CLAIMS

[Claim 1] A manufacturing method for manufacturing, by using a sheet member including paper and a sealant, a funnel component that includes: a funnel portion having a diameter reduced from a wide opening side toward a narrow opening side; and a side wall portion that connects to a wide opening side portion of the funnel portion and surrounds an outer surface of the funnel portion, the manufacturing method comprising the steps of:

forming a blank material surrounded by an arc, a pair of straight lines that extends in a radial direction of the arc, and a corrugated line that extends so as to form an arc that is concentric with the arc and has a radius less than the arc, by punching the sheet member by using a die;

forming a first intermediate product that is tapered, by rolling the blank material, and causing portions near the paired straight lines to overlap each other and be welded to each other;

forming a second intermediate product by folding back and welding the corrugated line portion of a narrow opening side portion of the first intermediate product over the entirety of a circumference of the corrugated line portion;

forming a third intermediate product having the side wall portion by folding the wide opening side portion of the second intermediate product back outward over the entirety of a circumference of the wide opening side portion; and

forming a cylindrical discharge portion forming the narrow opening side portion, a first tapered portion that connects to the discharge portion and has a tapered shape, and a second tapered portion that connects to the first tapered portion and has a tapered shape having a taper angle less than the first tapered portion, by performing a pressing process on the third intermediate product by using a mold to perform a drawing process.

[Claim 2] The manufacturing method for manufacturing the funnel component according to claim 1, wherein, during the drawing process, a plurality of recesses that extend over the discharge portion and the first tapered portion are further formed intermittently in a circumferential direction of the third intermediate product.

[Claim 3] The manufacturing method for manufacturing the funnel component according to claim 1 or 2, wherein the step of forming the third intermediate product includes the step of further contracting the folded portion in a circumferential direction of the second intermediate product.

[Claim 4] A manufacturing method for manufacturing a packaging container having a funnel component that includes: a funnel portion having a diameter reduced from a wide opening side toward a narrow opening side; and a side wall portion that connects to a wide opening side portion of the funnel portion and surrounds an outer surface of the funnel portion, the manufacturing method comprising the steps of:

forming the funnel component by the manufacturing method according to any one of claims 1 to 3;

forming a cup-shaped container body having a cylindrical side wall, a bottom portion, and an open end; and

inserting the funnel component through the open end of the container body thereinto so as to face the wide opening side portion of the funnel component toward the bottom portion of the container body, and joining an outer surface of the side wall portion to an inner circumferential surface of the container body.

[Claim 5] The manufacturing method for manufacturing the packaging container according to claim 4, wherein

the step of forming the container body includes the steps of:

forming a cup-shaped intermediate product having: a cylindrical side wall and a bottom portion formed of a sheet member including paper and a sealant; and an open end;

forming a first curling portion by curling the open end portion of the side wall outward;

softening the sealant by heating a portion, on a bottom portion side, of the first curling portion;

forming a second curling portion by further curling outward the first curling portion having the sealant softened; and

forming a flange portion by pressing the second curling portion.

[Claim 6] The manufacturing method for manufacturing the packaging container according to claim 4 or 5, wherein

the step of joining the outer surface of the side wall portion to the inner circumferential surface of the funnel component includes the steps of:

heating and softening the sealant on the outer surface of the side wall portion;

holding the container body in a state where the side wall portion of the funnel component is contracted in a circumferential direction such that an outer diameter of the side wall portion is less than an inner diameter of the open end of the container body, and inserting

the funnel component into the container body so as to face the wide opening side portion toward the bottom portion of the container body; and

pressing and widening the side wall portion of the funnel component inserted in the container body, and pressing and attaching the side wall portion to an inner surface of the side wall of the container body.

[Claim 7] The manufacturing method for manufacturing the packaging container according to any one of claims 4 to 6, wherein the step of joining the outer surface of the side wall portion to the inner circumferential surface of the container body further includes the step of heating and softening the sealant in a portion, of the inner surface of the side wall of the container body, to which the side wall portion of the funnel component is sealed, before inserting the funnel component into the container body.

[Claim 8] The manufacturing method for manufacturing the packaging container according to any one of claims 4 to 7, further comprising the step of sealing, after the step of joining the outer surface of the side wall portion to the inner circumferential surface of the container body, the open end of the container body with a film that is to be broken by a pressing force after the container body is filled with contents.

[Claim 9] The manufacturing method for manufacturing the packaging container according to any one of claims 5 to 8, wherein

the side wall has a rigidity higher than the bottom portion;

the step of forming the intermediate product includes the steps of:

forming a plurality of ruled lines on one of surfaces of a bottom member formed of a sheet member including paper and a sealant so as to radially extend as viewed from a center portion; and

forming the bottom portion by sealing the bottom member having the ruled lines, and a lower end side portion of the side wall with each other such that a surface on which the ruled lines are formed is positioned outside.

[Claim 10] The manufacturing method for manufacturing the packaging container according to claim 9, further comprising the steps of:

covering an opening at a top of the side wall, except for a portion of the opening, with a receiver tool, after the step of forming the bottom portion; and

expanding, after the step of forming the bottom portion, a center portion of the

bottom portion by blowing air through the portion of the opening into a space formed by the bottom portion and the side wall.

[Claim 11] The manufacturing method for manufacturing the packaging container according to claim 9 or 10, wherein

in the step of forming the bottom portion,

a lower end portion of the side wall is folded back inward, to sandwich an outer edge portion of the bottom member in an overlapping manner, and an overlapping portion in a region from a folding-back position to a predetermined height is sealed, and the overlapping portion in a region higher than the predetermined height is not sealed.

[Claim 12] The manufacturing method for manufacturing the packaging container according to claim 10 or 11, further comprising the step of heating the bottom portion to a temperature that is higher than or equal to 50°C and not higher than 80°C before the step of expanding the center portion of the bottom portion.

[Claim 13] The manufacturing method for manufacturing the packaging container according to any one of claims 10 to 12, wherein the opening is covered except for a center portion of the opening in the step of covering with the receiver tool.

[Claim 14] The manufacturing method for manufacturing the packaging container according to any one of claims 10 to 13, wherein air is blown at a pressure that is higher than or equal to 1 MPa and not higher than 10 MPa for a time period that is longer than or equal to 0.02 seconds and not longer than 10 seconds in the step of expanding the center portion of the bottom portion.

CLAIMS

[Claim 1] A manufacturing method for manufacturing, by using a sheet member including paper and a sealant, a funnel component that includes: a funnel portion having a diameter reduced from a wide opening side toward a narrow opening side; and a side wall portion that connects to a wide opening side portion of the funnel portion and surrounds an outer surface of the funnel portion, the manufacturing method comprising the steps of:

forming a blank material surrounded by an arc, a pair of straight lines that extends in a radial direction of the arc, and a corrugated line that extends so as to form an arc that is concentric with the arc and has a radius less than the arc, by punching the sheet member by using a die;

forming a first intermediate product that is tapered, by rolling the blank material, and causing portions near the paired straight lines to overlap each other and be welded to each other;

forming a second intermediate product by folding back and welding the corrugated line portion of a narrow opening side portion of the first intermediate product over the entirety of a circumference of the corrugated line portion;

forming a third intermediate product having the side wall portion by folding the wide opening side portion of the second intermediate product back outward over the entirety of a circumference of the wide opening side portion; and

forming a cylindrical discharge portion forming the narrow opening side portion, a first tapered portion that connects to the discharge portion and has a tapered shape, and a second tapered portion that connects to the first tapered portion and has a tapered shape having a taper angle less than the first tapered portion, by performing a pressing process on the third intermediate product by using a mold to perform a drawing process.

[Claim 2] The manufacturing method for manufacturing the funnel component according to claim 1, wherein, during the drawing process, a plurality of recesses that extend over the discharge portion and the first tapered portion are further formed intermittently in a circumferential direction of the third intermediate product.

[Claim 3] The manufacturing method for manufacturing the funnel component according to claim 1 or 2, wherein the step of forming the third intermediate product includes the step of further contracting the folded portion in a circumferential direction of the second intermediate product.

[Claim 4] A manufacturing method for manufacturing a packaging container having a funnel component that includes: a funnel portion having a diameter reduced from a wide opening side toward a narrow opening side; and a side wall portion that connects to a wide opening side portion of the funnel portion and surrounds an outer surface of the funnel portion, the manufacturing method comprising the steps of:

forming the funnel component by the manufacturing method according to any one of claims 1 to 3;

forming a cup-shaped container body having a cylindrical side wall, a bottom portion, and an open end; and

inserting the funnel component through the open end of the container body thereinto so as to face the wide opening side portion of the funnel component toward the bottom portion of the container body, and joining an outer surface of the side wall portion to an inner circumferential surface of the container body.

[Claim 5] The manufacturing method for manufacturing the packaging container according to claim 4, wherein

the step of forming the container body includes the steps of:

forming a cup-shaped intermediate product having: a cylindrical side wall and a bottom portion formed of a sheet member including paper and a sealant; and an open end;

forming a first curling portion by curling the open end portion of the side wall outward;

softening the sealant by heating a portion, on a bottom portion side, of the first curling portion;

forming a second curling portion by further curling outward the first curling portion having the sealant softened; and

forming a flange portion by pressing the second curling portion.

[Claim 6] The manufacturing method for manufacturing the packaging container according to claim 4 or 5, wherein

the step of joining the outer surface of the side wall portion to the inner circumferential surface of the container body includes the steps of:

heating and softening the sealant on the outer surface of the side wall portion;

holding the funnel component in a state where the side wall portion of the funnel component is contracted in a circumferential direction such that an outer diameter of the side wall portion is less than an inner diameter of the open end of the container body, and inserting the funnel component into the container body so as to face the wide opening side portion toward the

bottom portion of the container body; and

pressing and widening the side wall portion of the funnel component inserted in the container body, and pressing and attaching the side wall portion to an inner surface of the side wall of the container body.

[Claim 7] The manufacturing method for manufacturing the packaging container according to any one of claims 4 to 6, wherein the step of joining the outer surface of the side wall portion to the inner circumferential surface of the container body further includes the step of heating and softening the sealant in a portion, of the inner surface of the side wall of the container body, to which the side wall portion of the funnel component is sealed, before inserting the funnel component into the container body.

[Claim 8] The manufacturing method for manufacturing the packaging container according to any one of claims 4 to 7, further comprising the step of sealing, after the step of joining the outer surface of the side wall portion to the inner circumferential surface of the container body, the open end of the container body with a film that is to be broken by a pressing force after the container body is filled with contents.

[Claim 9] The manufacturing method for manufacturing the packaging container according to any one of claims 5 to 8, wherein

the side wall has a rigidity higher than the bottom portion;

the step of forming the intermediate product includes the steps of:

forming a plurality of ruled lines on one of surfaces of a bottom member formed of a sheet member including paper and a sealant so as to radially extend as viewed from a center portion; and

forming the bottom portion by sealing the bottom member having the ruled lines, and a lower end side portion of the side wall with each other such that a surface on which the ruled lines are formed is positioned outside.

[Claim 10] The manufacturing method for manufacturing the packaging container according to claim 9, further comprising the steps of:

covering an opening at a top of the side wall, except for a portion of the opening, with a receiver tool, after the step of forming the bottom portion; and

expanding, after the step of forming the bottom portion, a center portion of the

bottom portion by blowing air through the portion of the opening into a space formed by the bottom portion and the side wall.

[Claim 11] The manufacturing method for manufacturing the packaging container according to claim 9 or 10, wherein

in the step of forming the bottom portion,

a lower end portion of the side wall is folded back inward, to sandwich an outer edge portion of the bottom member in an overlapping manner, and an overlapping portion in a region from a folding-back position to a predetermined height is sealed, and the overlapping portion in a region higher than the predetermined height is not sealed.

[Claim 12] The manufacturing method for manufacturing the packaging container according to claim 10 or 11, further comprising the step of heating the bottom portion to a temperature that is higher than or equal to 50°C and not higher than 80°C before the step of expanding the center portion of the bottom portion.

[Claim 13] The manufacturing method for manufacturing the packaging container according to any one of claims 10 to 12, wherein the opening is covered except for a center portion of the opening in the step of covering with the receiver tool.

[Claim 14] The manufacturing method for manufacturing the packaging container according to any one of claims 10 to 13, wherein air is blown at a pressure that is higher than or equal to 1 MPa and not higher than 10 MPa for a time period that is longer than or equal to 0.02 seconds and not longer than 10 seconds in the step of expanding the center portion of the bottom portion.