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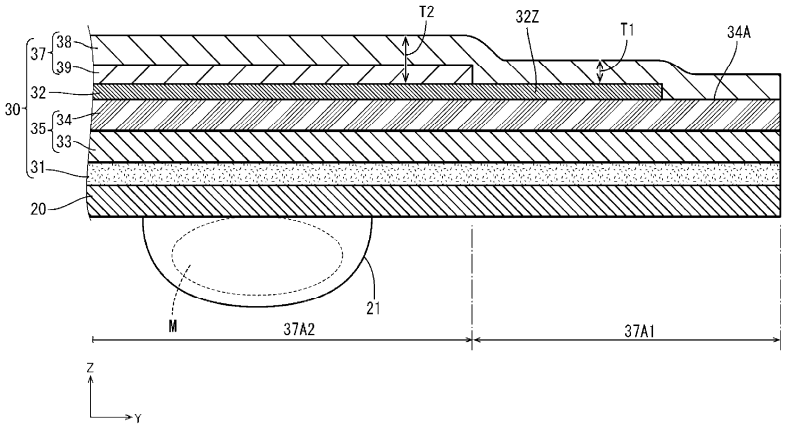
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(54) LID MATERIAL AND PACKAGING MATERIAL

(57) A lid material 30 for sealing an accommodation portion 21 of an accommodation container 20, the lid material includes: a substrate layer 35; a circuit pattern 32 that is provided on the substrate layer 35 and has a wiring path configured to be broken when the accommodation portion is unsealed; a resin layer 37 covering the circuit pattern 32 from a side opposite to the substrate layer; and a thermal adhesive layer 31 configured to be thermally adhered to the accommodation container 20, in which, the wiring path is provided with a terminal portion configured to be connected to an external device 40 for detecting the breakage, the resin layer 37 is divided into a first region 37A1 covering the terminal portion and a second region 37A2 covering a portion other than the terminal portion, and a thickness T2 of the second region 37A2 of the resin layer 37 is larger than a thickness T1 of the first region.

FIG.7



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Description

TECHNICAL FIELD

[0001] The present technique relates to a lid material and a packaging material.

BACKGROUND ART

[0002] In the related art, there has been known a technique of detecting unsealing of an accommodation portion in a packaging material (for example, press-through package (PTP)) including the accommodation portion for accommodating tablets and the like, and an example thereof is disclosed in Patent Literature 1. The packaging material disclosed in Patent Literature 1 includes an accommodation sheet (example of accommodation container) having a plurality of accommodation portions, and an unsealing detection sheet on which a circuit pattern is formed. When an accommodated object is removed from the accommodation portion, the circuit pattern of the unsealing detection sheet is broken. This breakage is detected by an external unsealing detector, and thus the unsealing of the accommodation portion is detected.

[0003] The circuit pattern of the unsealing detection sheet is divided into a region covered with a resin layer and a region not covered with the resin layer. The uncovered region serves as a connection portion that is conducted to a terminal portion of the unsealing detector.

CITATION LIST

PATENT LITERATURE

[0004] Patent Literature 1: JP2020-189636A

(Technical Problem)

[0005] The unsealing detection sheet may be attached to the lid material of the accommodation sheet afterwards, but it is convenient if the unsealing detection sheet can be thermally adhered to the accommodation sheet as the lid material in advance. If the unsealing detection sheet is used as the lid material, an unsealing detection function can be provided to an existing PTP without increasing the number of manufacturing processes.

[0006] However, there is a concern that the connection portion of the circuit pattern of the unsealing detection sheet disclosed in Patent Literature 1 may be damaged during thermocompression bonding. For example, thermocompression bonding between the lid material and the accommodation sheet in a PTP manufacturing process is performed by applying a pressure of about 0.2 MPa to 0.4 MPa in a temperature range of about 200°C to 300°C. The connection portion of the circuit pattern disclosed in Patent Literature 1 is not covered with the resin layer, and there is a concern that the connection portion may be peeled off from a substrate under such high temperature and high pressure.

SUMMARY OF INVENTION

[0007] The present technique has been completed on the basis of the above circumstances, and an object of the present technique is to implement a lid material with an unsealing detection function that enables stable thermocompression bonding, and a packaging material including the lid material.

(Solution To Problem)

[0008] A lid material according to the technique described in the description of this application is a lid material for sealing an accommodation portion of an accommodation container, the lid material including: a substrate layer; a circuit pattern that is provided on the substrate layer and has a wiring path configured to be broken when the accommodation portion is unsealed; a resin layer covering the circuit pattern from a side opposite to the substrate layer; and a thermal adhesive layer configured to be thermally adhered to the accommodation container, in which the wiring path is provided with a terminal portion configured to be connected to an external device for detecting the breakage, the resin layer is divided into a first region covering the terminal portion and a second region covering a portion other than the terminal portion, and a thickness of the second region of the resin layer is larger than a thickness of the first region.

[0009] In the lid material having the above configuration, the resin layer may include a first resin layer provided over the first region and the second region, and a second resin layer provided in the second region but not in the first region.

[0010] In the lid material having the above configuration, a dry weight per unit area in the second region of the resin layer may be 3.0 g/m^2 or more and 5.0 g/m^2 or less.

[0011] In the lid material having the above configuration, a dry weight per unit area in the first region of the resin layer may be 0.6 g/m^2 or more and 2.5 g/m^2 or less.

[0012] In the lid material having the above configuration, the terminal portion may be configured to be conductive by coming into contact with a tapered contact element included in the external device.

[0013] In the lid material having the above configuration, the thermal adhesive layer may be capable of sealing the accommodation portion by thermocompression bonding at a heating temperature of 220°C to 240°C.

[0014] A packaging material according to the technique described in the description of this application in-

cludes: the lid material having the above configuration; and an accommodation container having an accommodation portion sealed by the lid material, in which an accommodated object in the accommodation portion is removable by the lid material being pressed and broken.

[0015] In the packaging material having the above configuration, the wiring path may be shaped to pass through an overlapping portion overlapping the accommodation portion in a plan view, be folded back, and pass through the overlapping portion again.

(Advantageous Effects of Invention)

[0016] According to the present technique, it is possible to implement a lid material with an unsealing detection function that enables stable thermocompression bonding, and a packaging material including the lid material.

BRIEF DESCRIPTION OF DRAWINGS

[0017]

[FIG. 1] FIG. 1 is a perspective view of a PTP attached to an unsealing detector.
[FIG. 2] FIG. 2 is a perspective view of the unsealing detector with a second lid displaced upward.
[FIG. 3] FIG. 3 is an exploded perspective view of the PTP.
[FIG. 4] FIG. 4 is a cross-sectional view illustrating a state in which the unsealing detection sheet is thermally adhered to a sheet-shaped container by a heat roll.
[FIG. 5] FIG. 5 is a top view of the PTP.
[FIG. 6] FIG. 6 is a cross-sectional view taken along a line I-I in FIG. 5.
[FIG. 7] FIG. 7 is an enlarged cross-sectional view of the vicinity of a second region of a resin layer in FIG. 6.
[FIG. 8] FIG. 8 is a table showing results of Evaluation Experiment 1.
[FIG. 9] FIG. 9 is a top view of a PTP according to another embodiment.

DESCRIPTION OF EMBODIMENTS

<Embodiment 1>

[0018] Embodiment 1 will be described with reference to FIGS. 1 to 8. In the present embodiment, an unsealing detection sheet (example of lid material with unsealing detection function) 30 and a PTP (example of press-through package or packaging material) 10 to which the unsealing detection sheet 30 is thermally adhered are exemplified. In some drawings, an X axis, a Y axis, and a Z axis are shown, and each axis direction is drawn to be a direction common in each drawing.

[0019] As illustrated in FIG. 1, a PTP 10 is attached to an unsealing detector 40, which is an external device, to detect an unsealing state. An unsealing detection method of the unsealing detector 40 and an output method of an unsealing detection result are not limited, and an example of the unsealing detector 40 will be described below with reference to FIGS. 1 and 2. The unsealing detector 40 includes at least a plurality of (12 in the present embodiment) contact elements 41B, a communication module 42, and a housing 50. The housing 50 accommodates each unit and also serves as an attachment portion that detachably sandwiches and holds the PTP 10.

[0020] The housing 50 of the unsealing detector 40 is made of a resin material and includes a first housing 51 and a second housing 52. The first housing 51 occupies most of the housing 50, and an upper front portion thereof is recessed. The second housing 52 is a lid that covers a recess in the front upper portion of the first housing 51. The second housing 52 is pressed in an up-down direction (Z-axis direction) and displaced toward the first housing 51. Accordingly, the PTP 10 is sandwiched and held between the first housing 51 and the second housing 52. In this manner, the PTP 10 is attached to the unsealing detector 40.

[0021] The contact elements 41B of the unsealing detector 40 protrude from a surface of the first housing 51 on which the PTP 10 is sandwiched, and have a tapered shape. At least a protruding end of the contact element 41B has electrical conductivity. When the PTP 10 is attached to the unsealing detector 40 (FIG. 1), the contact elements 41B are brought into contact and conducted to respective terminal portions 32Z1 and 32A1 to 32J1 of a circuit pattern 32 to be described later of the PTP 10.

[0022] The communication module 42 of the unsealing detector 40 includes a control unit (detection unit) and a communication unit, and the control unit causes a current to flow through the contact elements 41B and detects a voltage generated in the circuit pattern 32 of the PTP 10. Then, the control unit 44 compares a detected voltage value with a predetermined threshold, and determines that the circuit pattern 32 is not broken and is in a sealed state when the detected voltage value is equal to or less than the threshold, and determines that the circuit pattern 32 is broken and is in an unsealed state when the detected voltage value is greater than the threshold. The communication unit transmits and outputs determined unsealing detection information to a management server or an information processing terminal.

[0023] Next, the PTP 10 will be described in detail. As illustrated in FIG. 3, the PTP 10 includes a sheet-shaped container 20 including accommodation portions 21 for accommodated objects M such as tablets, and the unsealing detection sheet 30 to be thermocompression-bonded to the sheet-shaped container 20. For example, as illustrated in FIG. 4, the unsealing detection

sheet 30 is thermally adhered to the sheet-shaped container 20 by a heat roll HR provided in an accommodated object filling machine. When the unsealing detection sheet 30 is thermally adhered to the sheet-shaped container 20, the unsealing detection sheet 30 covers an opening 21A of the accommodation portion 21 and seals the accommodation portion 21. A planar shape and a planar size of the unsealing detection sheet 30 are formed to be capable of covering the entire main surface of the sheet-shaped container 20, and are substantially the same as those of the sheet-shaped container 20 in the present embodiment.

[0024] The sheet-shaped container 20 includes a plurality of accommodation portions 21 protruding to a side opposite to the unsealing detection sheet 30. The accommodation portion 21 has an internal space for accommodating the accommodated object M on an inner side thereof, and a boundary portion with the unsealing detection sheet 30 is the opening 21A. The accommodation portion 21 is formed in a shape following a shape of the accommodated object M in a plan view. A material known as a sheet-shaped container for a PTP is appropriately used for the sheet-shaped container 20. The sheet-shaped container 20 is, for example, a resin container obtained by processing a resin sheet material having a thickness of about 60 μm to 400 μm.

[0025] In the present embodiment, each of the accommodation portions 21 has a circular shape in a plan view, and a total of ten accommodation portions 21 are formed in a manner of five accommodation portions 21 being formed at predetermined intervals in a longitudinal direction (Y-axis direction) and two accommodation portions 21 being formed at predetermined intervals in a short direction (X-axis direction). In addition, the five accommodation portions 21 arranged in the longitudinal direction are formed near one short side 20A of the sheet-shaped container 20. Thus, between the other short side 20B of the sheet-shaped container 20 and the accommodation portion 21, a blank region 20S wider than between the one short side 20A and the accommodation portion 21 is formed. The blank region 20S is a region where a first region 37A1 of a resin layer 37 of the unsealing detection sheet 30 to be described later overlaps in a plan view.

[0026] The unsealing detection sheet 30 is a composite material having a sheet shape that can be pressed through. A portion of the unsealing detection sheet 30 other than a portion covering the opening 21A of the accommodation portion 21 is thermally adhered to the sheet-shaped container 20. As illustrated in FIG. 6, the unsealing detection sheet 30 is an aluminum laminate in which a thermal adhesive layer 31, a substrate layer 35 (aluminum foil 33 and insulating layer 34), a circuit pattern 32, and a resin layer (overcoat layer and protective layer) 37 are laminated in this order from a lower side (sheet-shaped container 20 side).

[0027] The thermal adhesive layer 31 is configured to be thermally adhered to the sheet-shaped container 20 and cover the accommodation portion 21. A sealing property of the accommodation portion 21 is appropriately designed depending on an application of the PTP 10, but the accommodation portion 21 does not need to be airtight to such an extent that a gas does not leak at all, and may be airtight to such an extent that at least a solid does not leak. A known thermal adhesive for a PTP can be used for the thermal adhesive layer 31. The thermal adhesive layer 31 is formed of, for example, a thermal adhesive such as a polyester-based adhesive, a polypropylene-based adhesive, a vinyl chloride-based adhesive, or a vinyl chloride-vinyl acetate-based copolymer-based adhesive (vinyl chloride-vinyl acetate-based adhesive).

[0028] A temperature at which the thermal adhesive layer 31 is thermocompression-bonded, that is, a heating temperature by the heat roll HR is appropriately selected depending on a type of the PTP 10, and is generally in a range of 220°C to 260°C or in a range of 200°C to 300°C. In the present embodiment, since the second region 37A2 of the resin layer 37 is formed as a thick film as to be described later, it is preferable that the thermal adhesive layer 31 is formed of a material having a low melting point so as to be reliably thermally adhered in a short time as in the related art even in a case where heating by the heat roll HR is received via the thick resin layer 37. The thermal adhesive layer 31 is, for example, a thermal adhesive such as a polyester-based adhesive, a polypropylene-based adhesive, a vinyl chloride-based adhesive, or a vinyl chloride-vinyl acetate-based copolymer-based adhesive (vinyl chloride-vinyl acetate-based adhesive).

[0029] The substrate layer 35 includes the aluminum foil 33 and the insulating layer 34. By using the aluminum foil 33 for the substrate layer 35, moisture resistance can be particularly enhanced as compared with a resin or paper. The insulating layer 34 is interposed between the aluminum foil 33 and the circuit pattern 32 to ensure insulation therebetween. For example, white ink may be applied to the entire surface of a main surface of the aluminum foil 33 on an insulating layer 34 side in order to easily read a barcode or two-dimensional barcode printed as necessary.

[0030] The circuit pattern 32 is provided on a main surface 34A of the insulating layer 34 on a side opposite to the aluminum foil 33. The circuit pattern 32 includes a plurality of wiring patterns formed by printing conductive ink or the like on the insulating layer 34. The circuit pattern 32 is formed by, for example, supplying the conductive ink in a predetermined pattern shape to a surface of the insulating layer 34 and then curing the conductive ink. The conductive ink is a conductive composition in which conductive particles are dispersed in a vehicle containing a binder, and for example, various particles composed of materials exhibiting good electrical conductivity such as gold, silver, copper, platinum, aluminum, alloys thereof, and carbon black are used.

As a method of supplying the conductive ink, for example, various printing methods such as supply by a dispenser, a gravure printing method, and an inkjet printing method can be used. As a method of curing the conductive composition, a dry curing method, a heat curing method, or the like is used depending on a type of the conductive ink to be used.

[0031] As illustrated in FIG. 5, the circuit pattern 32 according to the present embodiment includes the same number of wiring paths as the number of the accommodation portions 21, more specifically, ten wiring paths of 32A, 32B, 32C, 32D, 32E, 32F, 32G, 32H, 32I, and 32J (hereinafter, referred to as 32A to 32J). Each of the wiring paths 32A to 32J is provided to each of the accommodation portions 21 such that the wiring path differs for each of the accommodation portions 21.

[0032] Both end portions of each of the wiring paths 32A to 32J are provided on a one short side 10A side of the PTP 10. The both end portions of each of the wiring paths 32A to 32J are provided with terminal portions to be connected in contact with the contact elements 41B of the unsealing detector 40. More specifically, a first terminal portion 32Z1 is provided on one end portion side of each of the wiring paths 32A to 32J, and second terminal portions 32A1, 32B1, 32C1, 32D1, 32E1, 32F1, 32G1, 32H1, 32I1, and 32J1 (hereinafter, referred to as 32A1 to 32J1) are provided on the other end portion side.

[0033] The first terminal portion 32Z1 is provided at the same position for all the wiring paths 32A to 32J, and is a terminal common to all the wiring paths 32A to 32J. The first terminal portion 32Z1 is connected to one of the contact elements 41B, and a predetermined reference potential (specifically, GND potential) is supplied from the contact element 41B. The second terminal portions 32A1 to 32J1 are provided at different positions for the respective wiring paths 32A to 32J. Each of the second terminal portions 32A1 to 32J1 is connected to any of the contact elements 41B, and is supplied with a predetermined potential from the contact element 41B. When a predetermined potential difference is generated (voltage is applied) between the first terminal portion 32Z1 and the second terminal portions 32A1 to 32J1, a current flows through each of the wiring paths 32A to 32J.

[0034] The respective wiring paths 32A to 32J are formed so as to connect the first terminal portion 32Z1 and the second terminal portion 32A1 to 32J1. Lengths of the wiring paths 32A to 32J are formed to be as large as the wiring paths 32A to 32J provided in the accommodation portion 21 having a larger distance from the terminal portions 32Z1 and 32A1 to 32J1. In addition, the respective wiring paths 32A to 32J have overlapping portions 32A2 to 32J2 overlapping the accommodation portion 21 in a plan view. When the accommodation portion 21 is unsealed, the overlapping portions 32A2 to 32J2 of the wiring paths 32A to 32J are broken.

[0035] Regarding the wiring paths 32A to 32J, as illustrated in the wiring paths 32A and 32J of FIG. 5 as an example, the wiring paths 32A and 32J may be formed so as to pass through the overlapping portion 32A2 and 32J2, be folded back in a substantially U shape, and pass through the overlapping portion 32A2 and 32J2 again. In this manner, the accommodation portion 21 is more reliably broken when unsealed.

[0036] When the PTP 10 is attached to the unsealing detector 40 (FIG. 1), the terminal portions 32Z1 and 32A1 to 32J1 are conducted to the contact elements 41B of the unsealing detector 40. When the PTP 10 is sandwiched between the first housing 51 and the second housing 52 of the unsealing detector 40, the contact elements 41B are pressed toward the opposing terminal portions 32Z1 and 32A1 to 32J1. The contact elements 41B have a tapered shape as described above, and are configured to be conducted to the terminal portions 32Z1 and 32A1 to 32J1 when pressed.

[0037] The resin layer 37 is formed on the entire surface as an outermost layer of the unsealing detection sheet 30, and covers and protects other layers of the unsealing detection sheet 30. The resin layer 37 is printed and coated on the entire main surface 34A of the insulating layer 34 and covers the entire circuit pattern 32. A material of the resin layer 37 is not particularly limited as long as it is a resin material, and the material is, for example, an epoxy-based resin material, and is formed by printing coating (MOP, Mat Over Print). The resin layer 37 protects the unsealing detection sheet 30 from heating and pressurization by the heat roll HR during manufacturing, and protects the unsealing detection sheet 30 from damage due to an external force during transportation. Therefore, the resin layer 37 preferably has heat resistance and pressure resistance against heating by the heat roll HR, and adhesion strength (adhesion) by which the resin layer 37 is not easily peeled off by an external force.

[0038] As illustrated in FIGS. 5 to 7, a sheet plane of the resin layer 37 is divided into the first region 37A1 covering the terminal portions 32Z1 and 32A1 to 32J1 of the circuit pattern 32 and the second region 37A2 covering most of the circuit pattern 32 other than the terminal portions 32Z1 and 32A1 to 32J1. The first region 37A1 is a region on the one short side 10A side of the PTP 10 (see FIG. 5), and is a region overlapping the blank region 20S of the sheet-shaped container 20 in a plan view.

[0039] The resin layer 37 has a laminated structure of a first resin layer 38 and a second resin layer 39 in a layer thickness direction. The first resin layer 38 is coated across the first region 37A1 and the second region 37A2. The second resin layer 39 is coated on the second region 37A2 but not on the first region 37A1. Accordingly, as illustrated in FIG. 7, a thickness T2 of the second region 37A2 of the resin layer 37 is larger than a thickness T1 of the first region.

[0040] In this manner, in a sheet plane of the unsealing detection sheet 30, a portion attached to the un-

sealing detector 40, that is, the terminal portions 32Z1 and 32A1 to 32J1 of the circuit pattern 32 can be conducted to the unsealing detector 40 while being protected by the first region 37A1 of the resin layer 37. More specifically, by adjusting the thickness T1 of the first region 37A1 of the resin layer 37 to be sufficiently small, the terminal portions 32Z1 and 32A1 to 32J1 can be conducted to the contact elements 41B of the unsealing detector 40 via the first region 37A1 of a thin film. In the present embodiment, the contact elements 41B have a tapered shape, and the contact elements 41B are easily conducted to the terminal portions 32Z1 and 32A1 to 32J1 via the first region 37A1 of the resin layer 37 when pressed. Depending on the thickness T1 of the first region 37A1 of the resin layer 37, the contact elements 41B penetrate the first region 37A1 of the resin layer 37 and contact the terminal portions 32Z1 and 32A1 to 32J1. In this manner, the contact elements 41B of the unsealing detector 40 and the terminal portions 32Z1 and 32A1 to 32J1 of the unsealing detection sheet 30 can be reliably conducted. On the other hand, since most of the sheet plane of the unsealing detection sheet 30 is covered with the second region 37A2 of the resin layer 37 having the large film thickness T2, the insulation property is ensured. As a result, it is possible to implement the unsealing detection sheet 30 that can be stably thermocompression-bonded to the sheet-shaped container 20, and it is possible to manufacture the PTP 10 by using an accommodated object filling machine in the related art.

[0041] A coating amount of such a resin layer 37 is preferably such that a dry weight per unit area in the first region 37A1 of the resin layer 37 is 0.6 g/m^2 or more and 2.5 g/m^2 or less. When the dry weight is less than 0.6 g/m^2, the thickness T1 of the first region 37A1 of the resin layer 37 becomes small, and the terminal portions 32Z1 and 32A1 to 32J1 cannot be protected from the heating by the heat roll HR, and the heat resistance and the pressure resistance cannot be ensured. In addition, when the dry weight is larger than 2.5 g/m^2, the thickness T1 of the first region 37A1 of the resin layer 37 becomes excessively large, and the terminal portions 32Z1 and 32A1 to 32J1 cannot be conducted to the contact elements 41B of the unsealing detector 40.

[0042] The coating amount of the resin layer 37 is preferably such that a dry weight per unit area in the second region 37A2 of the resin layer 37 is 3.0 g/m^2 or more and 5.0 g/m^2 or less. When the dry weight is less than 3.0 g/m^2, the thickness T2 of the second region 37A2 of the resin layer 37 becomes small, and the insulation property of the circuit pattern 32 covered with the second region 37A2 of the resin layer 37 cannot be ensured. In addition, when the dry weight is larger than 5.0 g/m^2, the thickness T2 of the second region 37A2 of the resin layer 37 is increased, the insulation property is improved, but an amount of resin used is increased because the thickness is increased more than necessary, and it is necessary to increase the number of times of coating, so that a manufacturing cost is increased.

<Evaluation Experiment 1>

[0043] In order to evaluate a performance of the above-described PTP 10, Evaluation Experiment 1 was performed. In Evaluation Experiment 1, a sealing property of the accommodation portion 21 and conductivity of the circuit pattern 32 were evaluated for samples for evaluation of the PTP 10 (Examples 1 to 6). Results of the evaluation experiment are shown in a table of FIG. 8.

<Conditions>

[0044]

- ·Thermal adhesive layer 31: Type 1 (rigid vinyl chloride-based thermal adhesive sheet) or Type 2 (rigid vinyl chloride-based thermal adhesive sheet having a melting point higher than that of Type 1)
- ·Resin layer 37: epoxy-based resin material
- ·Aluminum foil 33: entire surface coating with white ink on the main surface on the insulating layer 34 side is performed in Examples 1 and 2 and not in Examples 3 to 6
- ·Conditions of thermocompression bonding to sheet-shaped container 20: temperatures of 180°C, 200°C, 220°C, 240°C, and 260°C, with a constant pressure of 0.3 MPa

<Evaluation Method>

[0045] In a sealing property test (leakage test), a sample for evaluation was evacuated at 0.07 MPa for 1 minute to evaluate whether there is air leakage. The sealing property test was evaluated in two levels of A and C, and a case where there was no leakage of air was evaluated as A (good), and a case where there was leakage of air was evaluated as C (unacceptable). In a conductivity test (device operation confirmation), the PTP 10 was attached to the unsealing detector 40 and conduction was confirmed. The conductivity test was evaluated in two levels of A and C, and a case where a conduction state was confirmed was evaluated as A (good), and a case where the conduction state was not confirmed was evaluated as C (unacceptable).

<Evaluation Results>

[0046] As illustrated in FIG. 8, in Examples 1 to 4 in which the thermal adhesive sheet of Type 1 was used for the thermal adhesive layer 31, regarding the sealing property, results of good (evaluated as A) were obtained when the unsealing detection sheet 30 was adhered to the sheet-shaped container 20 by thermocom-

pression bonding at a heating temperature of 220°C or higher. On the other hand, the sealing property was insufficient by thermocompression bonding at a heating temperature of 200°C or lower (evaluated as C). In addition, in Examples 5 and 6 in which the thermal adhesive sheet of Type 2 was used for the thermal adhesive layer 31, results of good (evaluated as A) were obtained in thermocompression bonding at a heating temperature of 260°C, but the sealing property were insufficient in thermocompression bonding at a heating temperature of 240°C or lower (evaluated as C). Regarding the sealing property, it was confirmed that a temperature during thermocompression bonding was easily lowered by using the thermal adhesive sheet of Type 1 having a low melting point.

[0047] Regarding the electrical conductivity, results of good (evaluated as A) were obtained in the thermocompression bonding at a heating temperature of 220°C or higher in all of Examples 1 to 6. On the other hand, in the thermocompression bonding at a heating temperature of 200°C or lower, since a result of the sealing property test previously performed was poor (evaluated as C), the conductivity test was not performed (indicated by "-" in table of FIG. 8).

<Other Embodiments>

[0048] The present invention is not limited to the embodiments described with reference to the above description and drawings, and for example, the following embodiments are also included in the technical scope of the present invention.

(1) A shape of the circuit pattern 32 of the unsealing detection sheet 30 is an example, and can be changed as appropriate. For example, wiring paths 132A to 132J may be formed as an unsealing detection sheet 130 of a PTP 100 illustrated in FIG. 9. The wiring paths 132A to 132J may be formed so as to pass through overlapping portions 132A2 to 132J2, be folded back in a substantially U shape, and pass through the overlapping portions 132A2 to 132J2 again. In this manner, all the wiring paths 132A to 132J are more reliably broken when the accommodation portion 21 is unsealed.

(2) A configuration of the substrate layer 35 of the unsealing detection sheet 30 can be appropriately changed according to the purpose. For example, the aluminum foil 33 in the substrate layer 35 is not limited to a single layer, and two aluminum foils may be adhered by an intermediate layer made of a resin.

(3) A size and shape of the sheet-shaped container 20, the number and interval of the accommodation portions 21, and the like in the drawings are examples, and can be changed as appropriate.

REFERENCE SIGNS LIST

[0049]

10: PTP (packaging material)
20: sheet-shaped container (accommodation container)
21: accommodation portion
21A: opening
30, 130: unsealing detection sheet (lid material)
31: thermal adhesive layer
32: circuit pattern
32A, 32B, 32C, 32D, 32E, 32F, 32G, 32H, 32I, 32J: wiring path
32A1, 32B1, 32C1, 32D1, 32E1, 32F1, 32G1, 32H1, 32I1, 32J1: second terminal portion
32Z1: first terminal portion
33: aluminum foil
34: insulating layer
35: substrate layer
37: resin layer
37A1: first region
37A2: second region
38: first resin layer
39: second resin layer
40: unsealing detector (external device)
41B: contact element
M: accommodated object

Claims

1. A lid material for sealing an accommodation portion of an accommodation container, the lid material comprising:

a substrate layer;
a circuit pattern that is provided on the substrate layer and has a wiring path configured to be broken when the accommodation portion is unsealed;
a resin layer covering the circuit pattern from a side opposite to the substrate layer; and
a thermal adhesive layer configured to be thermally adhered to the accommodation container, wherein
the wiring path is provided with a terminal portion configured to be connected to an external device for detecting the breakage,
the resin layer is divided into a first region covering the terminal portion and a second region covering a portion other than the terminal portion, and
a thickness of the second region of the resin layer is larger than a thickness of the first region.

2. The lid material according to claim 1, wherein

the resin layer includes a first resin layer provided over the first region and the second region, and a second resin layer provided in the second region but not in the first region.

3. The lid material according to claim 1 or 2, wherein a dry weight per unit area in the second region of the resin layer is 3.0 g/m^2 or more and 5.0 g/m^2 or less.

4. The lid material according to claim 1 or 2, wherein a dry weight per unit area in the first region of the resin layer is 0.6 g/m^2 or more and 2.5 g/m^2 or less.

5. The lid material according to claim 1 or 2, wherein the terminal portion is configured to be conductive by coming into contact with a tapered contact element included in the external device.

6. The lid material according to claim 1 or 2, wherein the thermal adhesive layer is capable of sealing the accommodation portion by thermocompression bonding at a heating temperature of 220°C to 240°C.

7. A packaging material comprising:

the lid material according to claim 1 or 2; and
an accommodation container having an accommodation portion sealed by the lid material, wherein
an accommodated object in the accommodation portion is removable by the lid material being pressed and broken.

8. The packaging material according to claim 7, wherein
the wiring path is shaped to pass through an overlapping portion overlapping the accommodation portion in a plan view, be folded back, and pass through the overlapping portion again.

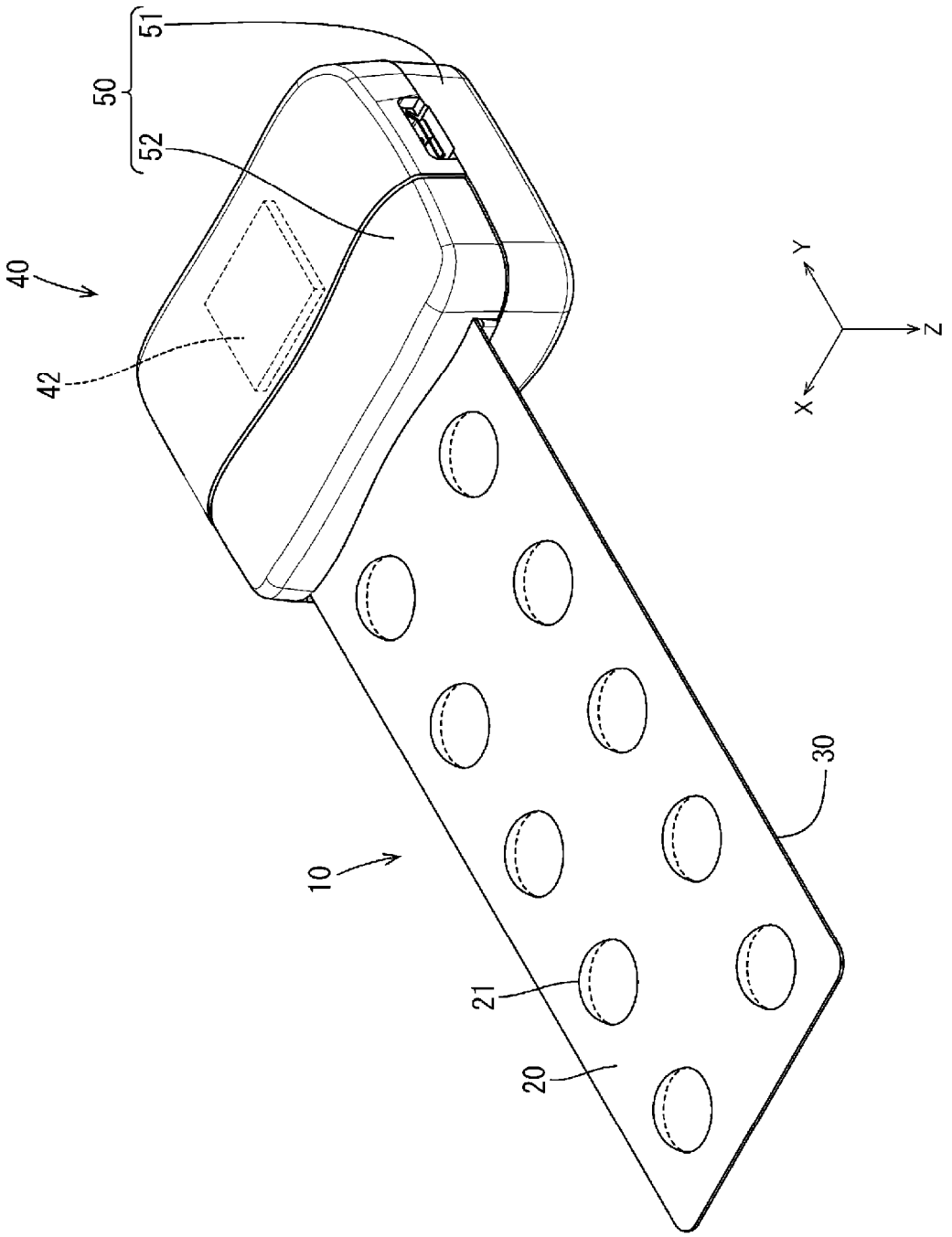


FIG.1

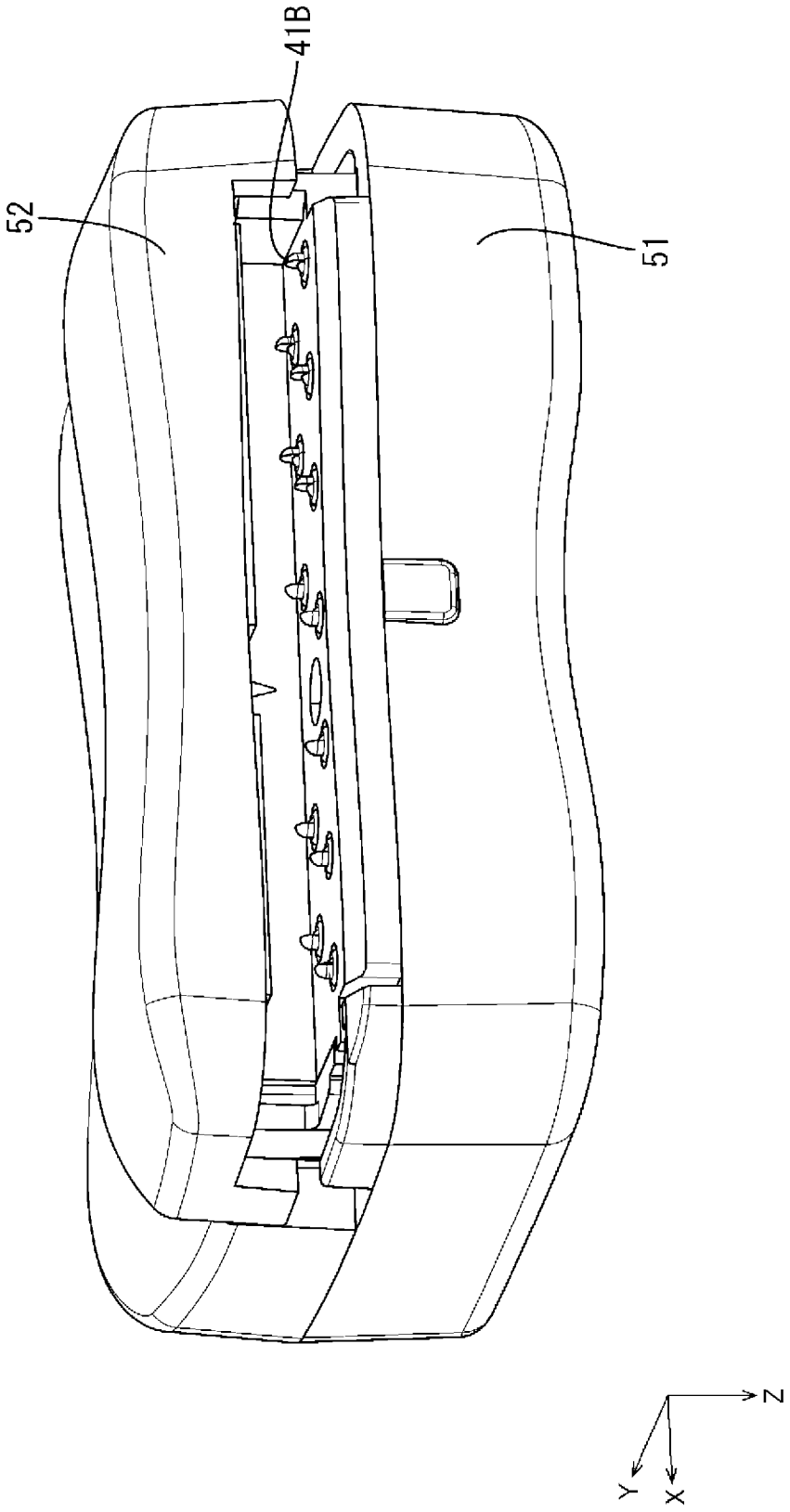


FIG.2

FIG.3

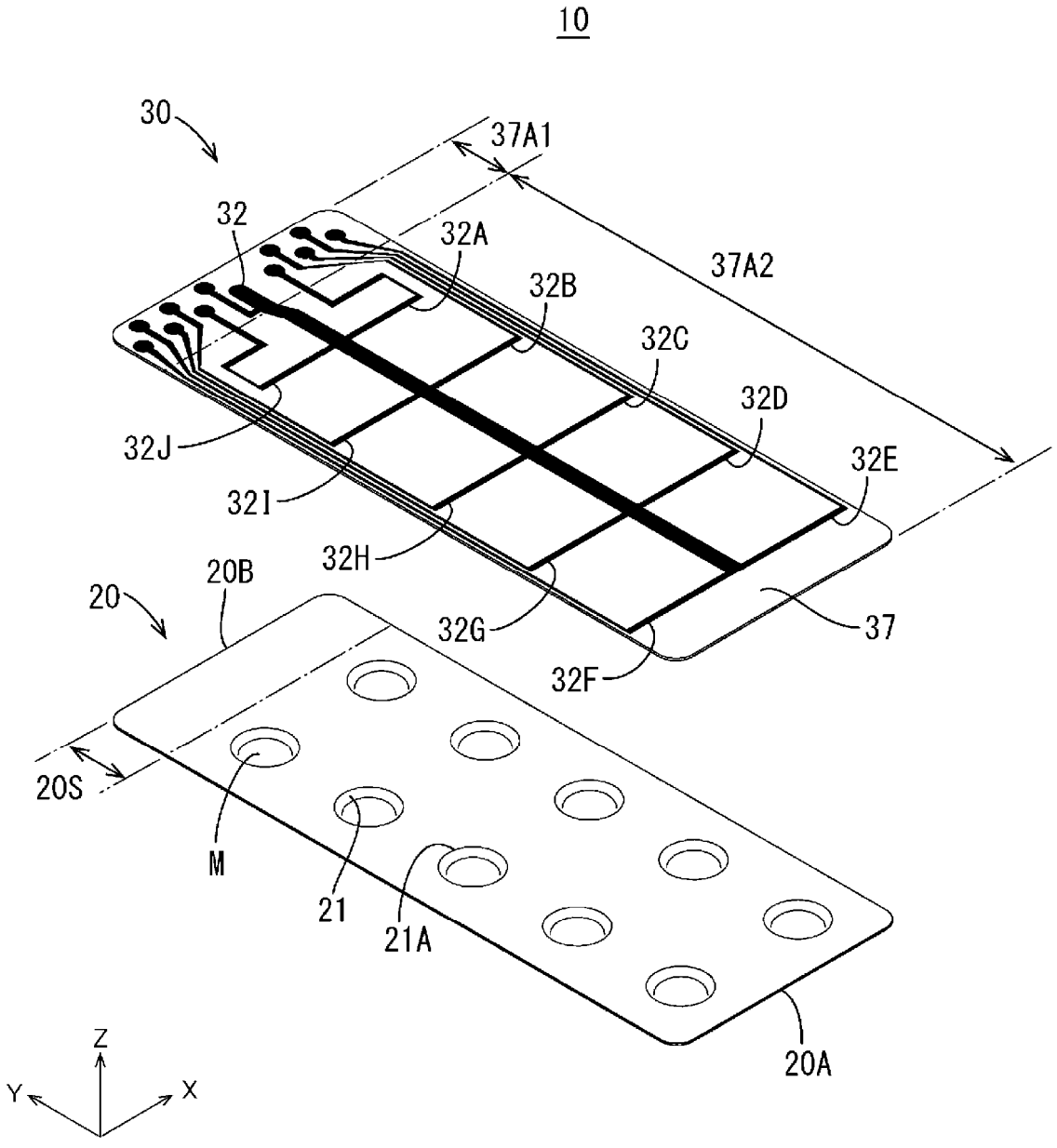

10
30
37A1
32
32A
37A2
32B
32C
32D
32J
32E
321
32H
20B
20
32G
37
32F
20S
M
21
21A
20A
Z
Y
X

FIG.4

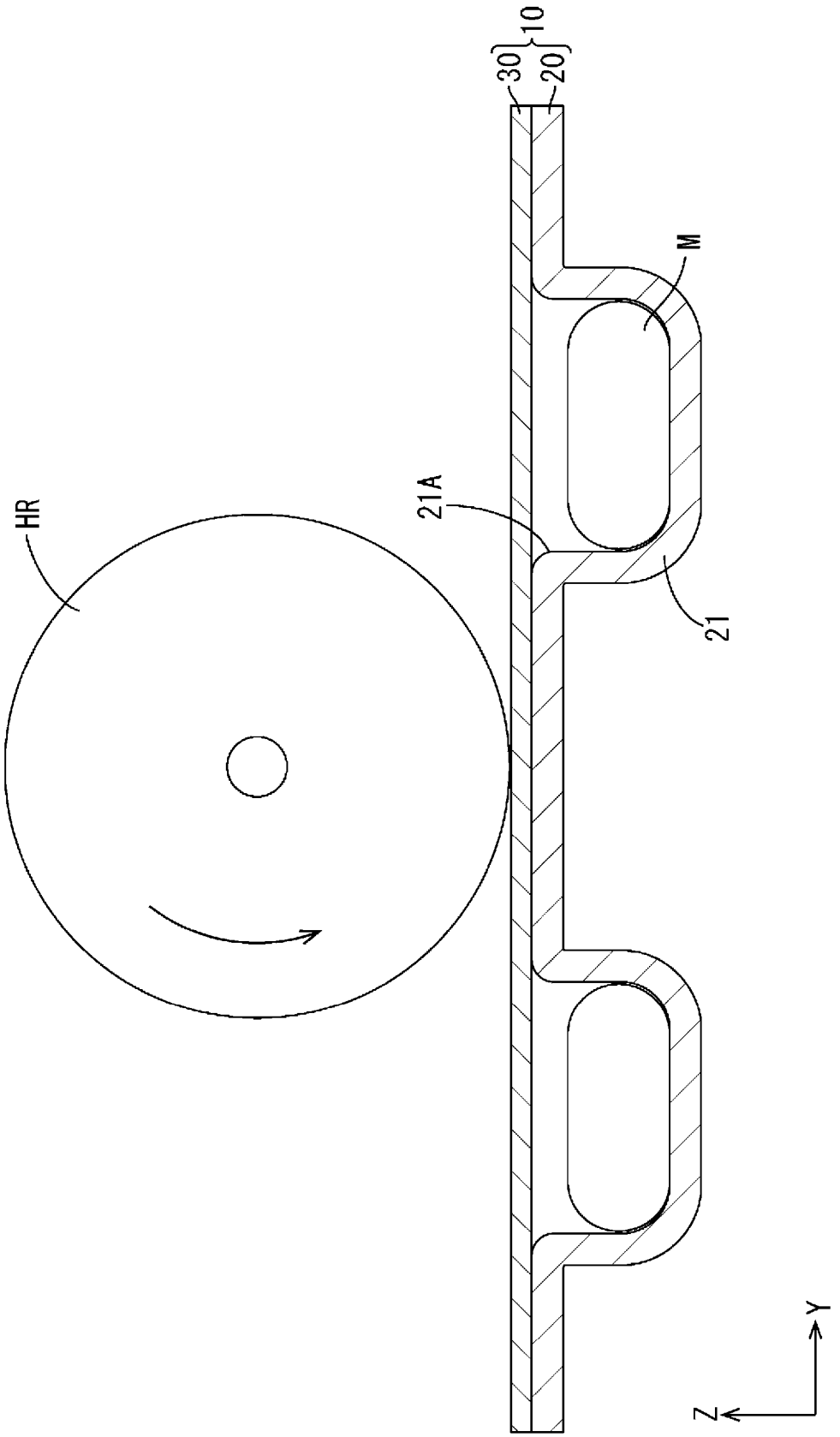


FIG.5

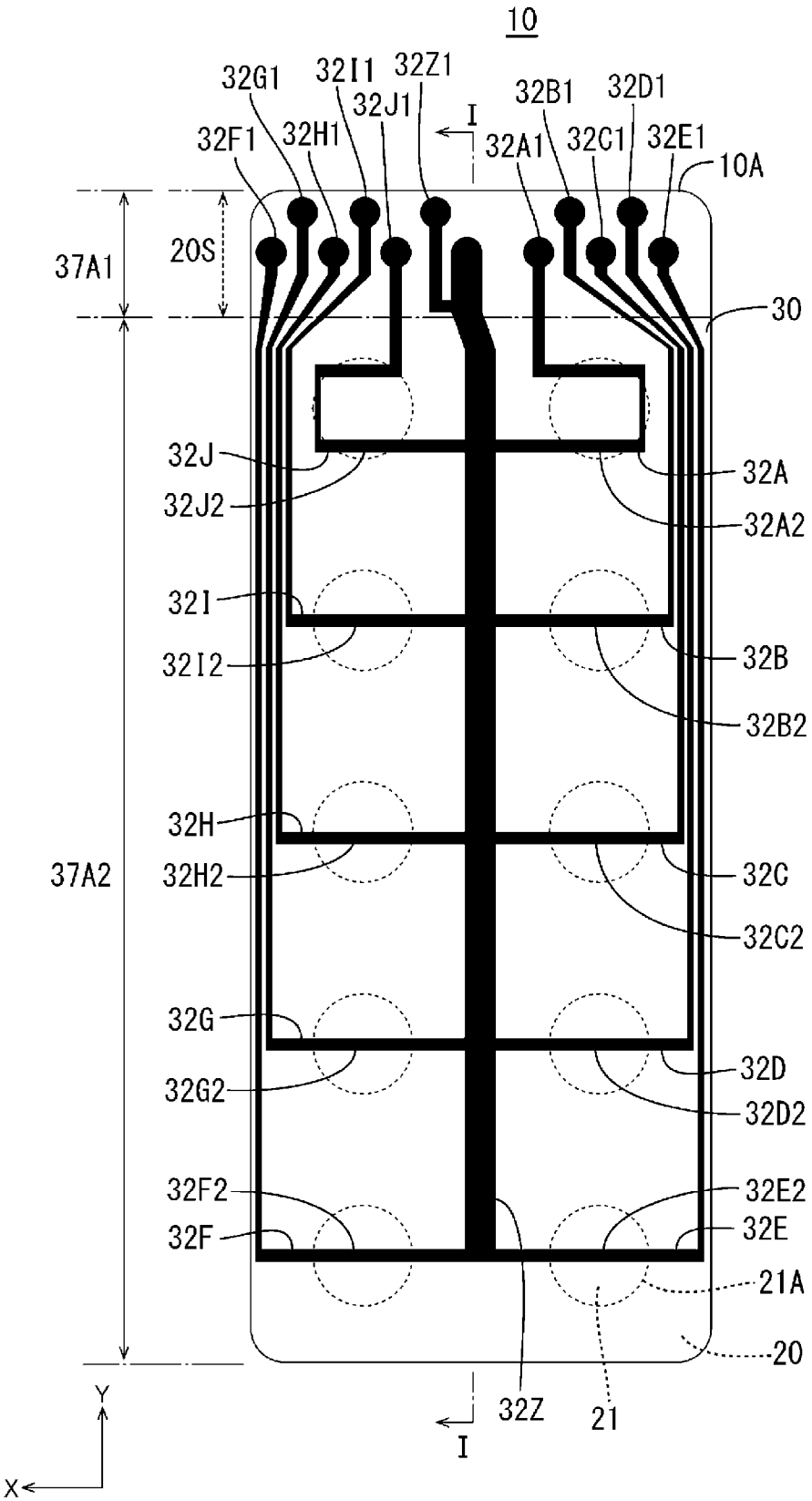

10
32G1
32I1
32Z1
32J1
32B1
32D1
32F1
32H1
I
32A1
32C1
32E1
10A
37A1
20S
30
32J
32A
32J2
32A2
32I
32I2
32B
32B2
32H
37A2
32H2
32C
32C2
32G
32G2
32D
32D2
32F2
32E2
32F
32E
21A
20
32Z
21
I
Y
X

FIG.6

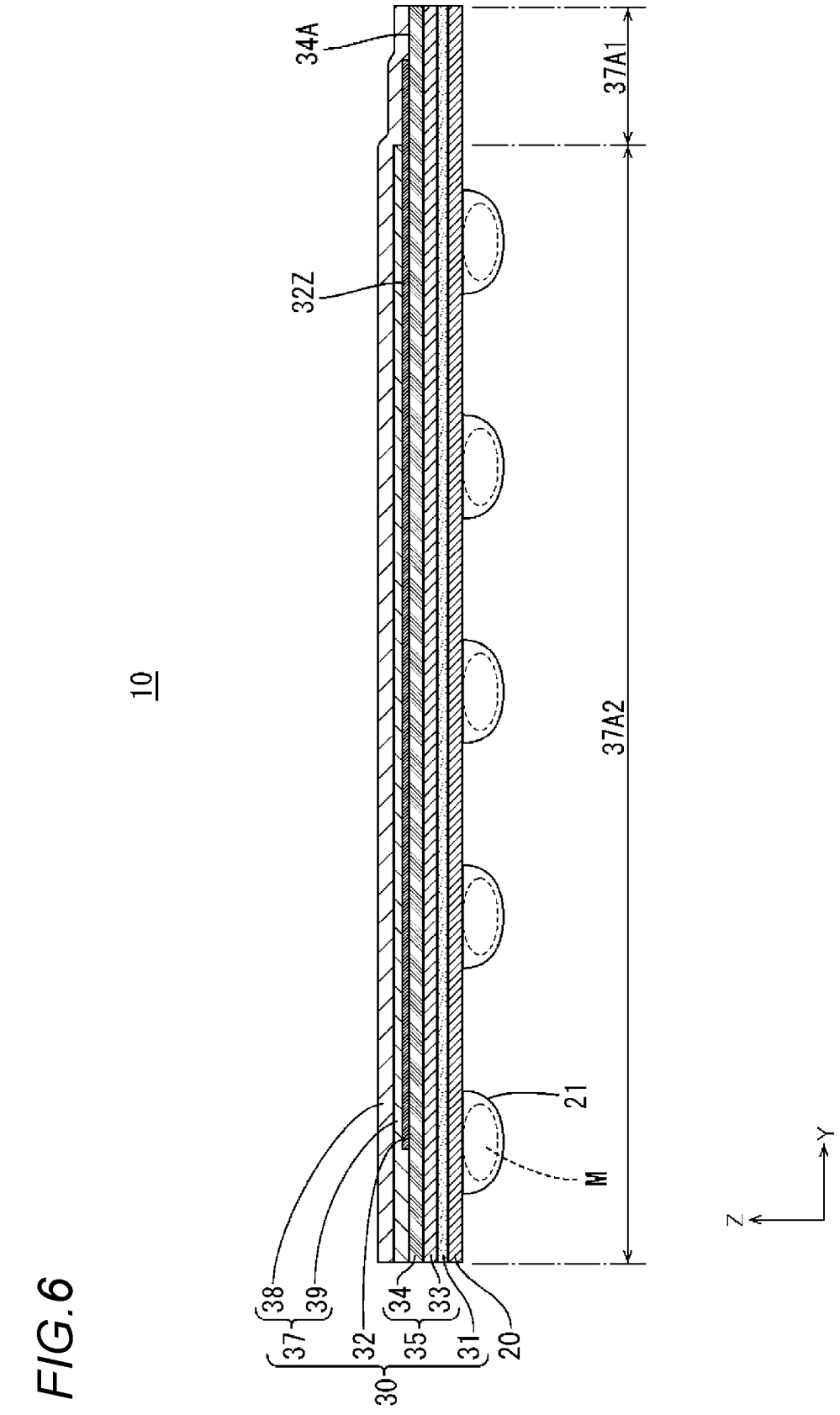


FIG.7

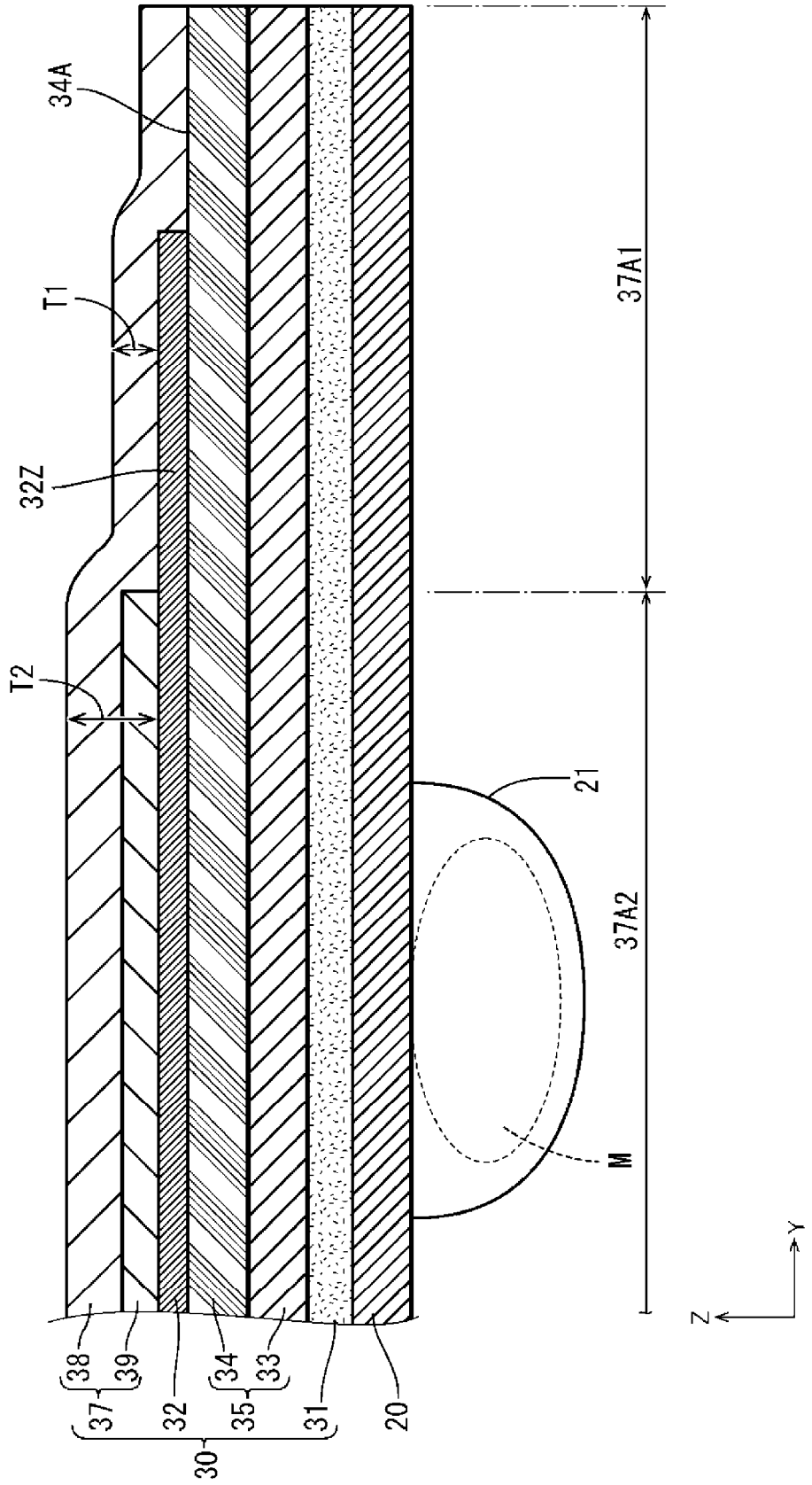
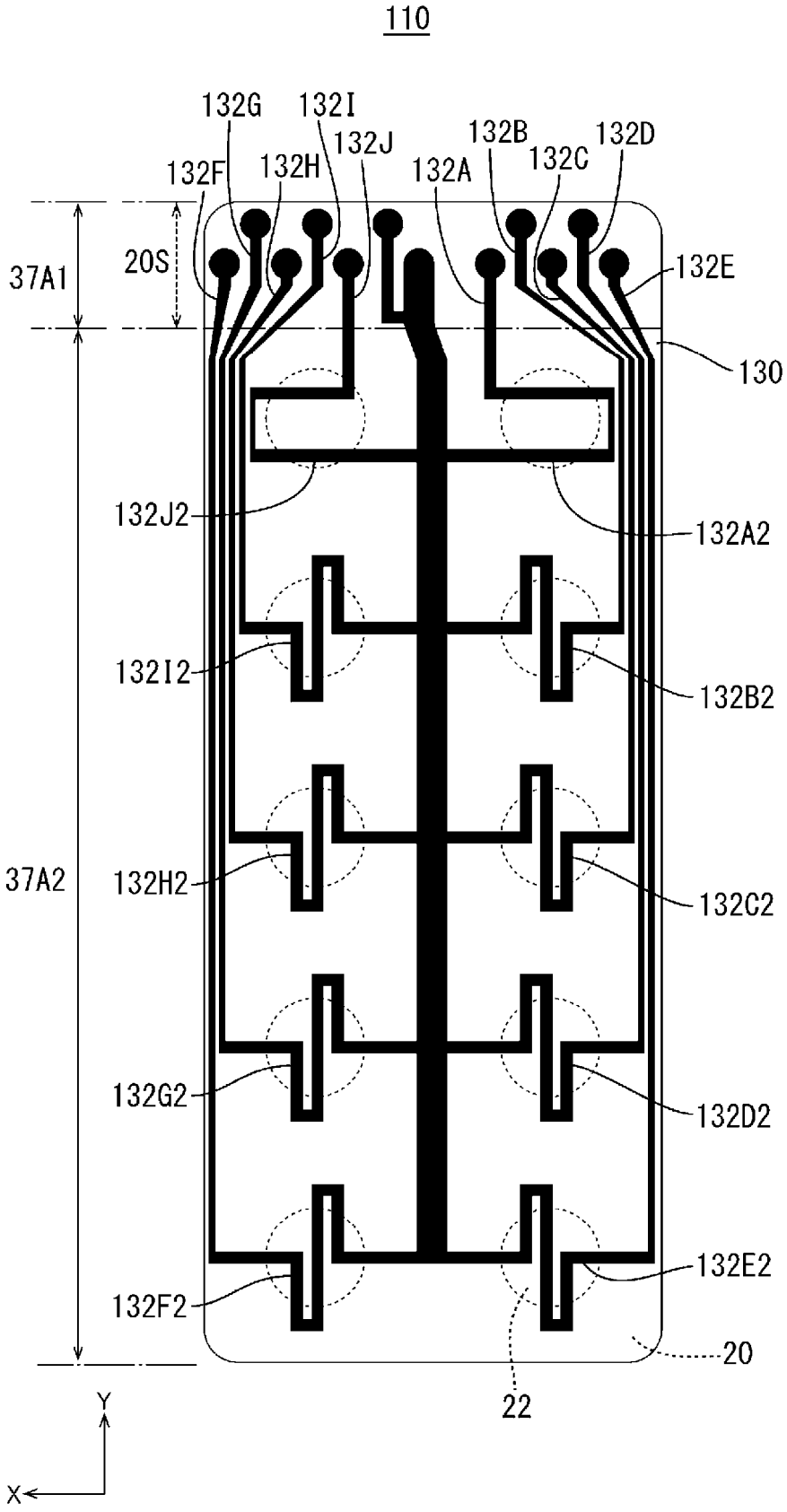


FIG.8

EXAMPLE	INK COATING ON AL FOIL 33	THERMAL ADHESIVE LAYER 31	COATING AMOUNT OF FIRST REGION 37A1 OF RESIN LAYER 37	VERIFICATION ITEM	HEATING TEMPERATURE (°C, WITH CONSTANT PRESSURE OF 0.3 MPa)				
					180	200	220	240	260
1	PRESENCE	TYPE 1	1.7g/m^3	LEAKAGE TEST	C	C	A	A	A
				DEVICE OPERATION CONFIRMATION	–	–	A	A	A
2	PRESENCE	TYPE 1	0.6g/m^3	LEAKAGE TEST	C	C	A	A	A
				DEVICE OPERATION CONFIRMATION	–	–	A	A	A
3	NONE	TYPE 1	1.7g/m^3	LEAKAGE TEST	C	C	A	A	A
				DEVICE OPERATION CONFIRMATION	–	–	A	A	A
4	NONE	TYPE 1	0.6g/m^3	LEAKAGE TEST	C	C	A	A	A
				DEVICE OPERATION CONFIRMATION	–	–	A	A	A
5	NONE	TYPE 2	1.7g/m^3	LEAKAGE TEST	C	C	C	C	A
				DEVICE OPERATION CONFIRMATION	–	–	A	A	A
6	NONE	TYPE 2	0.6g/m^3	LEAKAGE TEST	C	C	C	C	A
				DEVICE OPERATION CONFIRMATION	–	–	A	A	A

FIG.9


110
132G
132I
132J
132B
132D
132F
132H
132A
132C
37A1
20S
132E
130
132J2
132A2
132I2
132B2
37A2
132H2
132C2
132G2
132D2
132E2
132F2
20
22
Y
X

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2024/043239

A. CLASSIFICATION OF SUBJECT MATTER

B65D 83/04(2006.01)i; ***B65D 77/34***(2006.01)i
FI: B65D83/04 D; B65D77/34

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)

B65D83/04; B65D77/32-75/34; A61J1/03

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

Published examined utility model applications of Japan 1922-1996
Published unexamined utility model applications of Japan 1971-2025
Registered utility model specifications of Japan 1996-2025
Published registered utility model applications of Japan 1994-2025

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.
A	JP 2-257960 A (NISSHIN FLOUR MILLING CO., LTD.) 18 October 1990 (1990-10-18)	1-8
A	JP 2015-83108 A (KANAE CO., LTD.) 30 April 2015 (2015-04-30)	1-8
A	WO 2017/217376 A1 (DAI NIPPON PRINTING CO., LTD.) 21 December 2017 (2017-12-21)	1-8
A	JP 2008-533551 A (INTELLIGENT DEVICES INC.) 21 August 2008 (2008-08-21)	1-8
A	WO 2020/235513 A1 (UACJ FOIL CORP.) 26 November 2020 (2020-11-26)	1-8
A	US 8960440 B1 (VERIMED HOLDINGS LLC.) 24 February 2015 (2015-02-24)	1-8
A	US 7502666 B2 (MTS MEDICATION TECHNOLOGIES INC.) 10 March 2009 (2009-03-10)	1-8

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

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
21 January 2025	**04 February 2025**
Name and mailing address of the ISA/JP **Japan Patent Office (ISA/JP)** **3-4-3 Kasumigaseki, Chiyoda-ku, Tokyo 100-8915** **Japan**	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/JP2024/043239

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JP 2015-83108 A	30 April 2015	US 2016/0271019 A1 WO 2015/040918 A1	
WO 2017/217376 A1	21 December 2017	JP 2017-221600 A	
JP 2008-533551 A	21 August 2008	WO 2006/076806 A1 CA 2493410 A1	
WO 2020/235513 A1	26 November 2020	US 2022/0242640 A1 CN 113825707 A	
US 8960440 B1	24 February 2015	(Family: none)	
US 7502666 B2	10 March 2009	WO 2005/114378 A2	

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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