(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 891 608 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
08.07.2015 Bulletin 2015/28

(21) Application number: **12883761.4**

(22) Date of filing: **31.08.2012**

(51) Int Cl.:
B65B 63/02 *(2006.01)* ***B65B 29/02*** *(2006.01)*

(86) International application number:
PCT/JP2012/072187

(87) International publication number:
WO 2014/033918 (06.03.2014 Gazette 2014/10)

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

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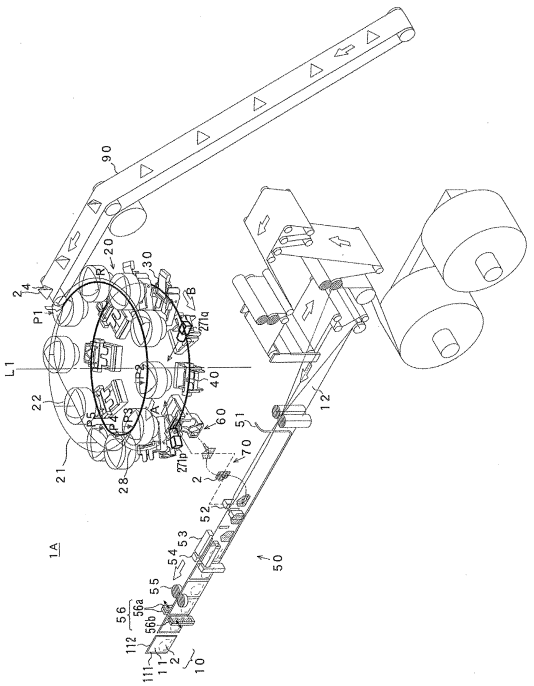
(54) MANUFACTURING METHOD AND MANUFACTURING DEVICE FOR EXTRACT BAG PACKAGE

(57) A method for manufacturing a package 10 in which an extraction bag 2 having four triangular surfaces is stored in an exterior bag 11 includes: a direction regulation step of regulating a direction of the extraction bag 2 to be a specified direction; a pressing step of pressing the extraction bag 2 so that one surface or one side of the extraction bag 2 is folded into two; a folding step of folding the extraction bag 2 by surface-pressing of the extraction bag 2 from both sides of surfaces that are overlapped upon being folded into two; and a packaging step of forming a package in which the folded extraction bag 2 is stored in the exterior bag. According to the method, when a trigonal-pyramid pack is packaged with an exterior bag 11, the trigonal-pyramid pack can be closed in the exterior bag in the state of being folded flat in a fixed form.

FIG. 1



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Description

Technical Field

[0001] The present invention relates to a method and apparatus for packaging an extraction bag to obtain a package in which the extraction bag having four triangular surfaces is closed in an exterior bag.

Background Art

[0002] Tea bags of black tea, green tea, herb tea and the like, as well as extraction bags of soup such as dried sardine and dried bonito are made from a belt-like water filter sheet. The water filter sheet is formed into tetrahedral or pyramid-like bags having four triangular surfaces, and each of the bags is filled with extraction materials such as tea leaves so as to be used as so-called a trigonal-pyramid pack. Examples of the trigonal-pyramid pack include a trigonal-pyramid pack with a thread tag in which a hanging thread and a tag to be used as a knob piece are attached to its outer surface.

[0003] The trigonal-pyramid packs are widely marketed in the form of being individually packaged with a flat bag-type exterior bag which is formed of an air-impermeable outer packaging film. Individual packaging machines which industrially perform individual packaging of trigonal-pyramid packs have also been known (Patent Literatures 1 and 2).

Citation List

Patent Literature

[0004]

Patent Literature 1: International Publication No. WO/2009/100751
Patent Literature 2: International Publication No. WO/2009/101686

Summary of Invention

Technical Problem

[0005] In a conventional individual packaging machine which individually packages trigonal-pyramid packs, a trigonal-pyramid pack is fed to a cylindrical guide and is pressed into an exterior bag by a pusher, and the exterior bag is sealed so as to manufacture a package of the trigonal-pyramid pack. Since an extraction bag sheet to form the triangular pack is a fabric, such as a thin nonwoven fabric or nylon gauze, the trigonal-pyramid pack is easily squashed inside the exterior bag by simple action of being pressed by the pusher.

[0006] However, in the package manufactured in this manner, the triangular pack is irregularly squashed, which may provide the pack with an unnecessary thickness and makes the pack bulky. As a result, an outer size of the pack may become unstable. Furthermore, when the triangular pack has a thread tag, the tag may be folded, the tag may be detached from the trigonal-pyramid pack, or a hanging thread is bit into a seal portion at the edge of the exterior bag in the process of the triangular pack being squashed. This leads to increase in the possibility of producing defective products.

[0007] Accordingly, an object of the present invention is to package a trigonal-pyramid pack with an exterior bag by closing the trigonal-pyramid pack in the exterior bag in the state of being folded flat in a fixed form.

Solution to Problem

[0008] The present inventors have found that a trigonal-pyramid pack can be folded flat if one side or one surface of the trigonal-pyramid pack is folded into two and then surface-pressing of the trigonal-pyramid pack is performed and that the above-stated object can be achieved by packaging the flat-folded trigonal-pyramid pack. The present invention has been completed based on the finding.

[0009] That is, the present invention is a method for manufacturing a package in which an extraction bag having four triangular surfaces is stored in an exterior bag, the method including:

a direction regulation step of regulating a direction of the extraction bag to be a specified direction;
a pressing step of pressing the extraction bag so that one surface or one side of the extraction bag is folded into two;
a folding step of folding the extraction bag by surface-pressing of the extraction bag from both sides of surfaces which are overlapped upon being folded into two; and
a packaging step of forming a package in which the folded extraction bag is stored in the exterior bag.

[0010] In the packaging method in particular, the extraction bag is an extraction bag with a thread tag in which a tag joined to a hanging thread is attached to a triangular surface, and
in the direction regulation step, the direction of the extraction bag is regulated to be a direction in which the triangular surface with the tag attached thereto is not folded in the folding step.

[0011] Moreover, the present invention is an apparatus for manufacturing a package in which an extraction bag having four triangular surfaces is stored in an exterior bag, the apparatus including:

a direction regulation device for regulating a direction of the extraction bag to be a specified direction;
a pressing device for pressing the extraction bag so that one surface or one side of the extraction bag is folded into two;

a folding device for performing surface-pressing of the extraction bag from both sides of surfaces that are overlapped upon being folded into two so as to fold the extraction bag flat; and

a package forming device for packaging the folded extraction bag with an outer packaging film so as to form a package in which the extraction bag is stored in the exterior bag formed of the outer packaging film.

[0012] Particularly, in the apparatus for manufacturing a package, the extraction bag is an extraction bag with a thread tag in which a tag joined to a hanging thread is attached to a triangular surface, and

the direction regulation device regulates the direction of the triangular surface with the tag attached thereto to be a direction in which the surface is not pressed inside by the pressing device.

Advantageous Effects of Invention

[0013] According to the present invention, the trigonal-pyramid pack can be folded flat, and a package in which the flat folded trigonal-pyramid pack is stored in an exterior bag can be obtained. Therefore, it becomes possible to prevent the package of the trigonal-pyramid pack from becoming unnecessarily bulky.

[0014] Furthermore, in the case of the trigonal-pyramid pack with a thread tag, a package can be obtained in which a trigonal-pyramid pack is folded flat without the tag being folded and is sealed in an exterior bag. Therefore, in individual packaging of the trigonal-pyramid packs, it becomes possible to prevent production of defective products having the tag being folded, with the tag being detached from the trigonal-pyramid pack, or having the hanging thread being bit into a seal section at the edge of the exterior bag.

Brief Description of Drawings

[0015]

FIG. 1 is a schematic view of a package manufacturing apparatus 1A of an embodiment.

FIG. 2 is a longitudinal sectional view of the package manufacturing apparatus 1A of the embodiment.

FIG. 3 is an enlarged partial view of the longitudinal sectional view of the package manufacturing apparatus 1A of the embodiment.

FIG. 4A is a longitudinal sectional view of a hopper-type holding device.

FIG. 4B is a top view of the hopper-type holding device.

FIG. 4C is a cross sectional view of the hopper-type holding device along line A-A of FIG. 4A.

FIG. 4D is a cross sectional view of the hopper-type holding device along line B-B of FIG. 4A.

FIG. 5(1) is a perspective view of an extraction bag with a thread tag before the tag is stripped, while FIG. 5(2) is a perspective view of the same after the tag is stripped.

FIG. 6A is an explanatory view of the extraction bag being folded in a pressing device.

FIG. 6B is an explanatory view of the extraction bag being folded in the pressing device.

FIG. 7 is a top view of a folding device which received the extraction bag.

FIG. 8A is a cross sectional view of the folding device which received the extraction bag along line A-A of FIG. 7.

FIG. 8B is an explanatory view of the action of the folding device.

FIG. 8C is an explanatory view of the action of the folding device.

FIG. 8D is an explanatory view of the action of the folding device.

FIG. 9A is a top view of the pressing device.

FIG. 9B is a side view of the pressing device.

FIG. 9C is a side view of the pressing device of FIG. 9A as viewed from B direction.

FIG. 10 is an explanatory view of the action of the pressing device and the folding device.

FIG. 11 is a side view of an extraction device.

FIG. 12 is a side view of the extraction device and a transfer device.

FIG. 13 is an explanatory view of a modified example of installation positions of tag direction confirmation cameras.

FIG. 14A is a schematic view of a package manufacturing apparatus 1B of an embodiment.

FIG. 14B is a schematic view of a direction regulation device portion in the package manufacturing apparatus 1B of the embodiment.

FIG. 15 is a schematic view of a package manufacturing apparatus 1C of an embodiment.

FIG. 16 is an explanatory view of the function of the package manufacturing apparatus 1C of the embodiment.

Description of Embodiments

[0016] Hereinafter, the present invention will be described in detail with reference to the drawings. Note that identical or similar component members are designated by identical reference numerals throughout the respective drawings.

[0017] FIG. 1 is a schematic view of a manufacturing apparatus 1A which performs a package manufacturing method of one embodiment of the present invention. The package manufacturing apparatus 1A is an apparatus configured to manufacture a package 10 in which an extraction bag 2 having four triangular surfaces, such as a tetrahedral tea bag, is individually packaged with an exterior bag 11 that is formed into a flat bag by three-side sealing. The package manufacturing apparatus 1A generally includes: a direction regulation device 20 which performs a direction regulation step of regulating the di-

rection of the extraction bags 2 which are continuously fed from a belt conveyer 90 to be a specified direction; a pressing device 30 which performs a pressing step of pressing the extraction bag 2 so that one surface or one side of the extraction bag 2, which was fed from the direction regulation device 20 to have the specified direction, is folded into two; a folding device 40 which performs a folding step of folding the extraction bag 2 flat by surface-pressing of the extraction bag 2 from both front and rear side of surfaces that are overlapped upon being folded into two by the pressing device 30; and a package forming device 50 which performs a packaging step of forming a package 10 by individually packaging the extraction bag 2 folded flat by the folding device 40 with an outer packaging film 12.

[0018] Note that the extraction bag 2 to be fed to the package manufacturing apparatus 1A may be manufactured by a publicly known method which includes: forming a belt-like water filter sheet into a cylindrical shape by bonding opposite edges of the water filter sheet to each other; and alternately forming a first horizontal seal obtained by squashing the cylindrical body and welding/melt-cutting the cylindrical body in a width direction and a second horizontal seal obtained by welding/melt-cutting the cylindrical body in another width direction that is orthogonal to the previous width direction while filling contents in between these horizontal seal formations. For example, the extraction bag 2 may be an extraction bag with a thread tag as illustrated in FIG. 5(1), in which a tag 4 joined as a knob piece to one end of a hanging thread 3 of the extraction bag 2 is attached to a triangular surface of the extraction bag 2. When the extraction bag 2 with a thread tag is used, the tag 4 is stripped from the surface of the extraction bag 2, so that a bag body 2' can be hung with a hanging thread 3 that extends from the tag 4 as illustrated in FIG. 5(2). Examples of a more concrete method for manufacturing such an extraction bag 2 include a method disclosed in International Publication No. WO/2011/61846.

[0019] FIG. 2 is a longitudinal sectional view of part of the package manufacturing apparatus 1A in which the direction regulation device 20, the pressing device 30, and the folding device 40 are incorporated. FIG. 3 is an enlarged view of the vicinity of a hopper-type holding device 22 included in the direction regulation device 20.

[0020] The direction regulation device 20 has a plurality of hopper-type holding devices 22 mounted on an upper table 21 which rotates around a shaft L1 in a direction of arrow A in FIG. 1. FIG. 4A is a longitudinal sectional view of the hopper-type holding device 22, and FIG. 4B is a top view of the hopper-type holding device 22. Provided in the bottom of each hopper-type holding device 22 is a placement section 23 formed to have a triangular hole in a transverse section so that one triangular surface of the extraction bag 2 goes therein. The bottom of the placement section 23 is formed from a shutter 24. The shutter 24 takes a position of closing the bottom of the placement section 23 as illustrated with a dashed line in FIG. 4B and a position of opening the bottom of the placement section 23 as illustrated with a two-dot chain line in the same drawing by means of a cam mechanism including a cam 241 and a cam follower 242 (FIG. 3).

[0021] The direction regulation device 20 has a rocking mechanism 25 including a rocking cylinder 251, a rocking cam 252, and a rocking cam follower 253 so that oscillation can be provided to the extraction bag 2 retained by the hopper-type holding device 22 in a rocking region R that is a specified range in the direction of arrow A starting from a position P1 where the hopper-type holding device 22 receives the extraction bag 2 from the belt conveyer 90. Even if the triangular surface of the extraction bag 2 does not fit into the placement section 23 at the beginning when the extraction bag 2 is fed to the hopper-type holding device 22 from the belt conveyer 90, oscillation by the rocking mechanism 25 is applied to the extraction bag 2 on the placement section 23 in the rocking region R as the hopper-type holding device 22 moves on the upper table 21. As a result, the oscillation helps the triangular surface of the extraction bag 2 to be fitted into the placement section 23, and thereby the direction of the extraction bag 2 is regulated to be aligned with the direction of the triangular hole of the placement section 23.

[0022] The rocking mechanism 25 which applies oscillation to the extraction bag 2 retained on the hopper-type holding device 22 is not limited to the aforementioned example in which the rocking cylinder 251 is used. Various mechanisms using motors and cranks may be provided instead.

[0023] As illustrated in FIG. 4C, the direction regulation device 20 also has, as a placement section positioning mechanism 26 which sets the placement section 23 in a specified direction, positioning recess sections 261 provided at intervals of 120 degrees on the periphery of the lateral surface of the hopper-type holding device 22, and a positioning ball plunger 262. By pressing the positioning ball plunger 262 to the positioning recess sections 261, the triangular hole of the placement section 23 may be fixed in the specified direction. Here, the direction of the placement section 23 is adjusted to be the direction in which one surface or one side of the extraction bag 2 is folded into two in the downstream pressing device 30. This makes it possible to finely fold the extraction bag 2.

[0024] Further, the direction regulation device 20 has a tag direction regulation mechanism 27 which regulates, when the extraction bag 2 is an extraction bag with a thread tag, the direction of the tag 4 of the extraction bag 2 which was fitted into the placement section 23, so as to prevent the tag 4 from being folded by the pressing device 30 and/or the folding device 40 on the downstream side. More specifically, as illustrated in FIGS. 1 and 2, in order to enable the direction of the tag 4 of the extraction bag 2 to be detected at an observation position P2 downstream from the rocking region R, two tag direction confirmation cameras 271 (271p, 271q) are provided to horizontally observe the extraction bag 2, which is at the

observation position P2, from three directions, and a CPU 272 is provided for controlling the cameras 271. As illustrated in FIGS. 4A and 4D, inspection holes 273 for allowing the tag direction confirmation cameras 271 (271p, 271q) to observe the extraction bag 2, which has been fitted into the placement section 23, are formed on the lower lateral surface of the hopper-type holding device 22 at intervals of 120 degrees. Positioning holes 274 (FIG. 4B) are also provided on the periphery of the upper surface of the hopper-type holding device 22 at intervals of 120 degrees, and an engaging pin 275 which can be inserted and removed to/from the positioning hole 274 is provided at a tag direction adjustment position P3 downstream of the observation position P2.

[0025] It is to be noted that in the present embodiment, the direction in which the extraction bag 2 fitted into the placement section 23 is pressed by the pressing device 30 on the downstream is the direction toward the shaft L1 that is the center of rotation of the upper table in plan view as illustrated with arrow X in FIG. 4D.

[0026] The engaging pin 275 moves up and down by a lifting cylinder 276, and moves in a direction of arrow q (FIG. 4B) on the level plane by 120 degrees at a time with a rotary motor 277. Accordingly, the engaging pin 275 is inserted into the positioning hole 274 at the tag direction adjustment position P3 and the engaging pin 275 is moved in the direction of arrow q by 120 degrees at a time, so that the direction of the placement section 23 can be changed.

[0027] Further, when one surface abc of the extraction bag 2 (vertexes being abcd) is pressed inside and thereby folded into two by the pressing device 30 on the downstream side as illustrated with a dashed line in FIG 6A(1), the surface which is not folded is a surface bcd which is generally parallel to the pressing direction as illustrated in FIG 6A(2). Moreover, when one side ab of the extraction bag 2 is pressed inside and thereby folded into two by the pressing device 30 as illustrated with a dashed line in FIG 6B(1), the surface which is not folded is a surface bcd and a surface acd which face the side ab that is folded into two as illustrated in FIG 6B(2).

[0028] Accordingly, in order to set the surface of the extraction bag 2 with the tag 4 attached thereto as the surface which is not folded by the pressing device 30 as described above, the tag direction regulation mechanism 27 adjusts the direction of the extraction bag 2 to be a specified direction by rotating the placement section 23 by 120 degrees at a time with use of the engaging pin 275 based on the observation result with the tag direction confirmation cameras 271p and 271q. In other words, when the tag is observed with the tag direction confirmation camera 271p illustrated in FIG. 4D (when the tag is present on the surface (p) of the extraction bag 2), the placement section 23 is rotated by 120 degrees clockwise so that the tag is positioned on the surface (r). When the tag is observed with the tag direction confirmation camera 271q (when the tag is present on the surface (q) of the extraction bag 2), the placement section 23 is rotated by 120 degrees counterclockwise so that the tag is positioned on the surface (r). When the tag is not observed with both the tag direction confirmation cameras 271p and 271q, then the tag is either on the surface (r) of the extraction bag 2 or on the surface facing the bottom of the placement section 23. Therefore, rotation of the placement section 23 is not performed.

[0029] After the direction of the extraction bag 2 is adjusted to be the specified direction at the tag direction adjustment position P3, the hopper-type holding device 22 starts to descend with the aid of the cam mechanism including a hopper lifting cam 221 and a hopper lifting cam follower 222 at a hopper descend start position P4 that is downstream from the position P3 as illustrated in FIG. 3, and comes closer to a receiving position P5 of the extraction bag 2 on a lower table 28. Then, the shutter 24 of the hopper-type holding device 22 opens at the receiving position P5, and the extraction bag 2 is dropped to the folding device 40 on the lower table 28. Then, the shutter 24 is closed, and the hopper-type holding device 22 ascends and receives supply of the extraction bag 2 again at the position P1 from the belt conveyer 90.

[0030] In the package manufacturing apparatus 1A of the present embodiment, the pressing device 30 and the folding device 40 are mounted on the lower table 28 which rotates around the shaft L1 in a direction of arrow B in FIG. 1.

[0031] FIG. 7 is a top view of the folding device 40 which has received the extraction bag 2 at the receiving position P5, and FIG. 8A is a cross sectional view along line A-A. As illustrated in the drawings, the folding device 40 includes an upper plate 41 having a flat surface with a recessed shape, a lower plate 42 having a flat surface with a projecting shape, and a fixing plate 43 placed in parallel with and behind the lower plate 42 (at the side of the rotation center of the lower table 28).

[0032] In order to rotate the upper plate 41, the lower table 28 includes a cam mechanism including an upper plate cam 411 and an upper plate cam follower 412. With this mechanism, a slider 413 moves back and forth on a rail 414, and one end of an articulated arm 416 rotates around a shaft L3 via a rod 415, whereby the upper plate 41 rotates around a shaft L2. Accordingly, the upper plate 41 takes a position opened to the lower plate 42 as illustrated in FIG. 8A and a position closed to the lower plate 42 as illustrated in FIGS. 8C and 8D. FIG. 8C is a view of the upper plate 41 in the closed state as viewed from the A-A direction of FIG. 7 as in the case of FIG. 8A, and FIG. 8D is a side view of the upper plate 41 in the closed state as viewed from the B-B direction of FIG. 7.

[0033] In order to rotate the lower plate 42, the lower table 28 includes a lower plate cam 421 and a lower plate cam follower 422. Consequently, a slider 423 moves back and forth on a rail 424, and a lower plate fixture 426 rotates around the shaft L3 via a rod 425, while the lower plate 42 mounted on the lower plate fixture 426 also rotates. Accordingly, the lower plate 42 takes a position at which the plate surface is leveled as illustrated in FIGS.

8A and 8B, and a position at which the plate surface has been rotated to be generally vertical as illustrated in FIG. 8C.

[0034] In the present invention, the pressing device 30 is a device for pressing so that one surface or one side of the extraction bag 2 fed from the hopper-type holding device 22 is folded into two. In the present embodiment, as illustrated in FIG. 9A, the pressing device 30 includes a tabular pressing plate 31 for pressing one side ab of the extraction bag 2 (vertexes being abcd) fed onto the lower plate 42 of the folding device 40. The pressing device 30 also includes two pressing plates 31 so that one sides of two extraction bags 2 may respectively be folded into two.

[0035] FIG. 9B is a side view of the pressing device 30 of FIG. 9A as viewed from A direction, and FIG. 9C is a side view of the pressing device 30 of FIG. 9A as viewed from B direction.

[0036] As illustrated in FIGS. 9B and 9C, the pressing device 30 has a reciprocating motor 311 and a lifting motor 312. By moving a slider 314 back and forth on a rail 313 with the reciprocating motor 311, the pressing plate 31 reciprocates with respect to the extraction bag 2 in a horizontal direction x. Moreover, by ascending and descending a table 315 with the lifting motor 312, the pressing plate 31 ascends and descends. By combining the reciprocation motion and the ascending/descending motion of the pressing plate 31 and also combining opening and closing motions of the upper plate 41 and the lower plate 42 of the above-mentioned folding device 40, the extraction bag 2 can be folded as illustrated in FIG. 10. In short, the pressing plate 31 is pressed into one side ab of the extraction bag 2 fed onto the lower plate 42 of the folding device 40.

[0037] Next, the upper plate 41 of the folding device 40 is rotated, and surface-pressing of the extraction bag 2 is performed from both sides so that a surface S (FIG. 8B) overlapped by folding the side ab into two is held by the upper plate 41 and the lower plate 42 (FIG. 10(2)), so that the extraction bag 2 is folded flat (FIGS. 10(3) and 8C). In the process of folding the extraction bag 2 flat, the pressing plate 31, whose plate surface is inclined with respect to the level plane, is moved downward while gradually being advanced so as to press the extraction bag 2 (FIG. 8A). Then, after the extraction bag 2 is folded flat by laying the upper plate 41 on top of the lower plate 42, the pressing plate 31 is moved upward while being retreated (FIG. 8B), and the pressing plate 31 is drawn out from the extraction bag 2 (FIGS. 10(4) and 8C). Therefore, the pressing plate 31 does not hinder folding of the extraction bag 2.

[0038] Next, as illustrated with the arrows in FIGS. 10(5) and 8C, the lower plate 42 is rotated to detach the lower plate 42 from the flat folded extraction bag 2. As a result, part of the flat folded extraction bag 2 at the side of the rotation center of the lower table 28 is put in the state of being held in between the fixing plate 43 and the upper plate 41. However, since the upper plate has a recessed shape, the extraction bag 2 can newly be held through a clearance in the center of the recessed shape, so that the extraction bag 2 can be taken out of the folding device 40 in the state of being folded and be sent to the package forming device 50 which forms packages.

[0039] The package forming device 50 is configured to package the extraction bag 2 with an outer packaging film to form a package 10, in which the flat folded extraction bag 2 is stored in a flat bag-type exterior bag 11 made of the outer packaging film. In the present invention, the package forming device 50 is not particularly limited, and various devices can be used such as a device illustrated in FIG. 1, which folds a belt-like outer packaging film 12 into two so that the top of a fold faces down, moves the film in a horizontal direction, inserts a flat folded extraction bag 2 into a double-folded outer packaging film 12, forms the outer packaging film 12 into flat bags by thermal bonding, and separates the formed packages from each other.

[0040] In this case, it is preferable to use delivery means that is a combination of an extraction device 60 illustrated in FIG. 11 and a transfer device 70 illustrated in FIG. 12 to insert the extraction bag 2 into the double-folded outer packaging film 12.

[0041] That is, the extraction device 60 illustrated in FIG. 11 includes an extraction gripper 61 which can holds the double-folded extraction bag 2. In the extraction gripper 61, the gap between a pair of grippers can be freely opened and closed by an opening/closing motor 62. The extraction device 60 also includes a reciprocating motor 63 and a 90-degree rotation motor 64. The extraction gripper 61 is retreated in a direction of arrow a with the reciprocating motor 63, and also a grip surface of the extraction gripper 61 is rotated by 90 degrees around a shaft L4 in a longitudinal direction of the extraction gripper 61 with the 90-degree rotation motor 64. At the same time, the position of the extraction gripper 61 is rotated in a direction of arrow b so as to move the extraction gripper 61 to a relay position Pa illustrated with a dashed line in FIG. 11.

[0042] As illustrated in FIG. 12, the transfer device 70 has a relay gripper 71 and an insertion gripper 72 which can hold the flat folded extraction bag 2 as with the case of the extraction device 60. The relay gripper 71 is moved by a relay gripper opening/closing motor 73 which opens and closes the relay gripper 71 and a 90-degree rotation motor 74 which rotates the relay gripper 71 by 90 degrees in a direction of arrow a.

[0043] Similarly, the insertion gripper 72 is also moved by a gripper opening/closing motor and a 90-degree rotation motor.

[0044] Therefore, according to the extraction device 60 and the transfer device 70, the flat folded extraction bag 2 which is held with the upper plate 41 and the fixing plate 43 of the folding device 40 is first held with the extraction gripper 61 of the extraction device 60. The grip surface is then rotated by 90 degrees, and the position of the extraction gripper 61 is also rotated to move the

extraction gripper 61 to the relay position Pa. Next, the extraction bag 2 held with the extraction gripper 61 at the relay position Pa is held with the relay gripper 71 of the transfer device 70, and the holding with the extraction gripper 61 is cancelled. The relay gripper 71 is rotated by 90 degrees as illustrated with arrow a in FIG. 12 to move the relay gripper 71 to a delivery position Pb. At the delivery position Pb, the extraction bag 2 held with the relay gripper 71 is held with the insertion gripper 72, and the holding with the relay gripper 71 is cancelled. The insertion gripper 72 is rotated by 90 degrees as illustrated with arrow b in FIG. 12, and the extraction bag 2 is inserted into the double-folded outer packaging film 12.

[0045] Using the extraction device 60 and the transfer device 70 in this manner makes it possible to send the flat folded extraction bag 2 in the flat folded state to the package forming device 50. In addition, when the aforementioned folding device 40 and the package forming device 50 are installed as an industrial line, installation arrangement becomes easy.

[0046] In the extraction device 60 and/or the transfer device 70, rotation of the grip surface can properly be performed in accordance with the direction of the production line and the number of 90-degree rotations of the grip position may properly be determined in accordance with the distance between the folding device 40 and the package forming device 50.

[0047] As illustrated in FIG. 1, once the flat folded extraction bag 2 is received inside the double-folded outer packaging film 12, the package forming device 50 temporarily bonds a portion to be a side seal 111 of the exterior bag 11 by a thermocompression bonding device 52. Meanwhile, inert gas, such as nitrogen gas, is sent from a gas introducing pipe 51 into the double-folded outer packaging film 12 that is downstream from the position where the temporary bonding is performed. Accordingly, in the aforementioned temporary bonding, the portion that is to be the side seal 111 is heat-bonded except the region where the gas introducing pipe 51 passes along. Next, a portion used as a top seal 112 of the exterior bag 11 is heat-bonded by the thermocompression bonding device 53, and also the whole region of the portion used as the side seal 111 of the exterior bag 11 is heat-bonded by the thermocompression bonding device 54. The top seal portion is cooled with a roll-shaped cooling device 55. Then, a cooling device-cum-cutter 56 having a retractable cutter 56b provided inside a cooling device 56a is used to cool the side seal portion with the cooling device 56a, while exterior bags linked through the side seal are severed from each other with the cutter 56b to obtain each of the packages 10 of the extraction bag 2.

[0048] The present invention may be embodied in various modes. For example, in the aforementioned manufacturing apparatus 1A, when the extraction bag 2 is of a type without a thread tag, the direction of the triangular surfaces of the extraction bag 2 may be regulated by the direction regulation device 20 so that one surface of the extraction bag 2 is folded into two by the pressing device 30 as illustrated in FIG. 6A. When the extraction bag 2 has a rectangular pyramid-like bottom, the hole in the placement section 23 of the hopper-type holding device 22 may have a rectangular shape.

[0049] In the tag direction regulation mechanism 27, the extraction bag 2 at the observation position P2 may be observed from the top with use of the tag direction confirmation camera 271 as illustrated in FIG. 13.

[0050] Further, in the direction regulation device 20 which regulates the direction of the extraction bag 2, the device which retains the extraction bag 2 so that one triangular surface of the extraction bag 2 makes a lowermost end as in the case of the aforementioned hopper-type holding device 22 may be replaced with a device which retains the extraction bag 2 with one side thereof making the lowermost end.

[0051] As the pressing device which presses the extraction bag 2 so that one surface or one side of the extraction bag 2 is folded into two, the device which reciprocates a plate material like the aforementioned pressing plate 31 may be replaced with a device which presses the extraction bag 2 with a rotating disk which is brought into contact with one surface or one side of the extraction bag 2 at right angles.

[0052] As the folding device which folds the extraction bag 2 flat, the device which applies pressure on the extraction bag 2 with use of the flat surfaces of the plate-like materials that face each other as in the aforementioned folding device 40 may be replaced with a device which holds the extraction bag 2 in between rotating belts that face each other.

[0053] The aforementioned modified modes may appropriately be combined.

[0054] For example, a package manufacturing apparatus 1B illustrated in FIG. 14A includes: a device to be used as a direction regulation device including a tray 110 which retains an extraction bag 2 so that one side of the extraction bag 2 makes a lowermost end and transfer means (not illustrated) which transfers the extraction bag 2 retained on the tray 110 so that one side of the extraction bag 2 that makes the lowermost end may align with the conveying direction of the extraction bag 2; a rotating disk 120 to be used as the pressing device; and belts 130 to be used as a folding device which rotate while facing each other.

[0055] The tray 110 has two placement portions 111 and 112 for the extraction bag 2, which are formed by crisscrossing grooves with a V shaped cross-section in vertical and horizontal directions. In the manufacturing apparatus 1B, a plurality of similar trays 110 are arrayed and are circulated as shown with arrows.

[0056] The manufacturing apparatus 1B operates as follows. First, the extraction bags 2, which are continuously fed from the apparatus for manufacturing the extraction bag 2, are received one by one at the first placement portion 111 of the tray 110.

[0057] When the extraction bag 2 is of a type with a thread tag, it is necessary to prevent the tag 4 from being folded when the extraction bag 2 is pressed with the rotating disk 120. Accordingly, when the extraction bag 2 is transferred from the first placement portion 111 to the second placement portion 112, the direction of the extraction bag 2 is properly changed so that the triangular surface with the tag 4 attached thereto is positioned to face the side of the extraction bag 2 which is to be pressed by the rotating disk. More specifically, in the case of the extraction bag fed from an apparatus for industrially manufacturing trigonal-pyramid packs (such as the apparatus described in International Publication No. 2011/61846), the direction of the lowermost side of the extraction bag 2 that is received in the first placement portion 111 of the tray 110 and the direction of the surface with the tag 4 attached thereto are alternately changed as illustrated in FIG. 14A. Accordingly, for example, when the direction of the lowermost side of the extraction bag 2 that is received in the placement portion 111 is aligned with the direction of the conveying direction of the extraction bag 2 as illustrated in (I), the extraction bag 2 is transferred to the placement portion 112 without changing the direction of the extraction bag 2. Contrary to this, as illustrated in (II), when the direction of the lowermost side of the extraction bag 2 that is received in the placement portion 111 is vertical to the conveying direction of the extraction bag 2 and the surface with the tag 4 attached thereto faces upward, the extraction bag 2 are vertically reversed, and the extraction bag 2 is transferred so that the side that forms the surface with the tag 4 attached thereto makes a lowermost side.

[0058] Moreover, in the case of the extraction bag 2 being of a type without a thread tag in the manufacturing apparatus 1B, for example, when the direction of the lowermost side of the extraction bag 2 received in the placement portion 111 is aligned with the direction of the conveying direction of extraction bag 2 as illustrated in (I) of FIG. 14B, the extraction bag 2 may be transferred to the placement portion 112 without changing the direction of the extraction bag 2. When the direction of the lowermost side of the extraction bag 2 which is received in the placement portion 111 is vertical to the conveying direction of the extraction bag 2 as illustrated in (II) of FIG. 14B, the extraction bag 2 may be rotated 90 degrees inside the level plane and be transferred to the placement portion 112.

[0059] After the direction of the extraction bag 2 is regulated in this manner, the tray 110 retaining the extraction bag 2 passes under the rotating disk 120. The upper end side of the extraction bag 2 is pressed inside by the rotating disk 120 in the direction vertical thereto, so that the side may finely be folded into two. Then, subsequent to this, the extraction bag 2 is passed between the belts 130 facing each other, by which the extraction bag 2 is folded flat. The flat folded extraction bag 2 may be inserted into the outer packaging film 12, which is folded into two by the package forming device 50 with the same means as the extraction device and the transfer device having grippers as described before.

[0060] A package manufacturing apparatus 1C illustrated in FIG. 15 includes a bucket table 140 as the direction regulation device which retains the extraction bag 2 so that one side of the extraction bag 2 makes the lowermost side. FIG. 16 is an explanatory view of the action inside the bucket 141. A right-side column of FIG. 16 illustrates cross sectional views of the bucket 141 as viewed from A direction in FIG. 15 (a rotation direction of a bucket table), and a left-side column illustrates cross sectional views of the bucket 141 as viewed from B direction in FIG. 15 (a radial direction of rotation of the bucket table).

[0061] While the surface of an upper end opening of the bucket 141 is generally a square shape so that the extraction bag 2 thrown in the bucket 141 is retained with one side of the extraction bag 2 making the lowermost end, the bottom thereof is formed narrow so as to have a triangular cross section as viewed from the A direction in FIG. 15.

[0062] The manufacturing apparatus 1C includes a pressing plate 150 to be used as a pressing device which presses one side of the extraction bag 2 that makes an uppermost side in the bucket 141, the pressing plate 150 being pressed with a plate surface thereof being in the direction vertical to one side that is the uppermost side of the extraction bag 2. The manufacturing apparatus 1C also includes pressure plates 160 to be used as a folding device which holds two facing surfaces of the extraction bag 2 inside the bucket 141.

[0063] The pair of pressure plates 160 of the folding device are in the state where both the plates are opened in a V shape along the inner wall of the bucket 141, when the bucket 141 receives the extraction bag 2. The opening width of the V shape is variable and the pair of pressure plates 160 can take a position where the opening of the V shape is closed at the center of the bucket.

[0064] In the manufacturing apparatus 1C, when the bucket 141 receives the extraction bag 2 from the belt conveyer 90, the bucket 141 retains the extraction bag 2 so that one side of the extraction bag 2 makes a lowermost end (FIG. 16(a)). Next, the pressing plate 150 presses the uppermost side of the extraction bag 2 that is retained on the bucket 141, and also narrows the opening of the pressure plates 160 which is opened in the V shape along the inner wall of the bucket 141 (FIG. 16(b)). Then, the extraction bag 2 is folded flat and further pressed downward with the pressing plate 150, and the flat folded extraction bag 2 is dropped to a bottom receiving guide 142 (FIG. 16(c)). The bottom receiving guide 142 is a plate-like member which opens and closes a lower part of the bottom of the bucket 141. A plate-like side guide 143 stands on each side of the bottom receiving guide 142 to help the extraction bag 2 dropped to the bottom receiving guide 142 to be retained there.

[0065] The extraction bag 2 dropped to the bottom receiving guide 142 is held by the gripper 170, and the

bottom receiving guide 142 is removed from the lower part of the bottom of the bucket 141, so that the extraction bag 2 is sent to the package forming device 50 with use of the gripper 170 (FIG. 16(d)).

[0066] According to the manufacturing apparatus 1C, it becomes possible to obtain a package in which the extraction bag 2 without a thread tag is finely folded.

Reference Signs List

[0067]

1A, 1B, 1C	Package manufacturing apparatus
2	Extraction bag or extraction bag with thread tag
3	Hanging thread
4	Tag
10	Package
11	Exterior bag
	111 Side seal
	112 Top seal
12	Outer packaging film
20	Direction regulation device
21	Upper table
22	Hopper-type holding device
	221 Hopper lifting cam
	222 Hopper lifting cam follower
23	Placement section
24	Shutter
	241 Cam for opening/closing shutter
	242 Cam follower for opening/closing shutter
25	Rocking mechanism
	251 Rocking cylinder
	252 Rocking cam
	253 Rocking cam follower
26	Placement section positioning mechanism
	261 Positioning recess section
	262 Positioning ball plunger
27	Tag direction regulation mechanism
	271, 271p, 271q Tag direction confirmation camera
	272 CPU
	273 Inspection hole
	274 Positioning hole
	275 Engaging pin
	276 Lifting cylinder
	277 Rotary motor
28	Lower table
30	Pressing device
31	Pressing plate
	311 Reciprocating motor
	312 Lifting motor
	313 Rail
	314 Slider
	315 Table
40	Folding device
41	Upper plate
	411 Upper plate cam
	412 Upper plate cam follower
	413 Slider
	414 Rail
	415 Rod
	416 Articulated arm
42	Lower plate
	421 Lower plate cam
	422 Lower plate cam follower
	423 Slider
	424 Rail
	425 Rod
	426 Lower plate fixture
43	Fixing plate
50	Package forming device
51	Gas introducing pipe
52	Thermocompression bonding device
53	Thermocompression bonding device
54	Thermocompression bonding device
55	Cooling device
56	Cooling device-cum-cutter
	56a Cooling device
	56b Cutter
57	Cutter
60	Extraction device
61	Extraction gripper
62	Opening/closing motor
63	Reciprocating motor
64	90-Degree rotation motor
70	Transfer device
71	Relay gripper
72	Insertion gripper
73	Relay gripper opening/closing motor
74	Relay gripper 90-degree rotation motor
90	Belt conveyer
110	Tray
111	First placement portion for extraction bag
112	Second placement portion for extraction bag
120	Rotating disk
130	Belt
140	Bucket table
141	Bucket
142	Bottom receiving guide
143	Side guide
150	Pressing plate
160	Pressure plate
170	Gripper
L1, L2, L3, L4	Shaft
P1	Position where extraction bag is received from belt conveyer
P2	Observation position
P3	Tag direction adjustment position
P4	Hopper descend start position
P5	Receiving position of extraction bag on lower table

Pa	Relay position
Pb	Delivery position
R	Rocking region

Claims

1. A method for manufacturing a package in which an extraction bag having four triangular surfaces is stored in an exterior bag, the method comprising:

   a direction regulation step of regulating a direction of the extraction bag to be a specified direction;
   a pressing step of pressing the extraction bag so that one surface or one side of the extraction bag is folded into two;
   a folding step of folding the extraction bag by surface-pressing of the extraction bag from both sides of surfaces which are overlapped upon being folded into two; and
   a packaging step of forming a package in which the folded extraction bag is stored in the exterior bag.

2. The method for manufacturing a package according to claim 1, wherein:

   the extraction bag is an extraction bag with a thread tag in which a tag joined to a hanging thread is attached to a triangular surface; and
   in the direction regulation step, the direction of the extraction bag is regulated to be a direction in which the triangular surface with the tag attached thereto is not folded in the folding step.

3. The method for manufacturing a package according to claim 1, wherein the extraction bag is received in a holding device provided with, in a bottom thereof, a placement section to which one triangular surface of the extraction bag is fitted, and in the direction regulation step, oscillation is provided to the extraction bag within the holding device so that the triangular surface of the extraction bag is fitted to the placement section, thereby regulating the direction of the extraction bag.

4. The method for manufacturing a package according to claim 3, wherein the extraction bag is an extraction bag with a thread tag in which a tag joined to a hanging thread is attached to a triangular surface, and
   the direction of the placement section is regulated in the direction regulation step so that the surface to which the tag is attached faces the side folded into two in the folding step.

5. The method for manufacturing a package according to claim 1, wherein in the direction regulation step the direction of the extraction bag is regulated so that one side of the extraction bag makes the lowermost end and extends in a conveying direction of the extraction bag, and in the pressing step an upper end side of the extraction bag is folded into two.

6. An apparatus for manufacturing a package in which an extraction bag having four triangular surfaces is stored in an exterior bag, the apparatus comprising:

   a direction regulation device for regulating a direction of the extraction bag to be a specified direction;
   a pressing device for pressing the extraction bag so that one surface or one side of the extraction bag is folded into two;
   a folding device for performing surface-pressing of the extraction bag from both sides of surfaces that are overlapped upon being folded into two so as to fold the extraction bag flat; and
   a package forming device for packaging the folded extraction bag with an outer packaging film so as to form a package in which the extraction bag is stored in the exterior bag formed of the outer packaging film.

7. The manufacturing apparatus according to claim 6, comprising delivery means for holding the extraction bag folded flat to take out of the folding device and delivering the extraction bag to the package forming device.

8. The apparatus for manufacturing a package according to claim 6 or 7, wherein the extraction bag is an extraction bag with a thread tag in which a tag joined to a hanging thread is attached to a triangular surface, and
   the direction regulation device regulates the direction of the extraction bag to be a direction in which the triangular surface to which the tag is attached is not pressed inside by the pressing device.

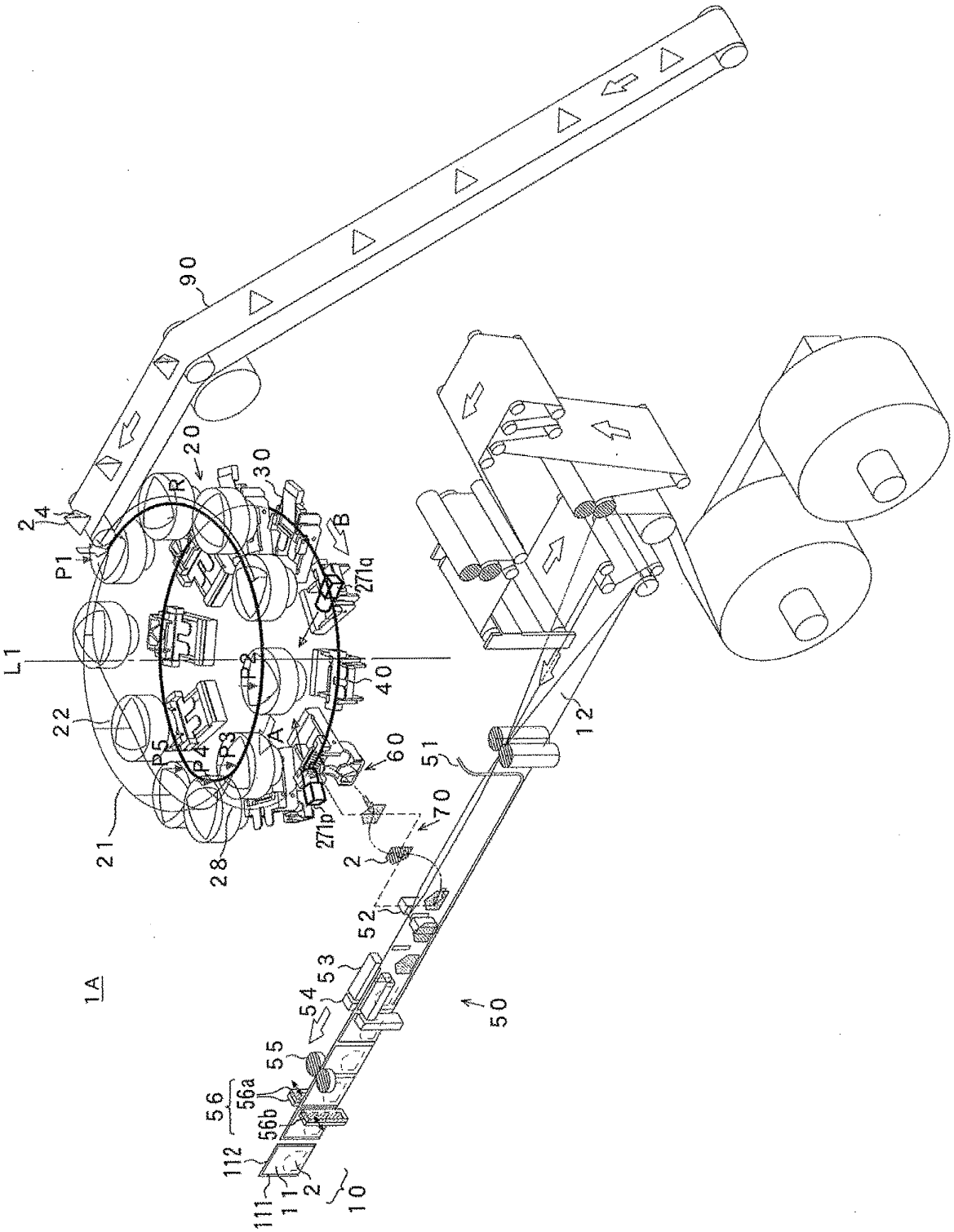
9. The apparatus for manufacturing a package according to any of claims 6 to 8, wherein the direction regulation device includes a holding device provided with a placement section to which one triangular surface of the extraction bag is fitted, and regulates the direction of the extraction bag so that the triangular surface of the extraction bag is fitted to the placement section by applying oscillation to the extraction bag fed within the holding device.

10. The apparatus for manufacturing a package according to claim 9, wherein the extraction bag is an extraction bag with a thread tag in which a tag joined to a hanging thread is attached to a triangular surface, and
    the direction regulation device regulates the direc-

tion of the placement section so that the surface to which the tag is attached faces the side folded into two in the pressing device.

11. The apparatus for manufacturing a package according to any of claims 6 to 8, wherein the direction regulation device holds the extraction bag so that one side of the extraction bag makes the lowermost end and extends in a conveying direction of the extraction bag, and the pressing device folds an upper end side of the extraction bag into two.

FIG. 1


90
20
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P1
R
B
271q
L1
P2
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22
P5
P4
P3
A
60
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12
70
271p
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1A
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56a
56b
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FIG. 2

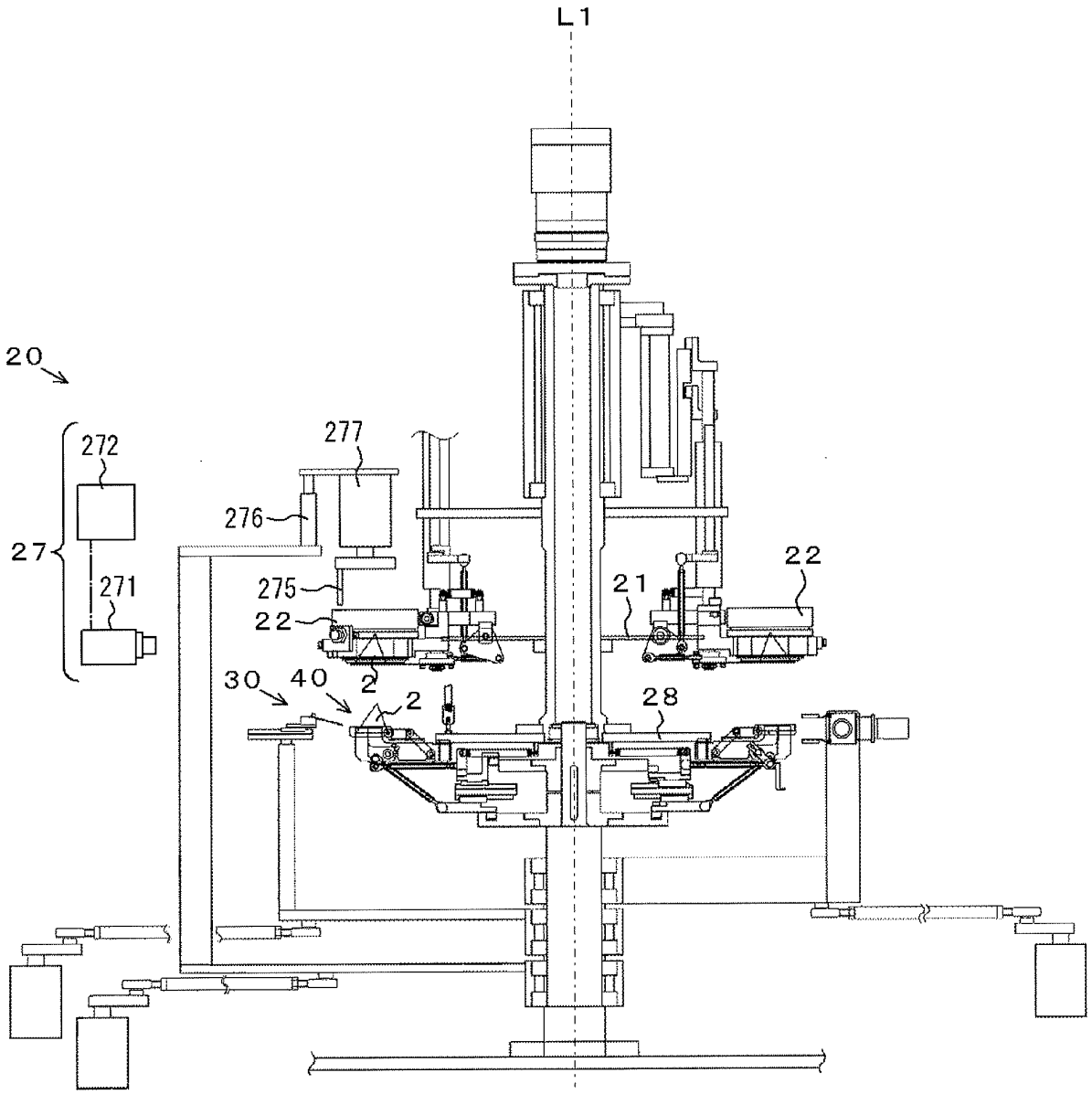


FIG. 3

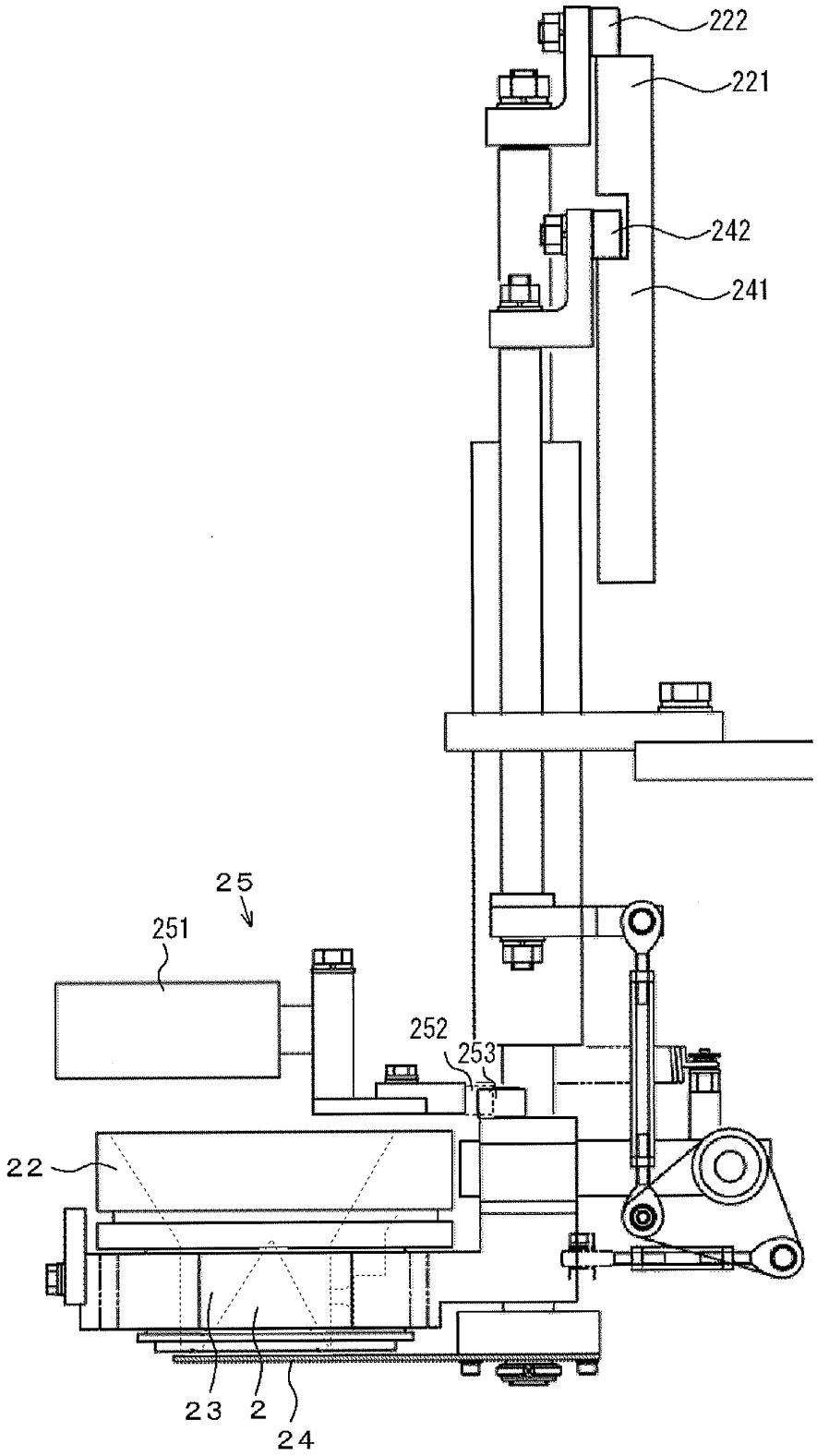


FIG. 4A

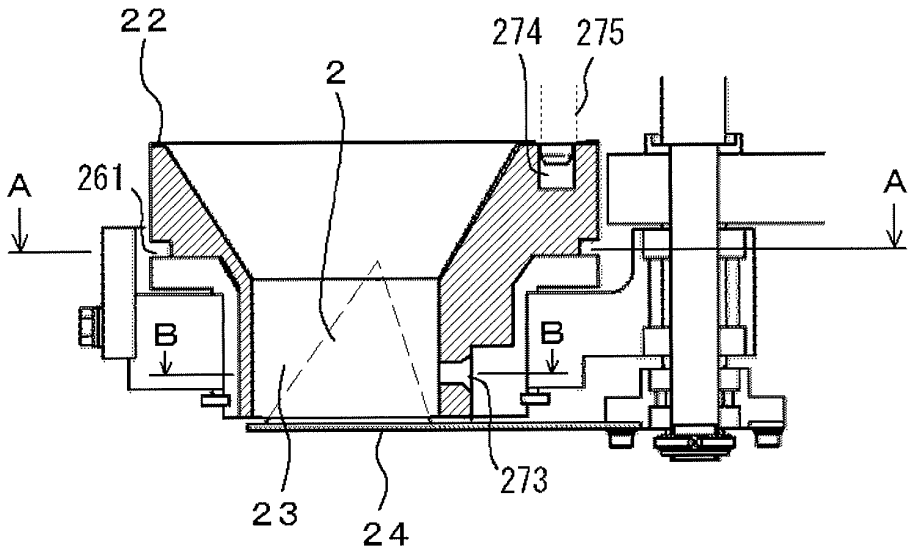


FIG. 4B

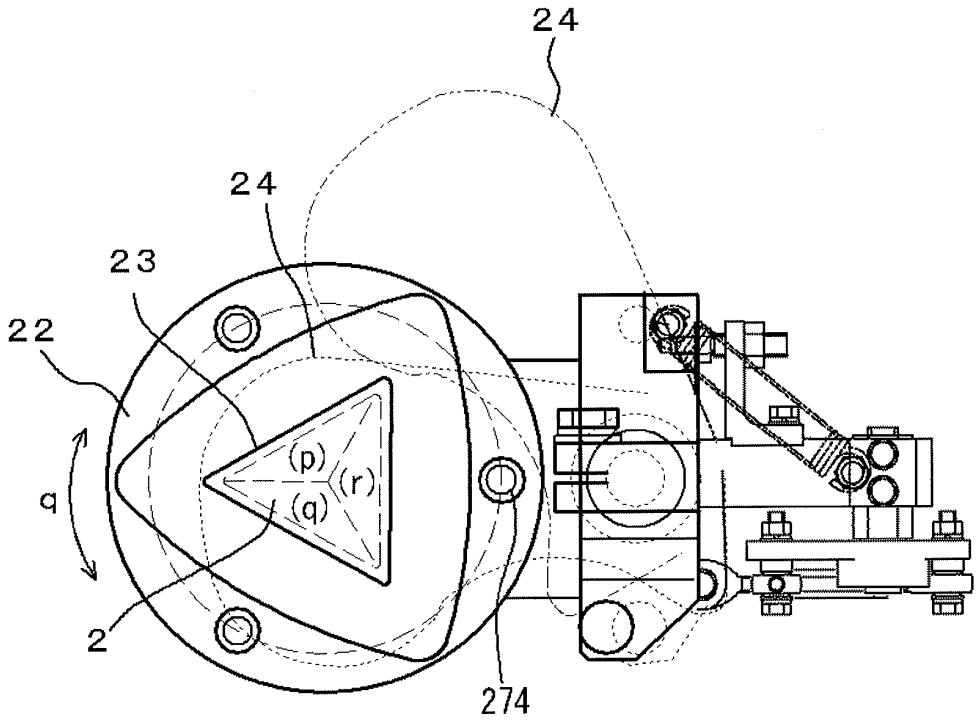
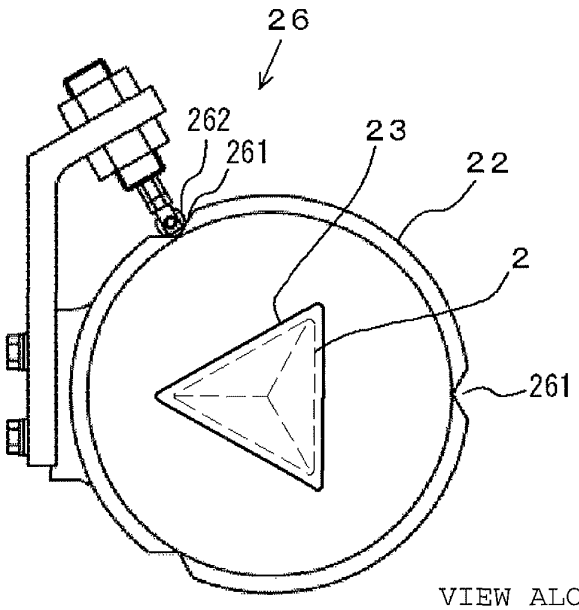


FIG. 4C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262
261
23
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2
261
VIEW ALONG A-A

FIG. 4D

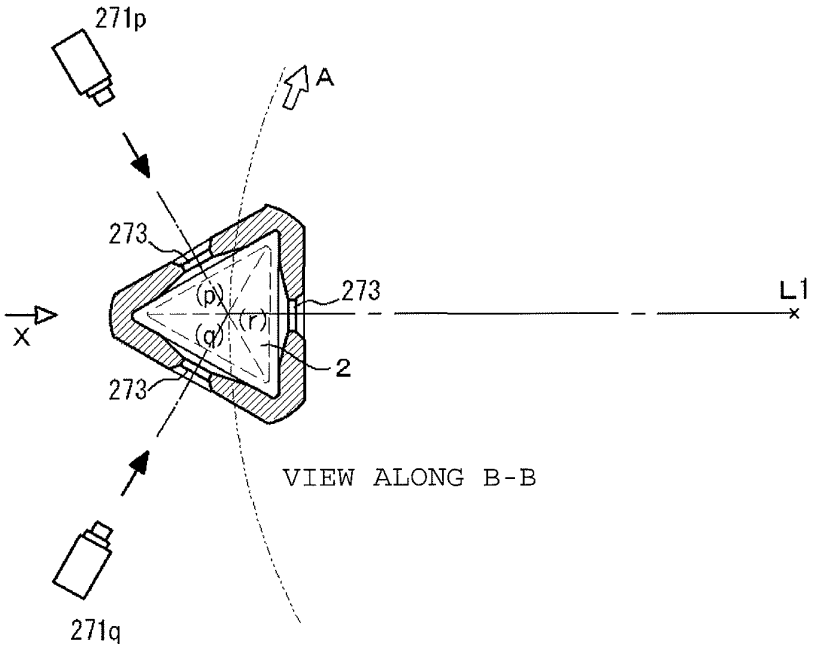
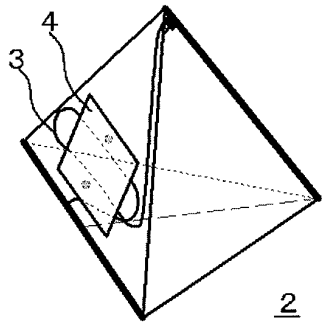

271p
A
273
273
L1
X
(p)
(r)
(q)
2
273
VIEW ALONG B-B
271q

FIG. 5

(1)



(2)

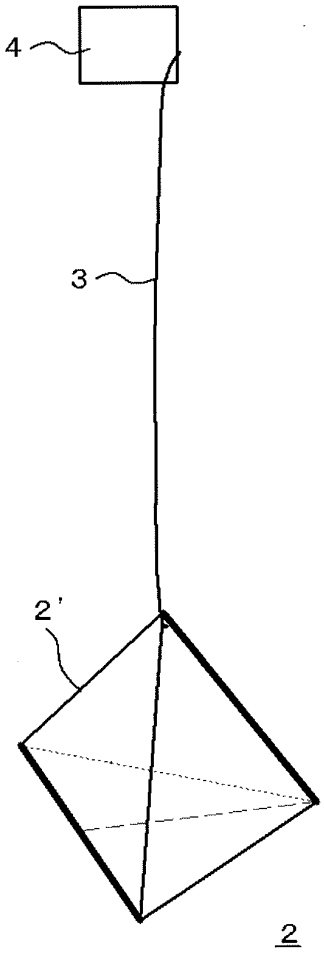


FIG. 6A

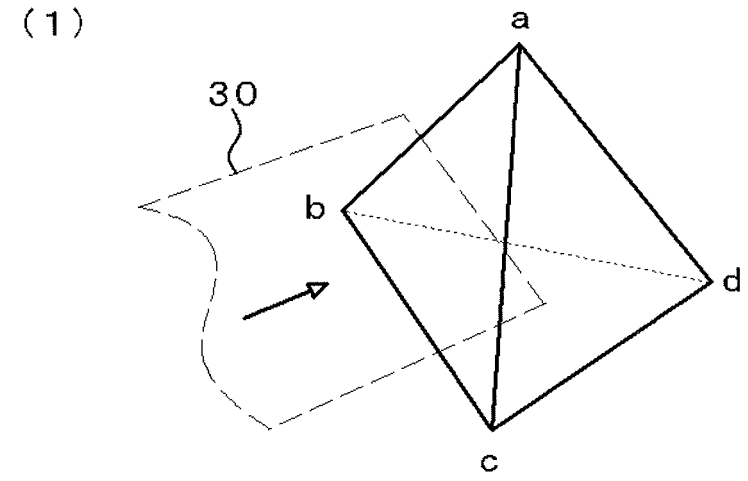
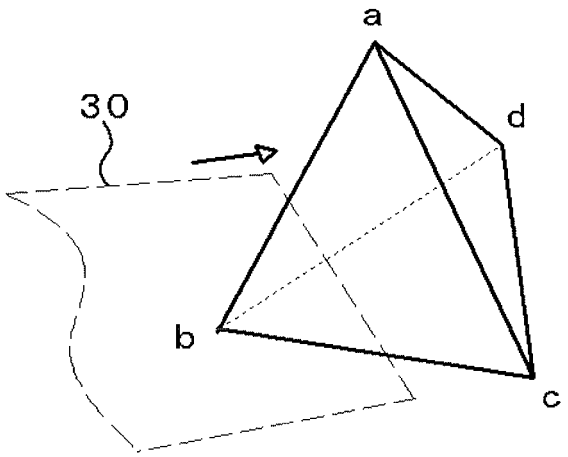


FIG. 6B

(1)



(2)

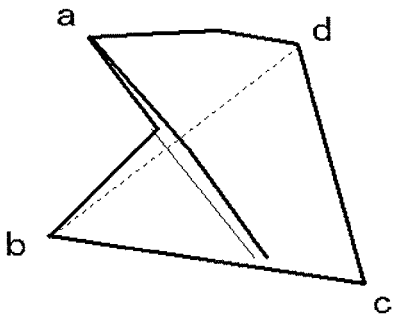


FIG. 7

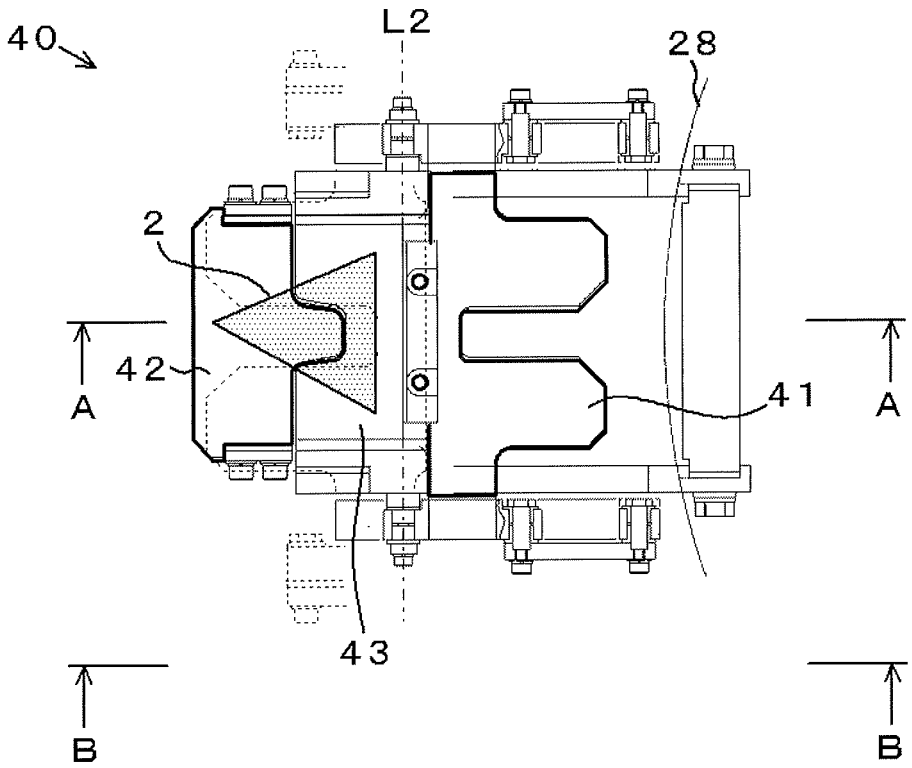


FIG. 8A

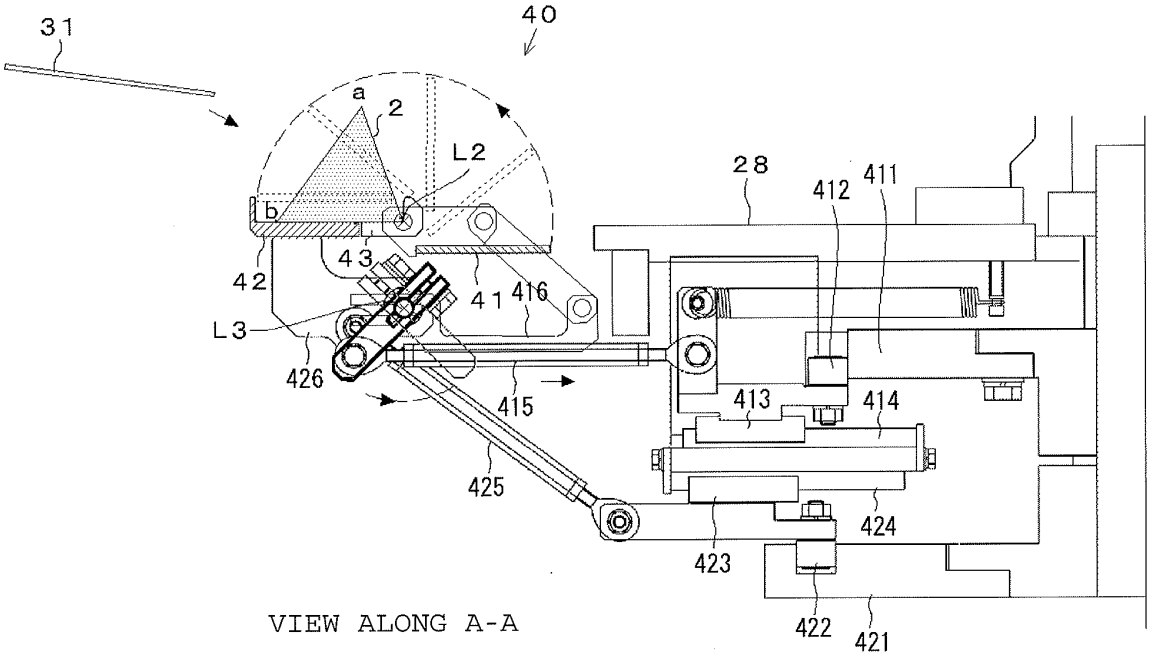

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FIG. 8B

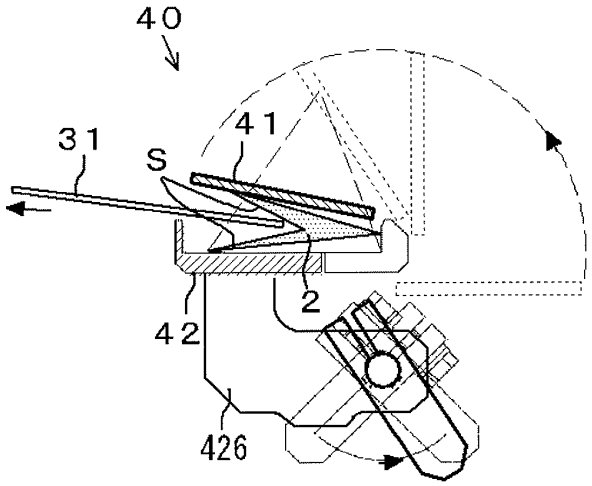
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FIG. 8C

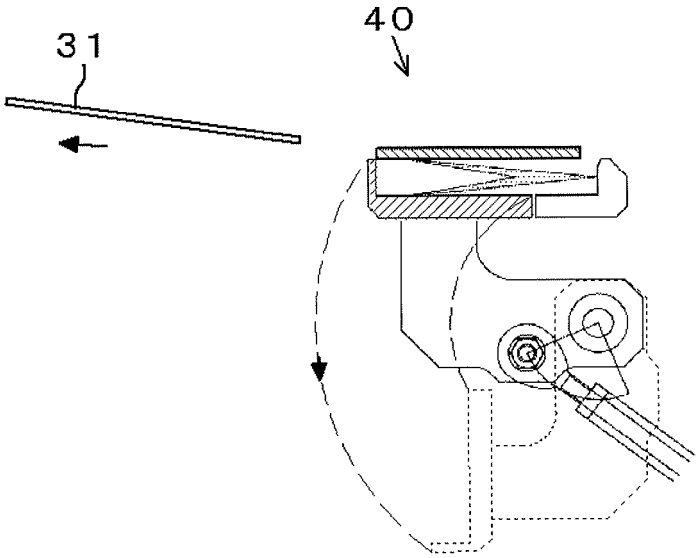


FIG. 8D

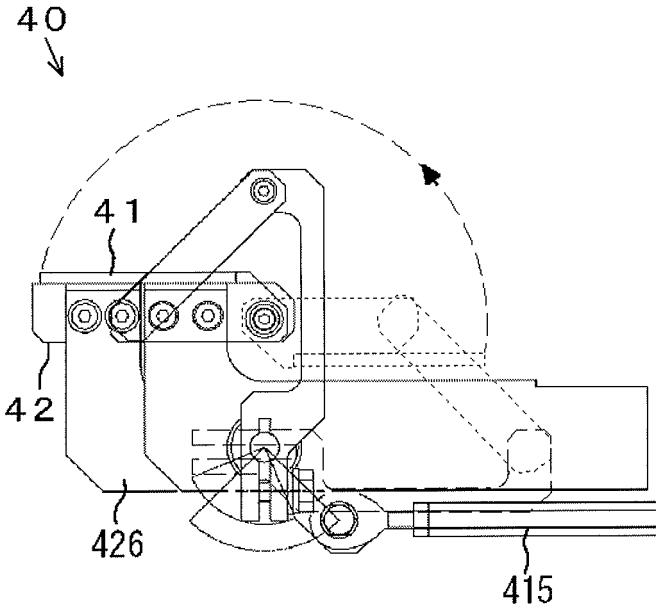


FIG. 9A

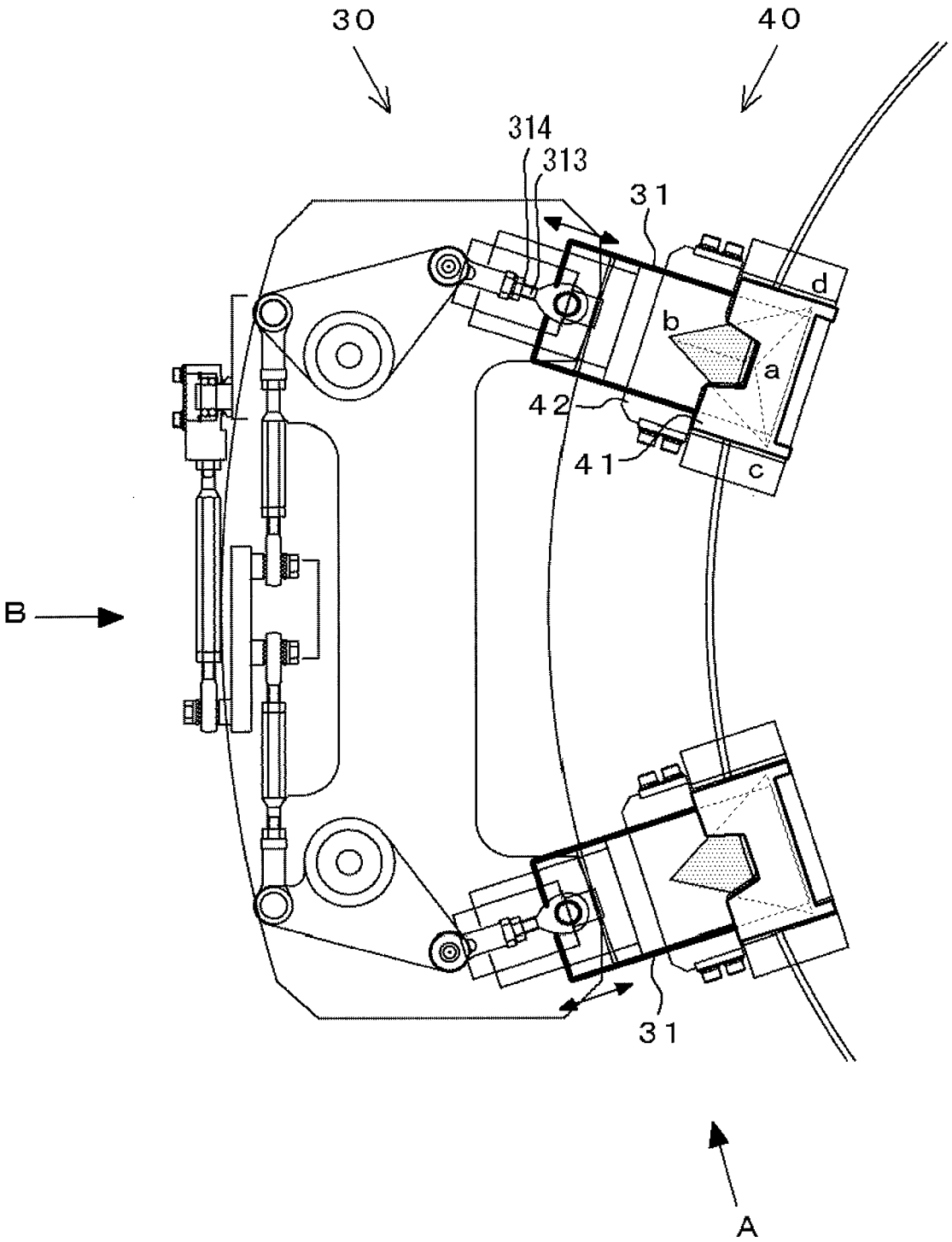


FIG. 9B

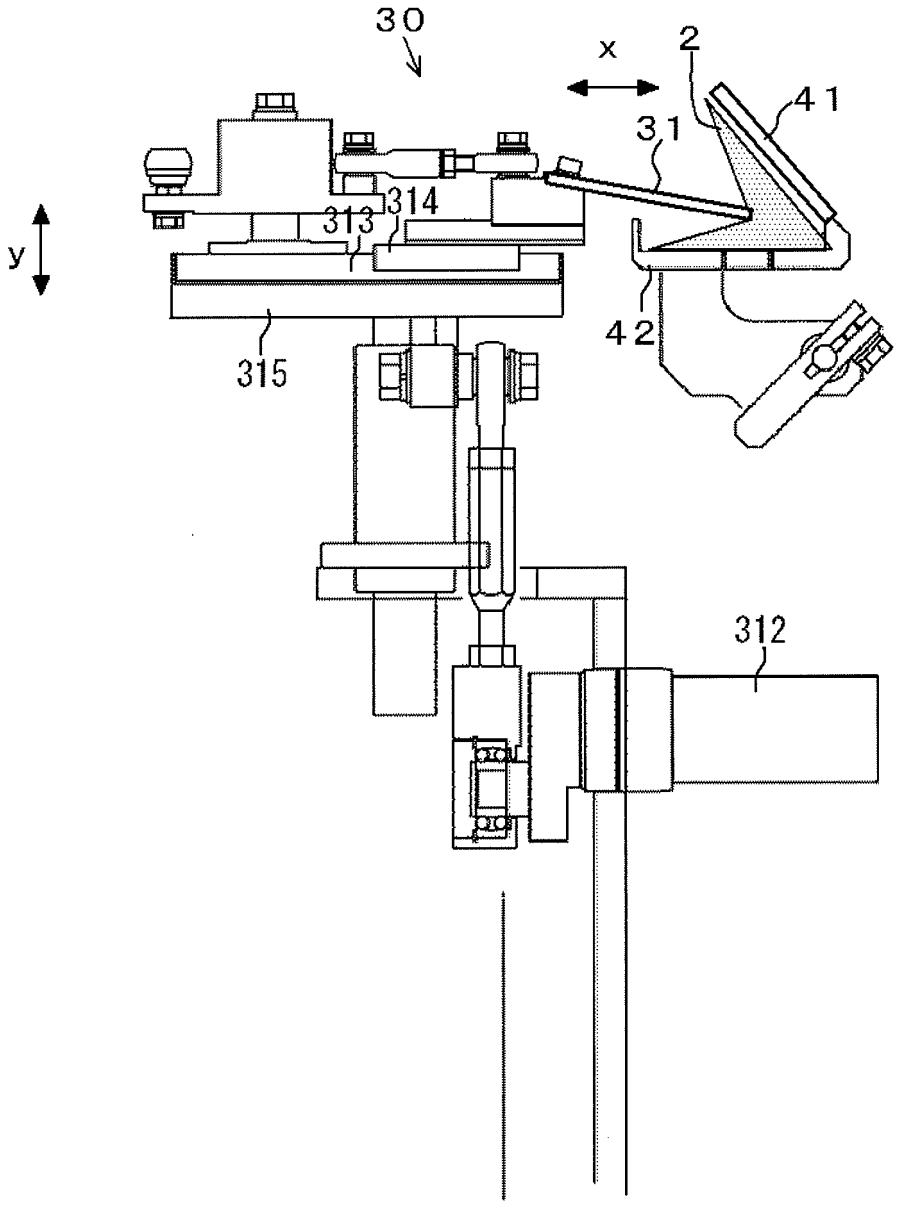


FIG. 9C

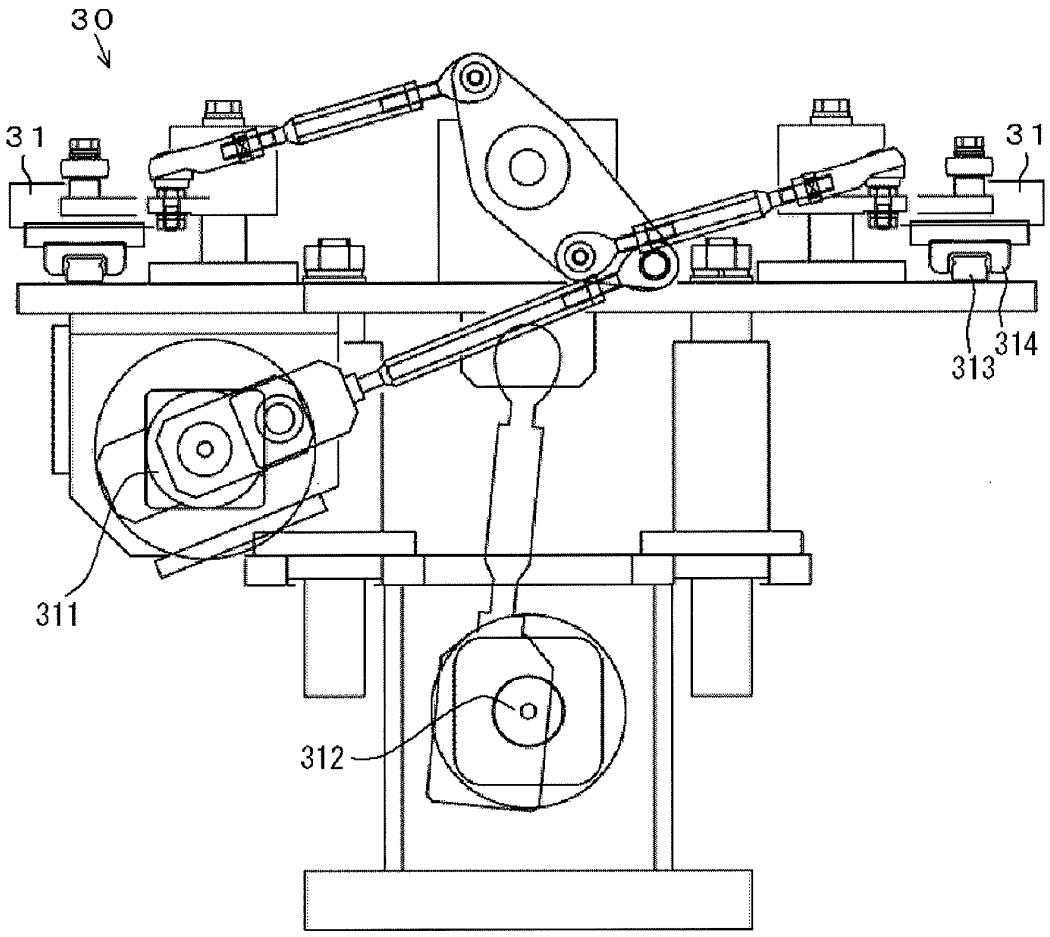


FIG. 10

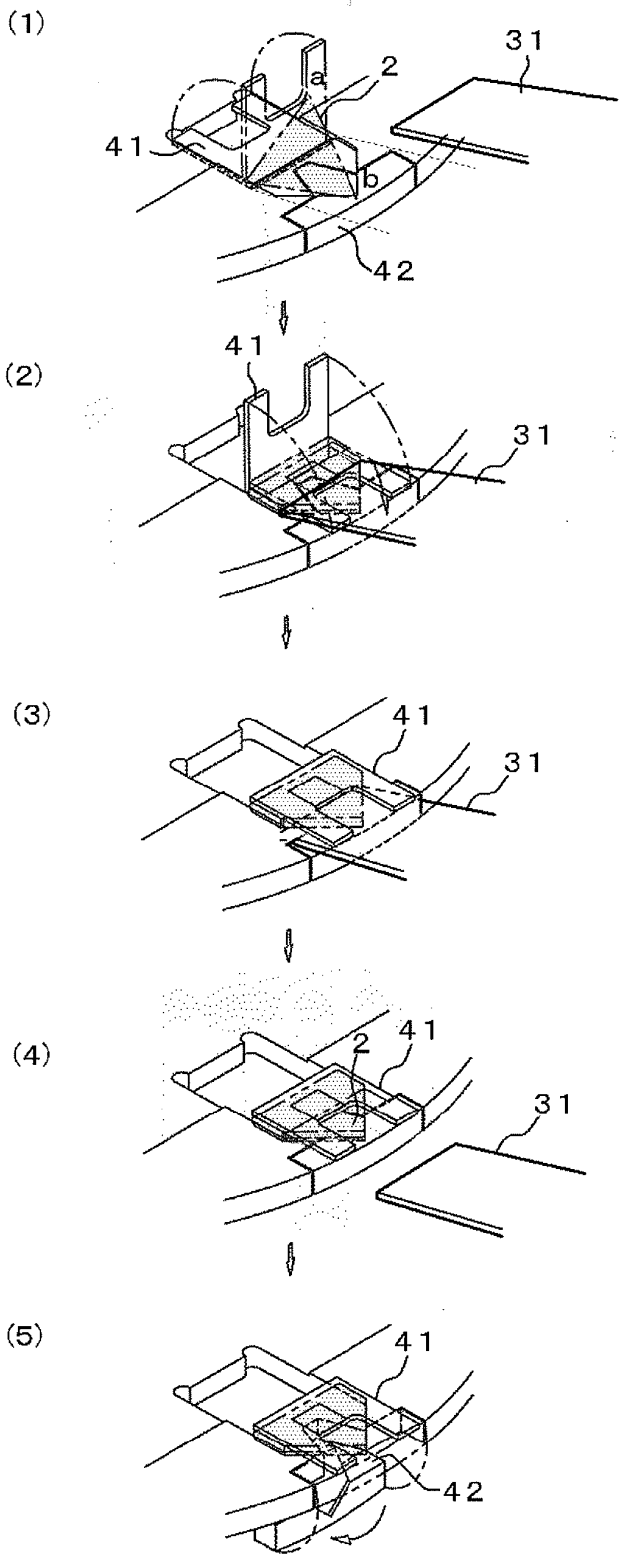


FIG. 11

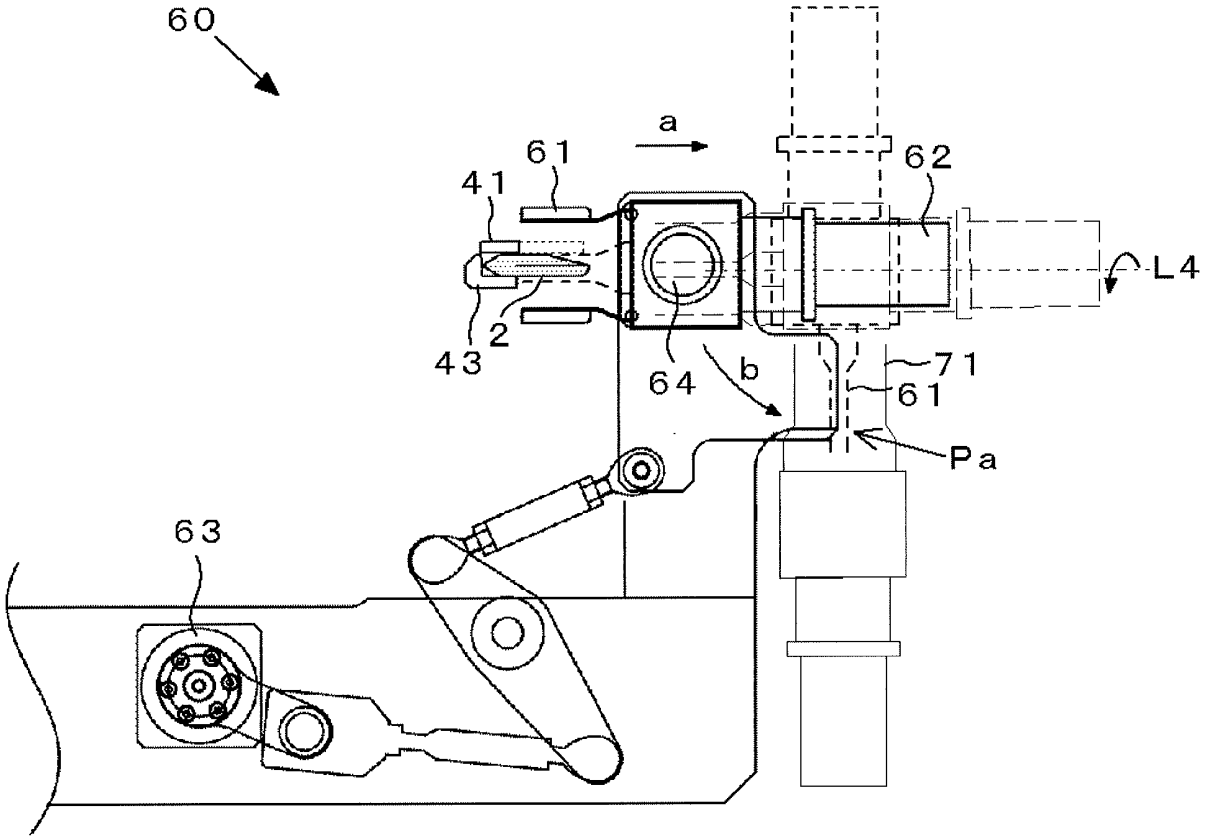


FIG. 12

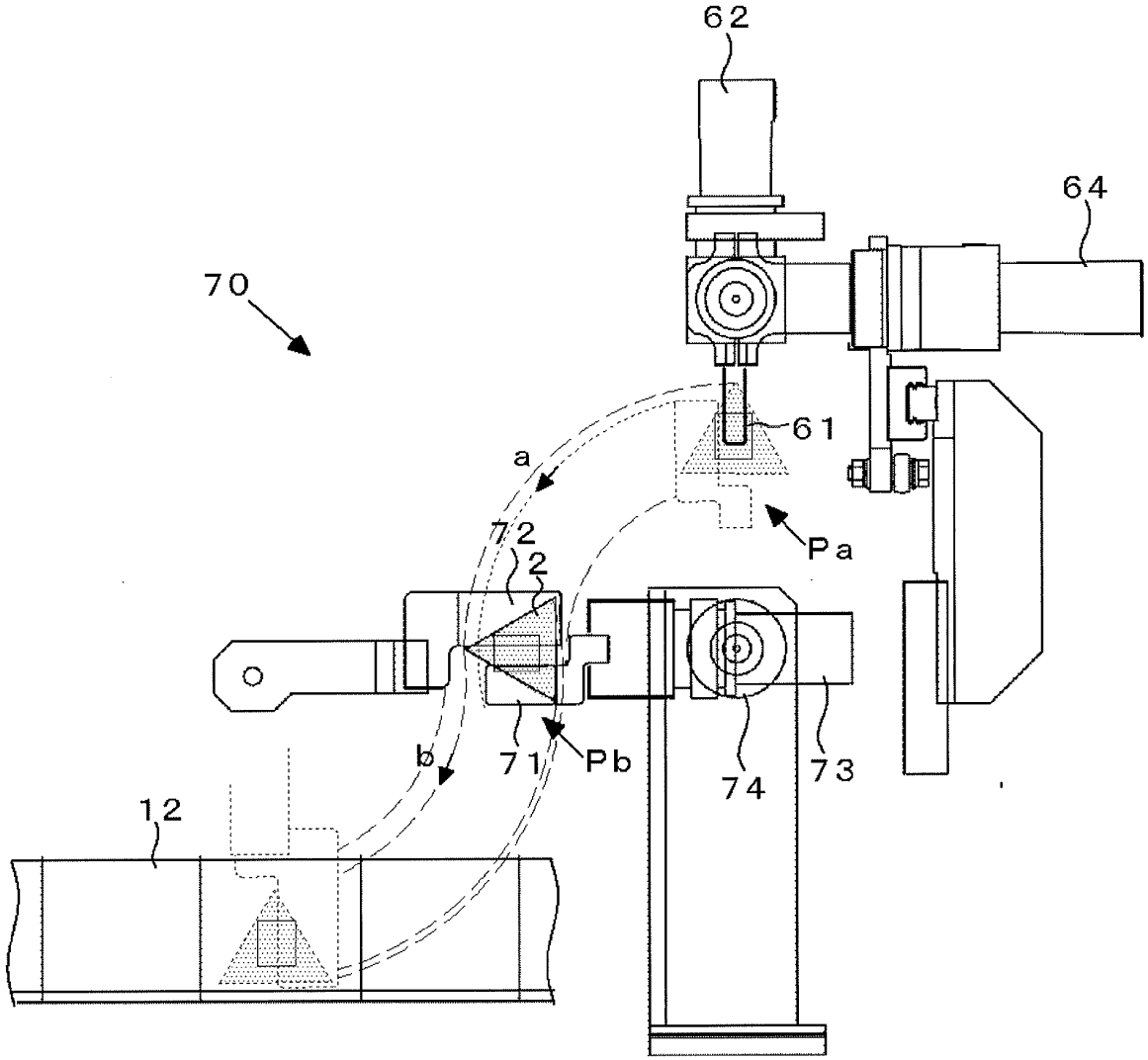


FIG. 13

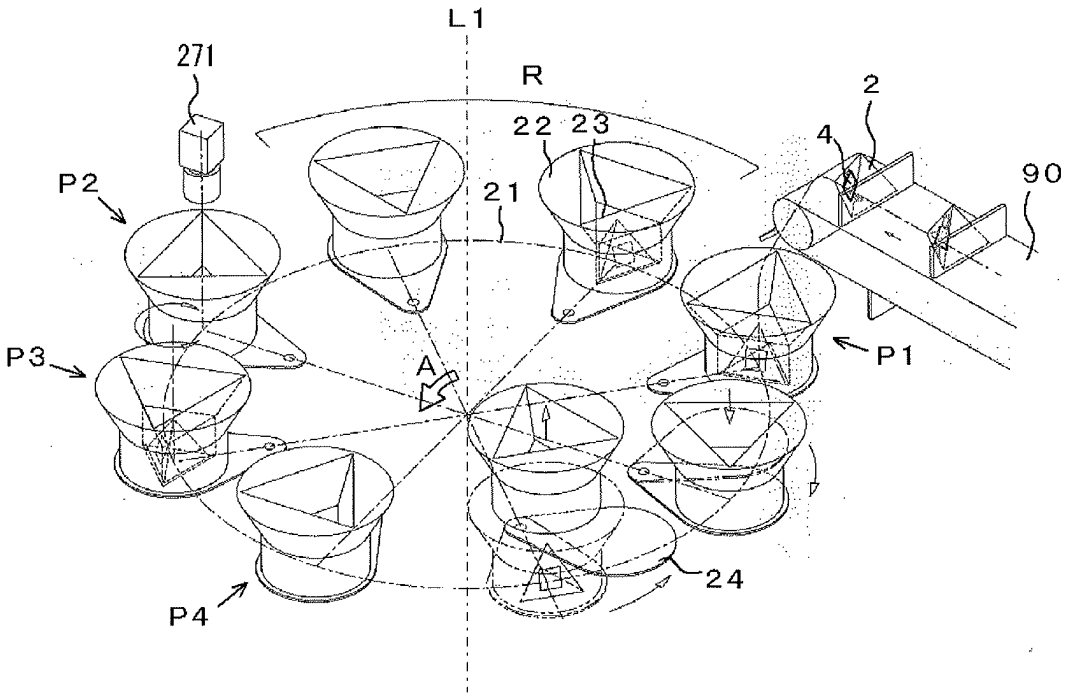


FIG. 14A

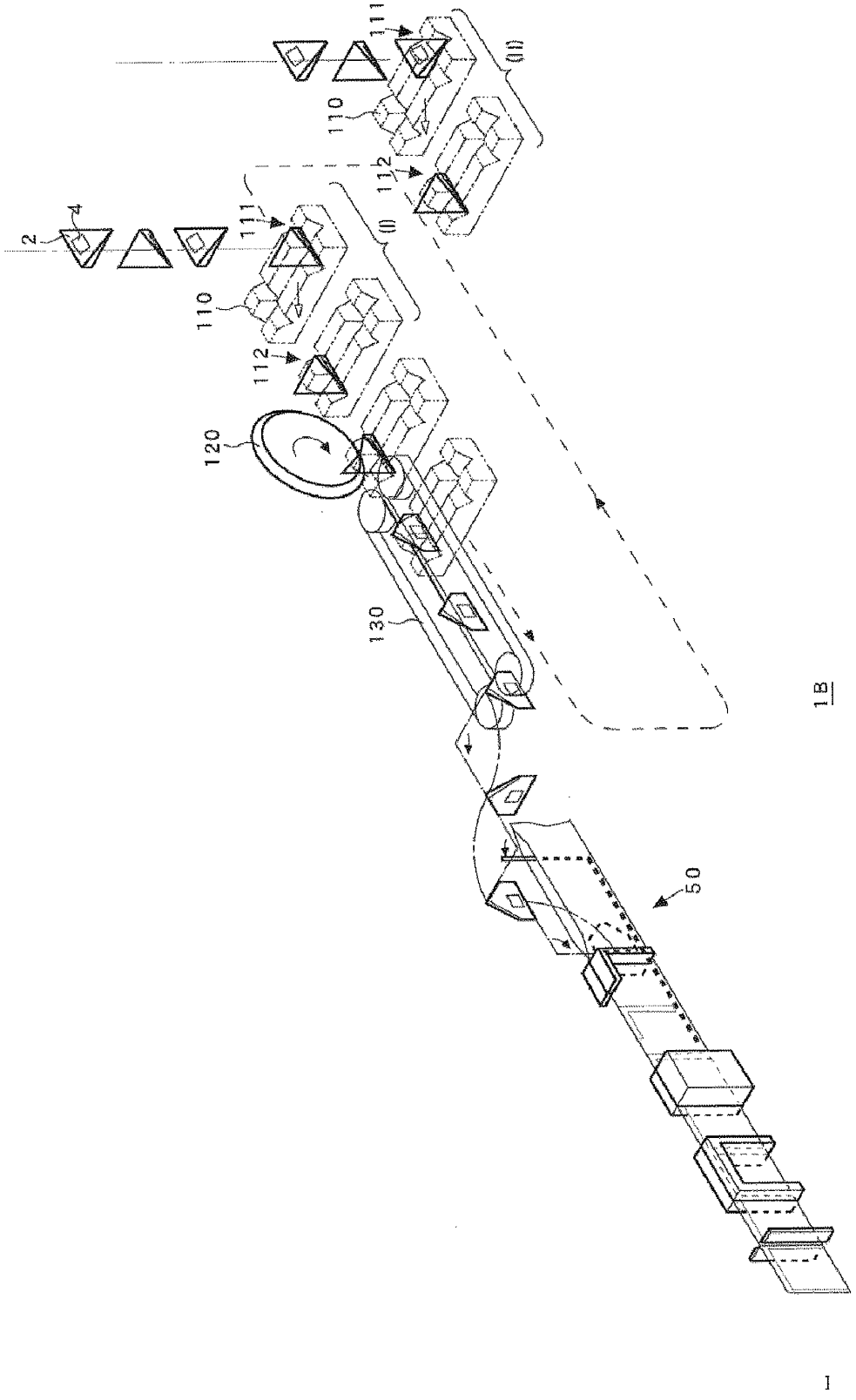


FIG. 14B

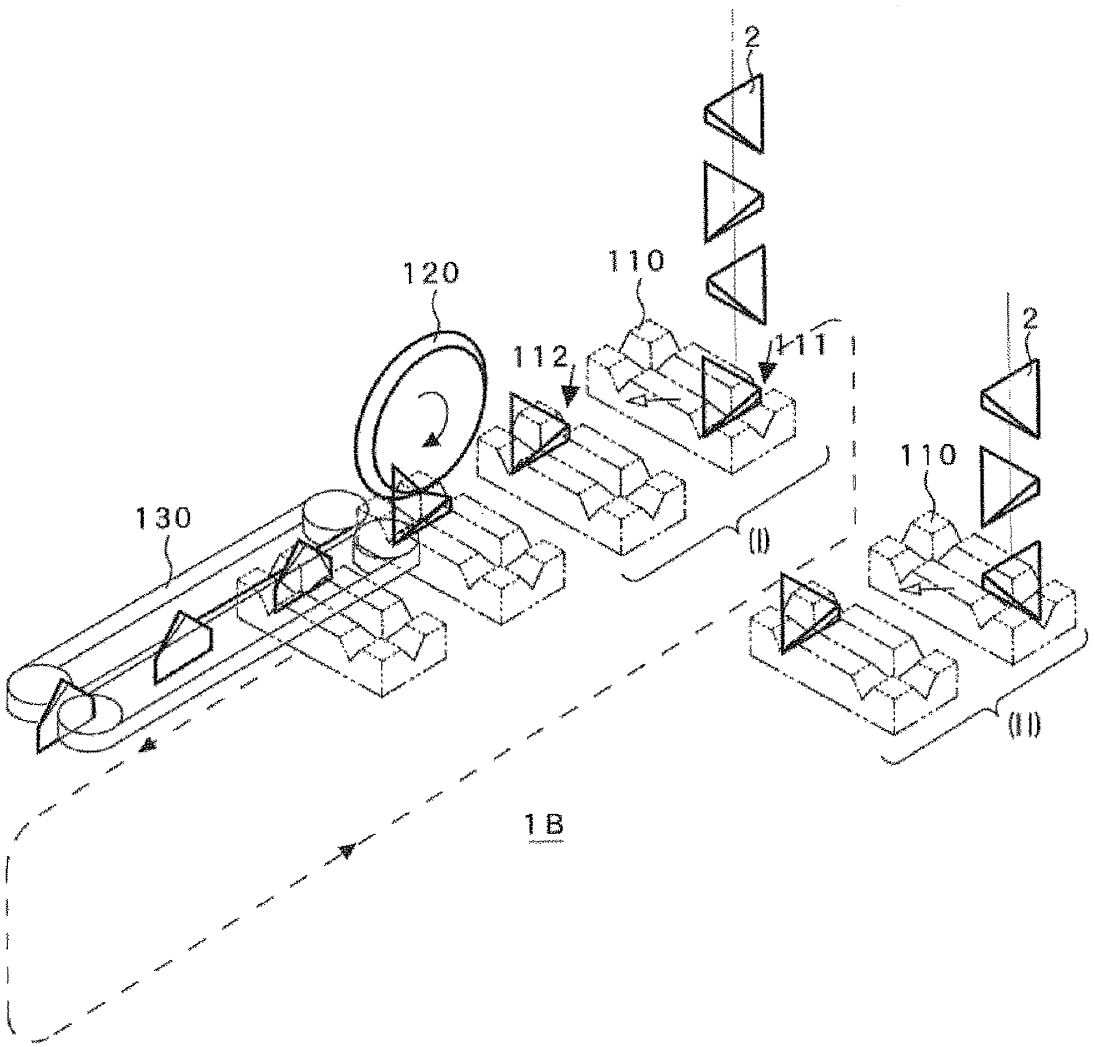


FIG. 15

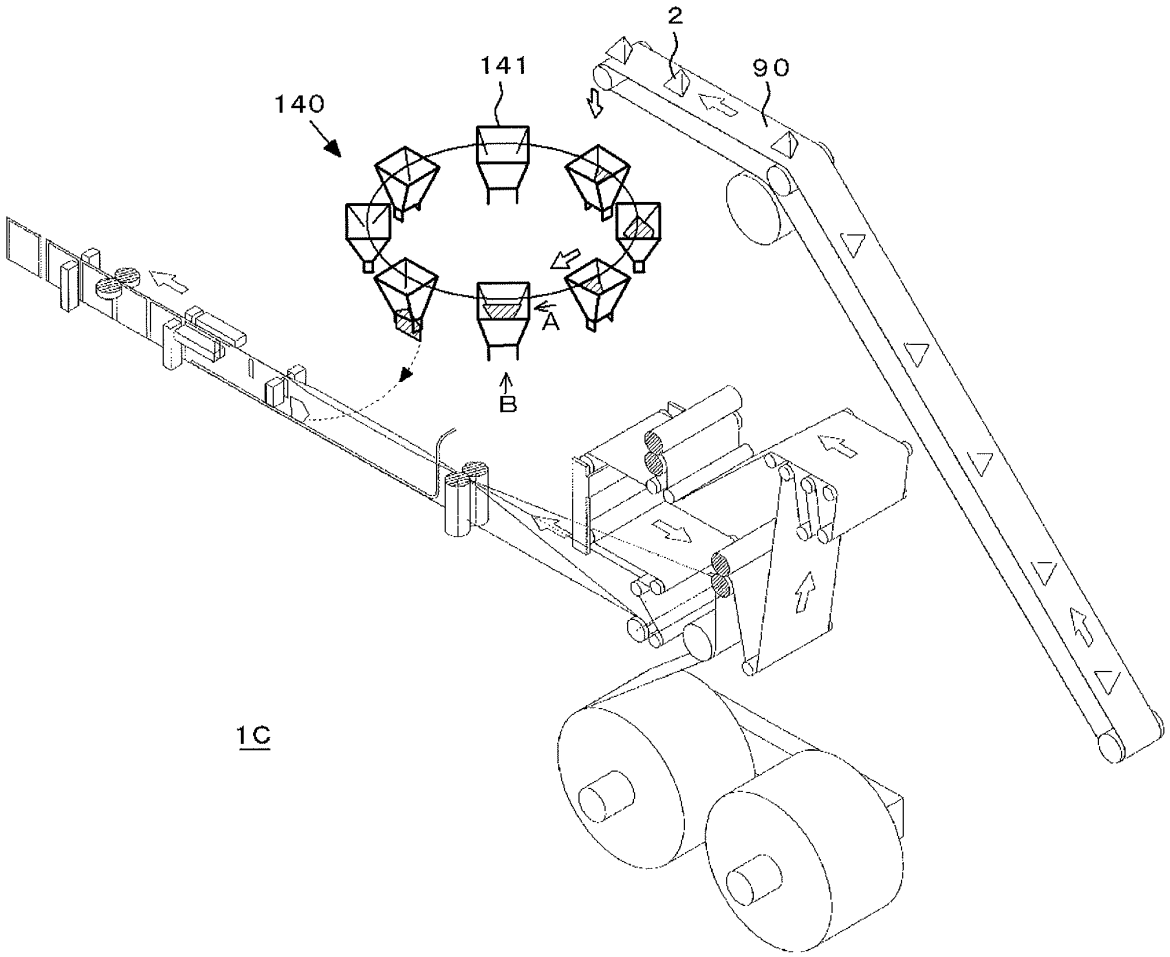
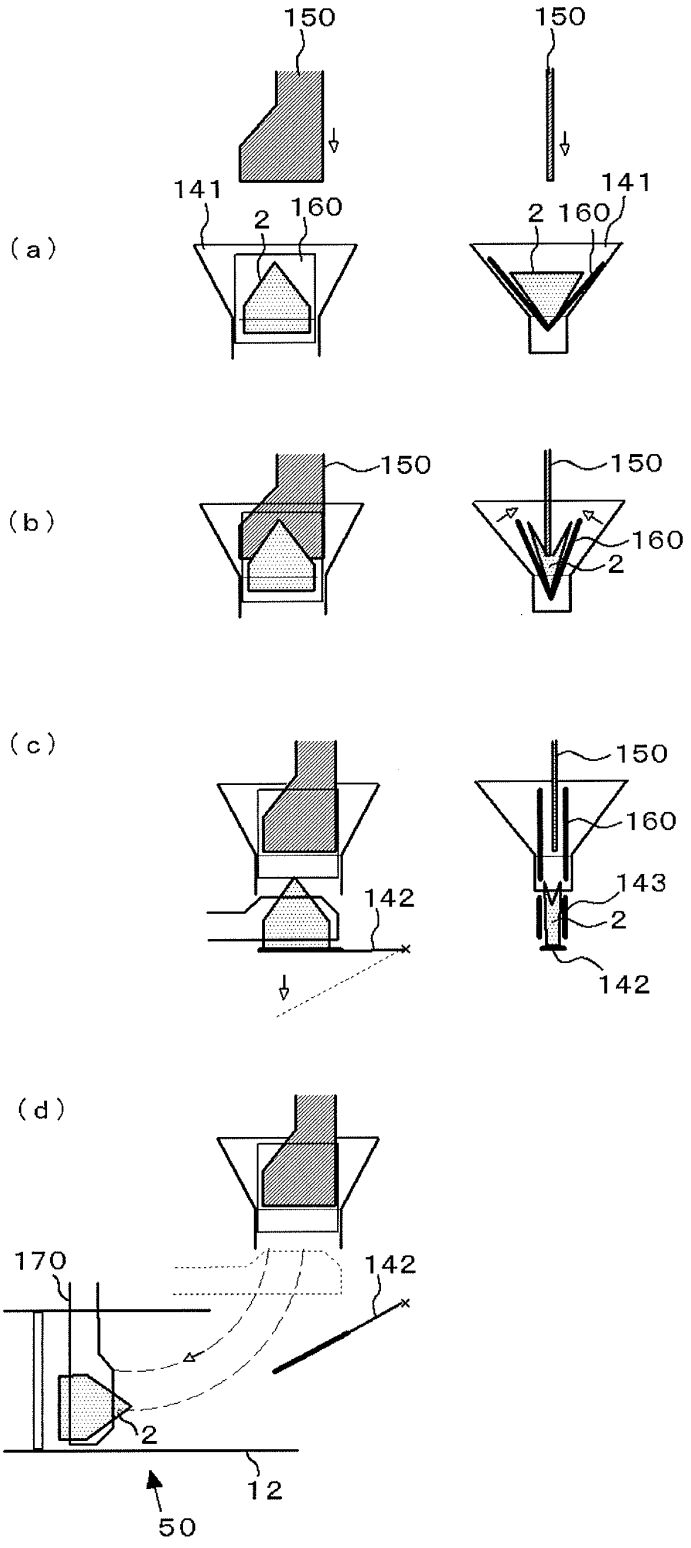


FIG. 16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(b)
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(c)
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(d)
170
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2
12
50

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2012/072187

A. CLASSIFICATION OF SUBJECT MATTER
B65B63/02(2006.01)i, *B65B29/02*(2006.01)i

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)
B65B63/02, B65B29/02

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

Jitsuyo Shinan Koho	1922-1996	Jitsuyo Shinan Toroku Koho	1996-2012
Kokai Jitsuyo Shinan Koho	1971-2012	Toroku Jitsuyo Shinan Koho	1994-2012

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US 4417433 A (THOMAS J. LIPTON, INC.), 29 November 1983 (29.11.1983), column 3, lines 49 to 65; column 4, lines 47 to 57; fig. 1 to 4 & US 4290521 A & US 4290521 A	1,5-7,11 2,4,8,10
Y	WO 2011/061846 A1 (Ohki Co., Ltd.), 26 May 2011 (26.05.2011), fig. 8 (Family: none)	2,4,8,10
A	WO 2009/101686 A1 (Fuso Industries Co., Ltd.), 20 August 2009 (20.08.2009), paragraph [0030]; fig. 1, 9 & CN 101939223 A	1-11

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:
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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 01/62600 A1 (I.M.A. INDUSTRIA MACCHINE AUTOMATICHE S.P.A.), 30 August 2001 (30.08.2001), page 5, line 4 to page 6, line 32; fig. 1 to 5 & JP 2003-523897 A & AU 3216801 A	1-11
A	EP 1607346 A2 (UNILEVER PLC), 21 December 2005 (21.12.2005), fig. 6 & JP 2001-519729 A & US 5873216 A & WO 1997/020686 A1	2,4,8,10

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO 2009100751 A **[0004]**
- WO 2009101686 A **[0004]**
- WO 201161846 A **[0018]**
- JP 2011061846 A **[0057]**