[0007]

A method for positioning a sheet material according to the present invention is a method for positioning a sheet material including a base material and a functional material disposed on the base material, the method including: disposing the sheet material above a sheet table; detecting a position in a plane direction of the functional material in the sheet material; performing positioning of relatively moving the sheet material with respect to the sheet table based on the position of the functional material that has been detected such that the functional material is disposed at a predetermined position with respect to the sheet table; and fixing the sheet material to the sheet table after the positioning is completed.

[0008]

A method for forming a shield layer with respect to an electronic component according to the present invention includes: preparing a first mold and a second mold that face each other; after the method for positioning a sheet material described above, conveying the sheet material from the sheet table via a conveyance mechanism to dispose the sheet material on an installation surface of the first mold in a state where the functional material faces the second mold; disposing a plurality of electronic components on a carrier at a predetermined interval; disposing the carrier on an installation surface of the second mold in a state where the electronic components face the first mold; and bringing the first mold and the second mold close to each other, and pressure-bonding the functional material against surfaces of the electronic components to form a shield layer on the surface of the electronic components, wherein the functional material is an electromagnetic wave shielding material.

Advantageous Effects of Invention

[0009]

from the viewpoint of product life and reactivity.

[0025]

Examples of the conductive filler include (1) metal powder of a conductive metal such as gold, copper, silver, or nickel, (2) alloy powder of an alloy of conductive metals, and (3) core-shell type particles of silver-coated copper powder, gold-coated copper powder, silver-coated nickel powder, and gold-coated nickel powder. The shape of the conductive filler may be a spherical shape, an elliptical spherical shape, a scaly shape, a dendrite shape, a grape shape, and/or a needle shape.

[0026]

<3-2. Sheet Material Positioning Device>

Next, a sheet material positioning device provided in the module C will be described. Fig. 7 is a side view of the positioning device, and Fig. 8 is a plan view of Fig. 7. The positioning device is a device that cuts out the sheet material 4 having a predetermined length from the roll 40 and disposes the sheet material 4 on the sheet table 52. As illustrated in Figs. 7 and 8, the positioning device includes a support mechanism 51 that supports the sheet material 4, the sheet table 52 that fixes the sheet material 4, a sensor unit 53 that detects the position of the shielding material 42 of the sheet material 4, and a cutting mechanism (cutting part) 54 that cuts the sheet material 4. These configurations are controlled by a controller (not illustrated) configured by a computer such as a PLC. Hereinafter, these configurations will be described in detail. Hereinafter, for convenience of description, description will be made according to the directions illustrated in Figs. 7 and 8, but the positioning device according to the present invention is not limited to the directions.

[0027]

<3-2-1. Support Mechanism>

[0032]

When the sheet material 4 is unwound, the left side of the unwound sheet material 4 is pressed by the second pressing part 542 and the support part 543. On the right side of the second pressing part 542 and the support part 543, the sheet material 4 is pressed by the first pressing part 534 and the sheet table 52. In this state, the base material 41 is cut by the cutter 541 moving in the front-back direction between the second pressing part 542 and the first pressing part 534. The means for cutting the sheet material may be other than the cutter 541. For example, the sheet material may be cut by heat such as a laser.

[0033]

<3-2-5. Operation of Positioning Device>

Next, an operation of the positioning device configured as described above will be described with reference to Figs. 9 to 14. First, as illustrated in Fig. 9, an end of the sheet material 4 wound as the roll 40 is held by the feeder 512. Next, as illustrated in Fig. 10, the feeder 512 moves to the right side to unwind the sheet material 4 from the roll 40. This causes one shielding material 42 in the unwound sheet material 4 to be disposed above the sheet table 52.

[0034]

Next, as illustrated in Fig. 11, the sensor unit 53 descends and detects the position of the shielding material 42 with the first sensor 532 and the second sensor 533. That is, as illustrated in Fig. 8, the first sensor 532 and the second sensor 533 are disposed above the back and left end edges of the shielding material 42, respectively, and detect the positions of these end edges. At this time, when the detected position of the left end edge does not fall within a predetermined range, the roll holder 511 and the feeder 512 are driven to adjust the unwinding distance of the sheet material 4, thereby

electronic component 1 on which the shield layer 13 is formed is thus obtained.

[0051]

Subsequently, the carrier 2 is removed from the upper mold, and the carrier 2 on which each electronic component 1 is mounted is separated. The separation method is not particularly limited, but for example, each electronic component 1 is gripped by a picking device, and the electronic components are divided into individual pieces together with the carrier 2. Alternatively, the electronic components 1 and the carrier 2 can be divided into individual pieces by dicing. That is, the carrier 2 can be cut between adjacent electronic components 1 to be divided into individual pieces.

[0052]

<5. Features>

The positioning device configured as described above has the following effects.

(1) In the pressure bonding step, to accurately bring the shielding material 42 into close contact with the surface of each electronic component 1, it is necessary to accurately position the shielding material 42 on the lower mold 62. In the present embodiment, in the module C, the shielding material 42 is disposed at a predetermined position on the sheet table 52. Thus, when the sheet material 4 is transferred from the sheet table 52 to the lower mold 62, the positioning of the shielding material 42 to the lower mold 62 is already completed. Thus, in the pressure bonding step, the shielding material 42 can be accurately pressure-bonded to the electronic component 1 without positioning the shielding material 42.

[0053]

(2) In the present embodiment, the end edges of two orthogonal sides of the shielding material 42 are detected by using the two sensors 532 and 533. Thus, the

suction ports are not particularly limited as long as the sheet material 4 can be firmly fixed.

[0064]

(7) In the above embodiment, in the module B, the electronic component 1 is disposed on the upper mold 61 and the sheet material 4 is disposed on the lower mold 62, but this may be reversed.

[0065]

(8) In the above embodiment, an example in which the electronic component 1 divided in advance is disposed on the carrier 2, and then the shielding material 42 is pressure-bonded to the electronic component 1 has been described, but the present invention is not limited to this configuration. For example, a semiconductor substrate can be divided into pieces by half cutting, and the divided pieces can be placed on the upper mold 61. Then, when the upper mold 61 and the lower mold 62 are brought close to each other after the sheet material 4 is disposed on the lower mold 62 as described above, the shielding material can be brought into close contact with the groove formed by half cutting and the top surface of the semiconductor substrate. The shield layer can be thus formed. Thereafter, dicing is performed along the groove, whereby electronic components separated into individual pieces on which the shield layer is formed can be obtained.

[0066]

(9) In the above embodiment, the positioning device that positions the shielding material 42 in the sheet material 4 including the base material 41 and the shielding material 42 disposed on the base material 41 has been described, but the configuration of the sheet material 4 is not limited to this. That is, the present invention can be applied to all sheet materials including a base material and a sheet-like

functional material having a size smaller than the base material and disposed on the base material. That is, the present invention can be applied to all processes in which it is necessary to position a functional material having a predetermined function with respect to a sheet table with high accuracy. The process after positioning can also be applied to various processes other than the above-described pressure bonding.

Reference Signs List

[0067]

1 Electronic component

2 Carrier

4 Sheet material

41 Base material

42 Shielding material (functional material)

51 Support mechanism

52 Sheet table

53 Sensor unit (detection part)

532, 533 Sensor

534 First pressing part

54 Cutting mechanism

Claims

[Claim 1] A positioning device for a sheet material including a long-length base material and an electromagnetic wave shielding material having a sheet shape disposed on the base material at predetermined intervals, the positioning device comprising:

a support mechanism that supports the sheet material;

a sheet table that fixes the sheet material; and

a detection unit that detects a position in a plane direction of the shielding material in the sheet material supported by the support mechanism,

wherein

after the sheet material is disposed on the sheet table, the sheet material is fixed to the sheet table after positioning of relatively moving the sheet material with respect to the sheet table is completed such that the shielding material is disposed at a predetermined position with respect to the sheet table based on the position of the shielding material detected by the detection unit.

[Claim 2] The positioning device for a sheet material according to claim 1, wherein

the support mechanism includes:

a roll holder that holds a roll that is the sheet material that has been wound; and

a feeder that unwinds the sheet material while holding an end of the sheet material wound as the roll,

a plurality of the shielding materials are disposed on the base material of the sheet material at an interval in an unwinding direction, and

the positioning device further comprising a cutting part that cuts the sheet material that has been unwound from the roll after the positioning of the sheet material that has been unwound is completed.

[Claim 3] The positioning device for a sheet material according to claim 2, wherein the detection unit detects a position of an end edge of the shielding material in a first direction in which the sheet material is unwound and a second direction orthogonal to the first direction.

[Claim 4] The positioning device for a sheet material according to claim 3, wherein

the detection unit includes a pressing part for pressing the sheet material that

has been unwound,

the detection unit moves up and down from above with respect to the sheet material that has been unwound, and

after the positioning, the detection unit descends, and the cutting part performs cutting in a state where the sheet material that has been unwound is sandwiched between the pressing part and the sheet table.

[Claim 5] The positioning device for a sheet material according to any one of claims 1 to 4, wherein the positioning is performed by moving at least one of the support mechanism and the sheet table.

[Claim 6] A method for positioning a sheet material including a long-length base material and an electromagnetic wave shielding material having a sheet shape disposed on the base material at predetermined intervals, the method comprising:

disposing the sheet material above a sheet table;

detecting a position in a plane direction of the shielding material in the sheet material;

performing positioning of relatively moving the sheet material with respect to the sheet table based on the position of the shielding material that has been detected such that the shielding material is disposed at a predetermined position with respect to the sheet table; and

fixing the sheet material to the sheet table after the positioning is completed.

[Claim 7] A method for forming a shield layer with respect to an electronic component, the method comprising:

preparing a first mold and a second mold that face each other;

after the method for positioning a sheet material according to claim 6, conveying the sheet material from the sheet table via a conveyance mechanism to dispose the sheet material on an installation surface of the first mold in a state where the functional material faces the second mold;

disposing a plurality of electronic components on a carrier at a predetermined interval;

disposing the carrier on an installation surface of the second mold in a state where the electronic components face the first mold; and

bringing the first mold and the second mold close to each other, and pressure-bonding the shielding material against surfaces of the electronic components to form a

shield layer on the surface of the electronic components.