description of the Drawings

This and other aspects of the present invention now be described more
20 in detail, with reference to the appended drawings showing a currently preferred embodiment of the invention.

Figure 1 shows a flow chart of a method of the invention.

Figure 2 shows a perspective view of a machine according to an embodiment of the invention.

25 Figure 3 shows a detailed view of pressing devices according to an embodiment of the invention.

Figure 4 shows a detailed view of pressing devices in a pressing position according to an embodiment of the invention.

Figure 5 shows a perspective view of a movement of the second pressing device and insert material according to an embodiment of the invention.

Figure 6 shows a perspective view of a cutting device according to an embodiment of the invention.

Figure 7 shows a side view of a cutting device according to an embodiment of the invention.

Figure 8 shows a perspective view of a pushing unit according to an embodiment of the invention.

10

Description of Embodiments

The present invention will be described more fully hereinafter with reference to the accompanying drawings, in which preferred embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. In the drawings, like numbers refer to like elements.

In figure 1, the method 100 according to an embodiment of the present invention is exemplified as a flow chart. In the method 100, a first and a second pressing device 2, 3 are used for forming partition walls 5 of a packaging insert from an insert material 6. The first step 102 consists of transporting the insert material 6 along the axis A in the machine 1. Following, the second step 104 consists of the second pressing device 3 holding the insert material 6 in a fixed position. In the third step 106, the first pressing device 2 moves to a distance D from the second pressing device 3, corresponding to the double indented height of the partition wall 5 to be formed. Next, in the fourth step 108, the first pressing device 2 grasps and holds the insert material at the distance D from the second pressing device 3. Next, in the fifth step 110, the first pressing device 2 moves along the axis A

toward the second pressing device 3, and as the first pressing device 2 holds on to the insert material 6, the insert material 6 is simultaneously pushed toward the second pressing device 3. Following, in the last step 112, the first pressing device 2 has moved the full distance to the second pressing device 3 and presses the insert material 6 between the two pressing devices 2, 3 thereby forming the partition wall 5.

The machine 1 for producing packaging inserts according to an embodiment of the invention is illustrated in fig. 2. The machine 1 comprises a first pressing device 2, a second pressing device 3, a gripping device 4, and a cutting device 8. Further, a poke/blow device 11 to facilitate the formation of the partition walls 5.

The machine 1 also comprises linear motors 21, 41, 42 which control the linear movement of the first pressing device 2 and the gripping device 4 respectively.

In figure 2 the first pressing device 2 is in open position, fully retracted from the second pressing device 3. The distance D between the planar surface 2a of the first pressing device 2 and the planar surface 3a of the second pressing device corresponds to the double intended height of the partition wall 5 to be formed. The insert material 6 has been transported according to step 102 in fig. 1 and the second pressing devices 3 holds the insert material 6 in a fixed position, in accordance to step 104.

The first pressing device 2 can grasp and hold the insert material 6, as described in step 106, and is moveable by the linear motor 21 along the axis A, in direction X/X', and is configured to hold the insert material 6 to push it along axis A, toward the second pressing device 3 as illustrated in fig. 3.

In figure 3, the first pressing device 2 is illustrated pushing the insert material 6 toward the second pressing device 3, as described in step 108 in fig. 1. The insert material 6 may be blown or poked by the poke/blowing device 11 in a direction Y, perpendicular to the axis A, in order to facilitate the forming of a partition wall 5 in an erect position. Fastening means, such as glue or adhesive, may be sprayed or applied on the insert material 6 on an

inner side 5a corresponding to the inner walls of the partition wall 5 sides. The glue or adhesive may be applied by the same device 11 that pokes or blows the insert material 6 during pressing. The device 11 may comprise an extending part 11a to facilitate the blow or poke for the partition wall 5 to form
5 in the erect direction. The device may alternatively be located above the axis A (following the Y direction) and grip or create a vacuum from above to facilitate the formation of an erect partition wall 5.

The device 11 may also comprise a perforating unit for perforating the insert material 6 at the distance $D/2$, corresponding to the intended top of the partition wall 5. Perforation on either side of the insert material 6 may facilitate
10 the formation of the partition walls 5 into an erect position. The perforation may be used as a compliment to or in replacement of blowing, poking, gripping, vacuum or other means for aiding the insert material 6 in the direction of the erect position of the partition wall 5. The perforating unit may
15 be provided as a separate unit from the device 11. The perforating unit may be arranged above the insert material 6 configured to perforate the insert material from above. Alternatively, the perforating unit may be arranged to move from the side of and across the insert material to perforate. The
20 perforating unit may be a perforating roller knife, or a straight knife having perforating teeth or the like.

Fig. 4 shows the fifth and sixth step 110, 112 of fig. 1, wherein the first pressing device 2 presses the insert material 6 toward the second pressing device 3. The pressing devices 2, 3 are in pressing position, where the second pressing device 3 is in a fixed position toward which the insert
25 material 6 is pressed against. The insert material 6 is formed into an erect partition wall 5, extending in the Y direction. The linear motor 21 presses the first pressing device 2 toward the second pressing device 3 with the insert material 6 in between, as shown in fig. 4.

As illustrated in fig. 5, the second pressing device 3 is liftable in the
30 direction Y perpendicular to the axis A. The second pressing device 5 can be lifted by a rotation R_B around axis B, perpendicular to axis A in the plane of

the insert material 6. Alternatively, the second pressing device 3 can be lifted by a linear motor lifting the second pressing device 3 perpendicular to the axis A, in the Y direction (not shown). Lifting the second pressing device 3 allows the partition wall 5 to pass underneath as the insert material 6 is transported
5 along the axis A by the gripping device 4, corresponding to step 102 of fig. 1. In another embodiment, the axis B can be placed upstreams from the axis B illustrated in fig. 5, i. e. on the part of the second pressing device that is closest to the first pressing device, to allow for a rotation in the opposite direction of R_B as to save space and allow the gripping device to grasp a
10 formed partition wall further upstreams.

The gripping device 4 is controlled by two linear motors 41, 42 where the first linear motor 41 controls the movement in the Y direction and the second linear motor 42 controls the movement in the X/X' directions.

The gripping device 4 is arranged to fix the position of the partition wall
15 5 to a bottom material 7. Further, it is arranged to seize a partition wall 5 and move the insert material 6 along the axis A in the X direction. The movement transports the insert material 6 along the axis A such that a distance between the most recently formed partition wall 5 and the planar surface 3a second pressing device 3 corresponds to the distance between two consecutive
20 partition walls 5. The gripping device 4 is configured to grasp the latest formed partition wall 5, or a previously formed partition wall 5.

The gripping device 4 comprises two linear parts extending perpendicular to axis A, in parallel to the direction Y. The gripping device 4 may be described as a parallel gripper.

25 Further, fig. 5 shows the retraction along axis A in the X' direction of the first pressing device 2, as it retracts back to the open position (illustrated in fig. 2).

The bottom material 7 is fed from a paper tray 12, schematically shown in fig. 5. Fastening means such as glue or adhesive is applied on the side
30 facing the insert material 6 by the gluing means 10. The bottom material 7 and the insert material 6 are fastened to each other by the gripping device 4

pressing the formed partition wall 5 on the insert material 6 toward the bottom material 7. The insert material 6 and the bottom material 7 can alternatively, or as complement, be fastened to each other by sewing or stapling or a combination of the presented alternatives. Such sewing and/or stapling can
5 be performed at ends of a packaging insert comprising one or more formed partition walls 5. Hence, the gluing device 10 may be removed and replaced by a sewing or stapling device 9.

A cutting device 8, exemplified in fig. 6, is arranged downstream in relation to the pressing devices 2, 3 and the gripping device 4, and is
10 configured to cut the insert material 6 with formed partition walls 5 into packaging inserts at desired lengths. The cutting device 8 comprises a cutting arm 83 to which a blade 81 is mounted and two cutting tracks 82a, 82b. The cutting device 8 extends along an axis C, around which the cutting arm 83 can perform a rotation R_c . The blade 81 is also rotatable R_k in the plane of
15 axis C. The cutting device 8 has two cutting positions 82a, 82b in order to facilitate cutting close to or on either side of a partition wall 5. The cutting positions 82a, 82b are chosen by 180 degrees rotation of the cutting arm 83 around axis C and the distance between them corresponds to the thickness of the cutting arm 83. The cutting device 8 can be arranged with the cutting arm
20 83 extending in parallel with the extension plane of the insert material 6, or alternatively perpendicular to said extension plane.

The blade 81 may in one embodiment be arranged to cut the insert material 6 in an angle slightly less than 90 degrees. The blade 81 can thereby
easier cut close to a partition wall without interfering with the partition wall.

25 Fig. 7 illustrates a further alternative cutting device 8' which comprises two blades 81a, 81b. The two blades 81a, 81b are arranged on a pivoting arm 84 which is rotatable around the axis D. The axis D extends in parallel with axis A. The cutting device 8' is moveable along axis A to provide cutting at a desired location. The blades 81a, 81b and the pivoting arm 84 are further
30 moveable in a direction perpendicular to axis A so as to provide the cutting action onto the insert material 6.

The blades 81a, 81b are inclined relative to the insert material 6 and axis A, providing an angle slightly less than 90 degrees, for instance in the range 70-89 degrees. As seen in fig. 7, the blades 81a, 81b are inclined such that one of the blades 81b provides an inclination in one direction, and the
5 other blade 81a an inclination in the other direction when in contact with the insert material 6. This provides inclined blades enabling cutting action close to a partition wall 5 in either direction.

The pivoting action of the pivoting arm 84, thereby selecting blade 81a, 81b, may be controlled by a motor, or directly affected by the movement of
10 the cutting device 8', such that movement in one direction across the insert material 6 provides cutting action by one blade 81a, and movement in the opposite direction across the insert material 6 provides cutting action by the other blade 81b.

The cutting device 8' may comprise corresponding cutting tracks 82a,
15 82b as the cutting device 8.

The stapling device 9 is arranged to staple the insert material 6 to the bottom material 7. The staples can be positioned on the insert material 6 in proximity to the angle between the partition wall 5 and insert material 6.

In an embodiment wherein the insert material 6 and the bottom
20 material 7 is sewn together, the stapling device 9 can be replaced by a sewing device, configured to sew the two materials 6, 7 to each other.

Fig. 8 illustrates an embodiment of the device 11 for blowing or poking the insert material 6 in the form of a pushing unit 90. The pushing unit 90 comprises a frame 92 configured to be arranged such that the insert material
25 6 extends through an opening 96 of the frame 92. At a bottom section 93 of the frame 92 a blade 94 is arranged. The blade 94 may comprise a knife with a sharp edge and/or teeth for perforating the insert material. The pushing unit 90 further comprises a sub-frame 95 to which the blade 94 is attached. The sub-frame 95 is configured to be moveable in the direction Y when the insert
30 material 6 extends through the frame 92. The blade 94 will thereby push the insert material 6 in the direction Y. The pushing unit 90 is further moveable

along axis A to be positioned at the half distance D. When moving the blade in direction Y, the pushing unit 90 will facilitate the formation of a partition wall. If the blade 94 is sharp and/or provided with teeth, the folding of the insert material 6 to form a partition wall 5 is further facilitated. A linear motor
5 may be arranged to move the sub-frame 95 in the direction Y. Another linear motor may be arranged to move the pushing unit 90 along axis A to the desired position.

In the drawings and specification, there have been disclosed preferred embodiments and examples of the invention and, although specific terms are
10 employed, they are used in a generic and descriptive sense only and not for the purpose of limitation, the scope of the invention being set forth in the following claims.

CLAIMS

1. Method (100) for producing a packaging insert by forming at least one partition wall (5) from an insert material (6) using a first pressing device (2) and a second pressing device (3), the method comprising the steps of:

5 transporting (102) the insert material along an axis A,
 holding (104) the insert material in a fixed position by the second pressing device,
 moving (106) the first pressing device along axis A to a distance D from the second pressing device corresponding to the double intended
10 height of the partition wall, and
 holding (108) and pressing (110) the insert material by means of the first pressing device towards the second pressing device along axis A such that the insert material is pressed between the first and the second pressing device into an erect position forming (112) a partition wall.

15

2. Method (100) according to claim 1, comprising the step of lifting the second pressing device (3) as to allow a formed partition wall (5) to pass underneath the second pressing device.

20 3. Method (100) according to claim 1 or 2, comprising a step of blowing or poking the insert material (6) in a direction (Y) perpendicular to the axis A to facilitate the forming of the partition wall (5) into the erect position.

25 4. Method (100) according to any of the previous claims, further comprising a step of moving a previously formed partition wall (5) along the axis A, using a gripping device (4), such that the insert material (6) is moved a distance along the axis A, wherein the moved distance sets the distance between a next partition wall to be formed and a preceding partition wall.

5. Method (100) according to claim 4, comprising a step of feeding a bottom material (7) from a paper tray (12) and fixing the bottom material to the insert material (6) by sewing, punching or stapling or by using glue or adhesive.

5

6. Method (100) according to claim 4 or 5, comprising a step of pressing the insert material (6) towards the bottom material (7) using the gripping device (4).

10

7. Method (100) according to any of the previous claims, further comprising a step of cutting the packaging insert at a desired length by a cutting device (8).

15

8. A packaging insert produced by the method according to any of the preceding claims.

9. Machine (1) for producing a packaging insert by forming at least one partition wall (5) from an insert material (6), characterized in that the machine comprises a first pressing device (2) and a second pressing device (3),

20 wherein

an insert material is transportable in the machine along an axis

A,

the second pressing device is configured to hold the insert material in a fixed position,

25

the first pressing device is configured to be moved along the axis A to a distance from the second pressing device corresponding to the double intended height of the partition wall, and

the first pressing device is further configured to hold and move the insert material towards the second pressing device along axis A such that

30

the insert material is pressed between the first and the second pressing device into an erect position forming a partition wall.

10. Machine (1) according to claim 9, wherein the second pressing device (3) is liftable such as to allow a formed partition wall (5) to pass underneath.

5

11. Machine (1) according to claim 9 or 10, further comprising means (11) for blowing or poking the insert material (6) in a direction perpendicular to the axis A to facilitate the forming of the partition wall (5) into an erect position.

10

12. Machine (1) according to any of the claims 9-11, further comprising a gripping device (4) configured to pull the insert material (6) along the axis A by seizing a formed partition wall (5) and pulling along axis A away from the second pressing device (3).

15

13. Machine (1) according to claim 12, wherein the gripping device (4) is configured to press the insert material (6) towards a bottom material (7).

14. Machine (1) according to any of the claims 9-13, further comprising a paper tray (12) configured to feed a bottom material (7) adapted to be fastened to the insert material (6) by sewing, punching, stapling, or using glue or adhesive.

20

15. Machine (1) according to any of the claims 9-14, further comprising a cutting device (8) configured to cut-off the packaging insert at a desired length.

25

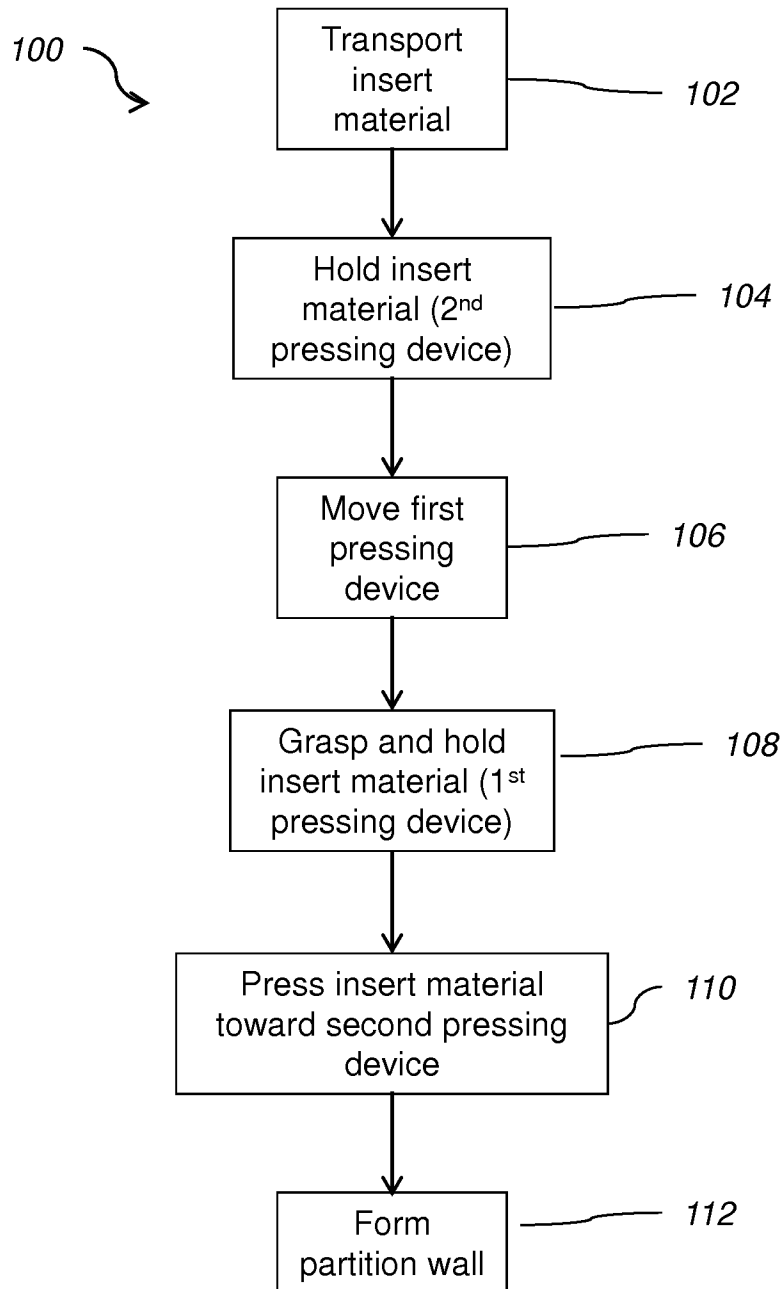


Fig. 1

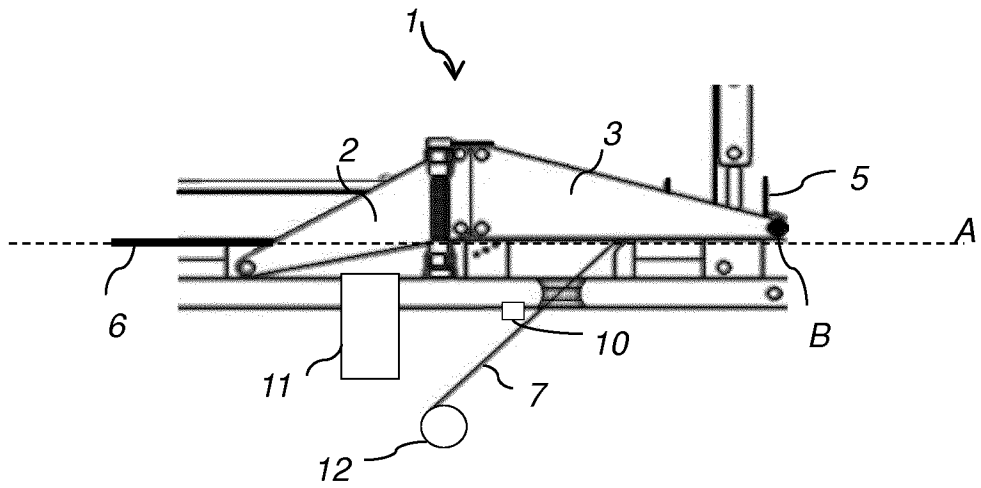


Fig. 4

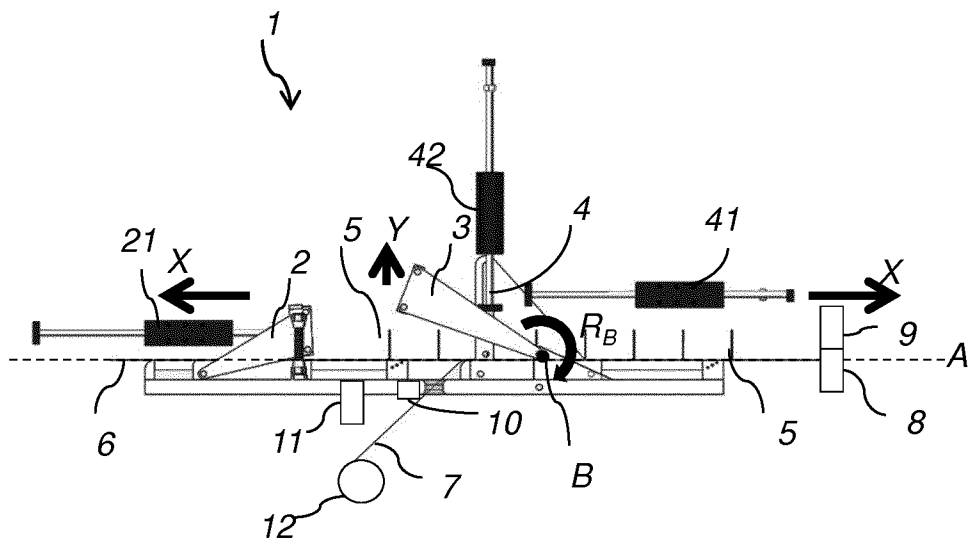


Fig. 5

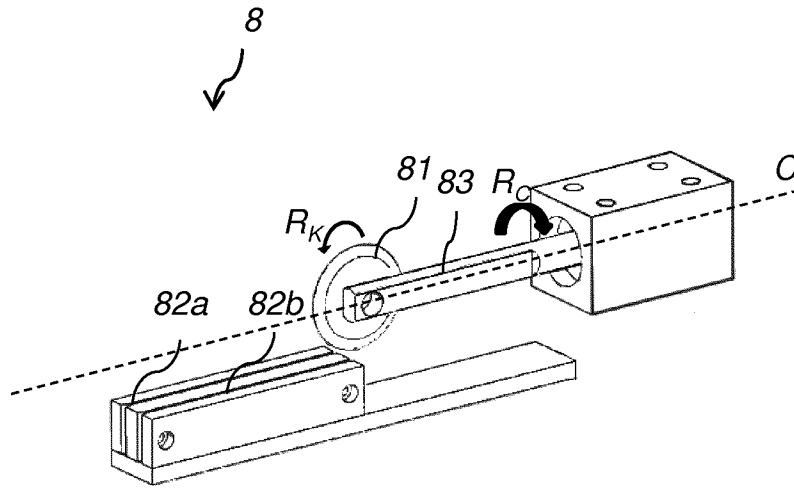


Fig. 6

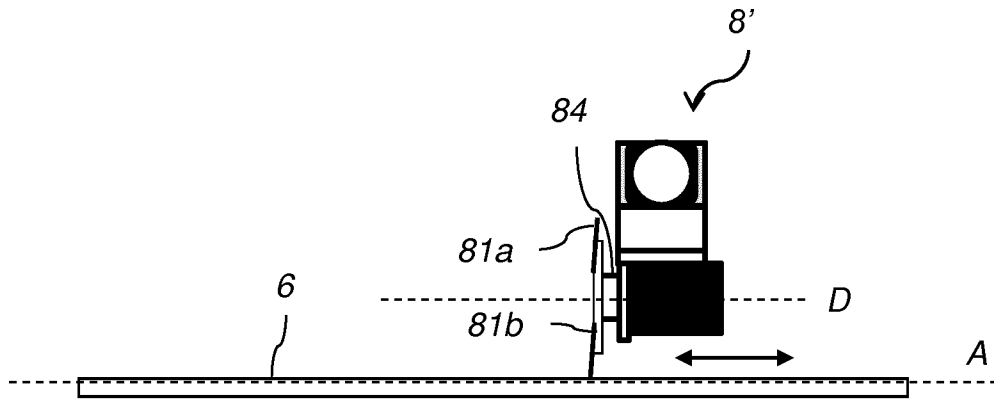


Fig. 7

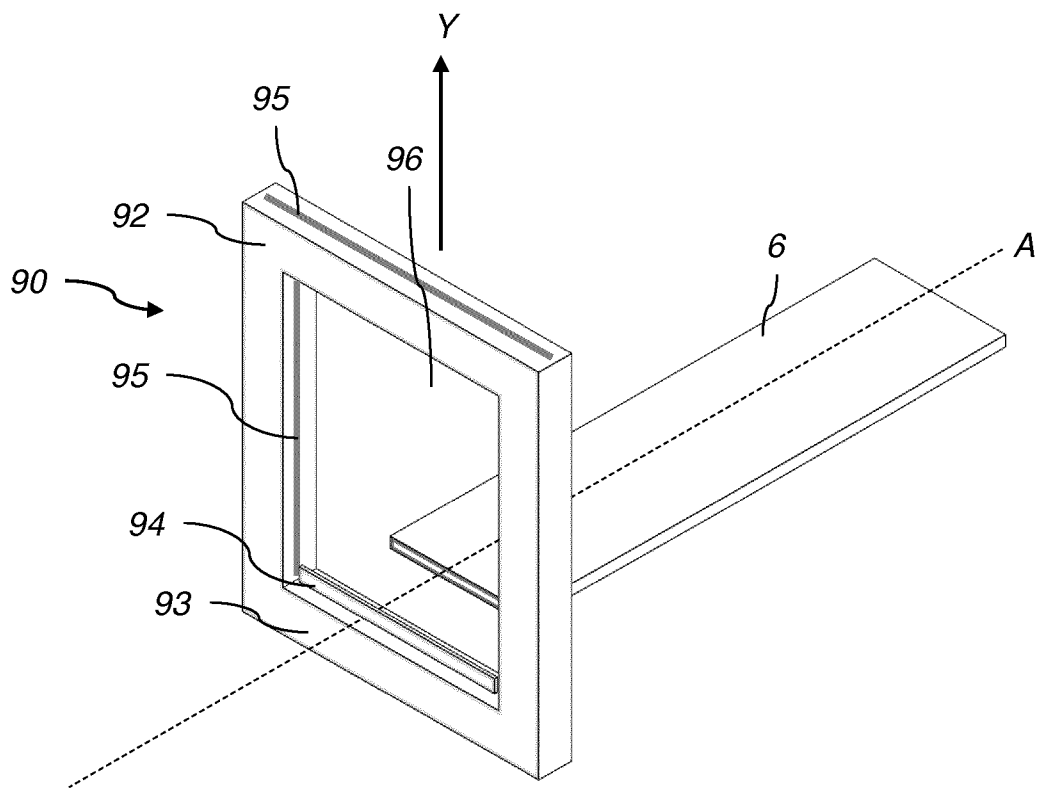


Fig. 8

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2017/055066

A. CLASSIFICATION OF SUBJECT MATTER
INV. B31D5/00
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
B31D B65D B31F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 5 200 013 A (TRABER ROMAN [CH]) 6 April 1993 (1993-04-06) column 3, line 35 - column 4, line 5 column 4, line 67 - column 5, line 30 column 5, line 31 - column 6, line 22; figures 1-8	1,8,9,14 2-7, 10-13,15
X A	US 4 894 113 A (HOFER OTTO J [LI]) 16 January 1990 (1990-01-16) column 1, line 15 - line 66; figures 1-16	8 1-7,9-15

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 5 May 2017	Date of mailing of the international search report 16/05/2017
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Sundqvist, Stefan
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2017/055066

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