Claims

1. A suction device, comprising:
a columnar main body;
a flat end face formed at the main body;
a concave part formed at the end face;
a fluid flow-forming means for forming a fluid swirl flow in the concave part or forming a radial flow by discharging fluid into the concave part, the fluid swirl flow or the radial flow generating negative pressure that applies suction to a material; and
a guide part that surrounds the concave part, and controls flow of a fluid flowing out of the concave part and flowing along the end face, such that the fluid flows in a direction away from a position occupied by the material prior to commencement of suction, wherein the guide part is a cylindrical member that is arranged such that an opening edge of the cylindrical member projects toward the material relative to the end face.

2. The suction device according to Claim 1, further comprising a flange part that is formed inwardly at the opening edge, the flange part comprising a surface that opposes the end face.

3. The suction device according to Claim 1 or 2, wherein:
an inner periphery of the guide part is tapered such that an inner diameter of the guide part reduces toward the opening edge; and
the guide part guides the fluid flowing out of the concave part along the inner periphery.

4. The suction device according to any one of Claims 1 to 3, wherein:
the guide part comprises a plate-like member that extends across another opening edge of the guide part; and
the plate-like member is fixed on a surface opposite to the end face of the main body.

5. The suction device according to Claim 1, wherein the guide part is made of plural members.

6. A suction device, comprising:
a columnar main body;
a flat end face formed at the main body;
a concave part formed at the end face;
a fluid flow-forming means for forming a fluid swirl flow in the concave part or forming a radial flow by discharging fluid into the concave part, the fluid swirl flow or the radial flow generating negative pressure that applies suction to a material;
a guide part that surrounds the concave part, and controls flow of a fluid flowing out of the concave part and flowing along the end face, such that the fluid flows

in a direction away from a position occupied by the material prior to commencement of suction;

a cylindrical container that surrounds an outer circumference of the guide part, the container comprising a bottom with a through hole, wherein the main body is arranged within the through hole such that the concave part opens toward the outside of the container.

7. The suction device according to Claim 6, wherein an inner periphery of the container is tapered such that an inner diameter of the container reduces toward the through hole.

8. The suction device according to any one of Claims 1 to 7, wherein the material is food.