CLAIMS

[Claim 1] An extraction device, comprising:

an elastic body that includes a first end facing a first direction, a second end positioned opposite from the first end, and a contact face facing a second direction intersecting with the first direction, the elastic body being capable of expanding in the second direction;

a first pressing unit that presses the first end of the elastic body;

a second pressing unit that presses the second end of the elastic body; and

a pulling unit that is capable of pulling the second pressing unit toward the first direction, wherein

the contact face is capable of coming into contact with an object to be extracted when the elastic body compressed by pressing force of the first pressing unit and pressing force of the second pressing unit expands in the second direction,

the object to be extracted is pulled by friction between the object to be extracted and the contact face when the pulling unit is pulled in the first direction while the contact face of the elastic body is in contact with the object to be extracted, and

when the pulling unit is pulled in the first direction while the contact face of the elastic body is in contact with the object to be extracted, the object to be extracted is capable of being pulled by the friction between the object to be extracted and the contact face while the first pressing unit is separated from the first end.

[Claim 2] The extraction device according to claim 1, wherein

the elastic body is provided with a first opening extended in the first direction,

the contact face is an outer peripheral face of the elastic body,

the first pressing unit is provided with a second opening extended in the first direction,

the pulling unit is disposed through the first opening and the second opening, and

the contact face of the elastic body expanded in the second direction is capable of coming into contact with an inner peripheral face of a third opening provided on the object to be extracted.

[Claim 3] An extraction device, comprising:

an elastic body that includes a first end facing a first direction, a second end positioned opposite from the first end, and a contact face facing a second direction intersecting with the first direction, the elastic body being capable of expanding in the second direction;

a first pressing unit that presses the first end of the elastic body;

a second pressing unit that presses the second end of the elastic body;

a pulling unit that is capable of pulling the second pressing unit toward the first direction; and

an intermediate member interposed between the first end of the elastic body and the first pressing unit, wherein

the contact face is capable of coming into contact with an object to be extracted when the elastic body compressed by pressing force of the first pressing unit and pressing force of the second pressing unit expands in the second direction,

the object to be extracted is pulled by friction between the object to be extracted and the contact face when the pulling unit is pulled in the first direction while the contact face of the elastic body is in contact with the object to be extracted, and

the first pressing unit presses the first end of the elastic body through the intermediate member, and

a contact area between the intermediate member and the elastic body is larger than a contact area between the first pressing unit and the intermediate member.

[Claim 4] The extraction device according to any one of claims 1 to 3, wherein a hooking unit is provided at an end of the pulling unit.

[Claim 5] The extraction device according to claim 2, wherein an outer diameter of the elastic body is from 0.95 to 0.99 times of an inner diameter of the third opening of the object to be extracted.

[Claim 6] The extraction device according to claim 2 or 5, wherein length of the first pressing unit along the first direction is from 1.00 to 1.40 times of an inner diameter of the third opening of the object to be extracted.

[Claim 7] The extraction device according to claim 2 or 6, wherein an outer diameter of the second pressing unit is from 0.70 to 1.00 times of an outer diameter of the elastic body.

[Claim 8] The extraction device according to claim 2 or 7, wherein an outer diameter of the first pressing unit is from 0.70 to 1.00 times of an outer diameter of the

elastic body.

[Claim 9] The extraction device according to claim 2 or 8, wherein an outer diameter of the pulling unit is from 0.95 to 1.00 times of an inner diameter of the first opening of the elastic body.

[Claim 10] The extraction device according to claim 2 or 9, wherein a gap between the contact face of the elastic body and the inner peripheral face of the third opening of the object to be extracted is larger than a gap between an inner peripheral face of the first opening of the elastic body and an outer peripheral face of the pulling unit disposed through the elastic body.

[Claim 11] The extraction device according to claim 2 or 10, wherein the elastic body is made of rubber.

[Claim 12] The extraction device according to claim 1, wherein the contact face of the elastic body expanded in the second direction is capable of coming into contact with an outer peripheral face of the object to be extracted.

[Claim 13] The extraction device according to claim 1, further comprising a retaining unit that retains the first pressing unit while the elastic body is compressed by the first pressing unit and the second pressing unit.

CLAIMS

1. An extraction device, comprising:

an elastic body that includes a first end facing a first direction, a second end positioned opposite from the first end, and a contact face facing a second direction intersecting with the first direction, the elastic body being capable of expanding in the second direction;

a first pressing unit that presses the first end of the elastic body;

a second pressing unit that presses the second end of the elastic body; and

a pulling unit that is capable of pulling the second pressing unit toward the first direction, wherein

the contact face is capable of coming into contact with an object to be extracted when the elastic body compressed by pressing force of the first pressing unit and pressing force of the second pressing unit expands in the second direction, and

the object to be extracted is pulled by friction between the object to be extracted and the contact face when the pulling unit is pulled in the first direction while the contact face of the elastic body is in contact with the object to be extracted.

2. The extraction device according to claim 1, wherein when the pulling unit is pulled in the first direction while the contact face of the elastic body is in contact with the object to be extracted, the object to be extracted is capable of being pulled by the friction between the object to be extracted and the contact face while the first pressing unit is separated from the first end.

3. The extraction device according to claim 1 or 2,

wherein

the elastic body is provided with a first opening extended in the first direction,

the contact face is an outer peripheral face of the elastic body,

the first pressing unit is provided with a second opening extended in the first direction,

the pulling unit is disposed through the first opening and the second opening, and

the contact face of the elastic body expanded in the second direction is capable of coming into contact with an inner peripheral face of a third opening provided on the object to be extracted.

4. The extraction device according to any one of claims 1 to 3, further comprising

an intermediate member interposed between the first end of the elastic body and the first pressing unit, wherein

the first pressing unit presses the first end of the elastic body through the intermediate member, and

a contact area between the intermediate member and the elastic body is larger than a contact area between the first pressing unit and the intermediate member.

5. The extraction device according to any one of claims 1 to 4, wherein a hooking unit is provided at an end of the pulling unit.

6. The extraction device according to claim 3, wherein an outer diameter of the elastic body is from 0.95 to 0.99 times of an inner diameter of the third opening of the object to be extracted.

7. The extraction device according to claim 3 or 6, wherein length of the first pressing unit along the first direction is from 1.00 to 1.40 times of an inner diameter of the third opening of the object to be extracted.

8. The extraction device according to claim 3 or 7, wherein an outer diameter of the second pressing unit is from 0.70 to 1.00 times of an outer diameter of the elastic body.

9. The extraction device according to claim 3 or 8, wherein an outer diameter of the first pressing unit is from 0.70 to 1.00 times of an outer diameter of the elastic body.

10. The extraction device according to claim 3 or 9, wherein an outer diameter of the pulling unit is from 0.95 to 1.00 times of an inner diameter of the first opening of the elastic body.

11. The extraction device according to claim 3 or 10, wherein a gap between the contact face of the elastic body and the inner peripheral face of the third opening of the object to be extracted is larger than a gap between an inner peripheral face of the first opening of the elastic body and an outer peripheral face of the pulling unit disposed through the elastic body.

12. The extraction device according to claim 3 or 11, wherein the elastic body is made of rubber.

13. The extraction device according to claim 1 or 2,

wherein the contact face of the elastic body expanded in the second direction is capable of coming into contact with an outer peripheral face of the object to be extracted.

14. The extraction device according to claim 1, further comprising a retaining unit that retains the first pressing unit while the elastic body is compressed by the first pressing unit and the second pressing unit.

15. A retaining device, comprising:

a first member that includes a first portion;

a second member that includes a second portion; and

a third member interposed between the first portion and the second portion, that elastically expands in an intersecting direction with a direction toward which the first portion and the second portion approach each other when the first portion and the second portion approach each other, and retains an object while expanded in the intersecting direction.