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(54) **DISCHARGE HEAD WITH PICKUP MEMBER, AND LIQUID-MATERIAL DISCHARGE DEVICE**

AUSSTOSSKOPF MIT AUFNAHMEGLIED UND VORRICHTUNG ZUM AUSSTOSSEN VON FLÜSSIGEM MATERIAL

TÊTE DE DÉCHARGE AVEC ÉLÉMENT DE CAPTURE, ET DISPOSITIF DE DÉCHARGE DE MATÉRIAU LIQUIDE

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Description

Technical Field

[0001] The present invention relates to a discharge head including a pickup member, and a liquid-material discharge device.

Background Art

[0002] These days, decorative members called rhinestones (hereinafter, referred to as "stones") are arranged on and stuck to surfaces of a case for smartphone, a container for small article, and the like (workpiece) for aesthetic purposes (see Patent Document 1). The stone is generally a facet cut crystal, a piece of glass, or a diamond-like stone made of acrylic resin, having metal vacuum-deposited on a back surface thereof. The stone is attached by putting an appropriate amount of adhesive on a toothpick or brush, applying it to a surface of an object to be decorated, and placing the stone held with tweezers or the like on the adhesive.

[0003] As a liquid-material discharge device, a dispenser is known. A dispenser including a manual switch device for controlling discharge of liquid is also known (see Patent Document 2). Patent Document 3 discloses a handheld device having the features of the preamble of claim 1. Patent Documents 4 and 5 disclose further related prior art.

Prior Art List

Patent Document

[0004]

Patent Document 1: JP 2003 182293 A
Patent Document 2: JP 2003 080142 A
Patent Document 3: WO 99/44672 A1
Patent Document 4: JP 2017 154058 A
Patent Document 5: US 2013/230612 A1

Summary of the Invention

Problems to be Solved by the Invention

[0005] Conventionally, when attaching a part such as a decorative member to a workpiece, it has been required to take an application tool such as a toothpick to apply adhesive to a surface of the workpiece, then switch the application tool to a pickup tool such as tweezers to place the part.

[0006] An object of the present invention is to provide a handy-type device that enables an application operation and a placement operation by the single device when attaching a part to a workpiece.

Means for Solving the Problems

[0007] The above object is achieved by a liquid-material discharge device having the features of claim 1. Advantageous further developments are set out in the dependent claims.

Advantageous Effect of the Invention

[0008] According to the present invention, it is possible to perform an application operation and a placement operation by a single device when attaching a part to a workpiece.

Brief Description of the Drawings

[0009]

[Fig. 1] Fig. 1 is a configuration diagram of a liquid-material discharge device according to a first embodiment.
[Fig. 2] Fig. 2 is a side view illustrating a configuration of a discharge head according to the first embodiment.
[Fig. 3] Fig. 3 is a view illustrating a part attachment operation by the liquid-material discharge device, (a) illustrates an

operation of picking up an attachment member, (b) illustrates an operation of applying liquid material, (c) illustrates an operation of placing the attachment member, and (d) illustrates an operation of releasing the held attachment member.
[Fig. 4] Fig. 4(a) is a configuration diagram of a discharge head according to a second embodiment and (b) is a side view illustrating a configuration of a discharge head according to a third embodiment.
[Fig. 5] Fig. 5 is a diagram illustrating an arrangement example of a suction port of a pickup member.

Mode for Carrying out the Invention

[0010] A liquid-material discharge head of the present invention, which is a handy type and includes a nozzle and a liquid reservoir, includes a pickup member arranged next to the nozzle. Herein, the pickup member is a member for holding an attachment member. Though it may be constituted by a rod-shaped member having adsorption resin at the distal end, it is preferably constituted by a configuration to hold a target object by generating negative pressure at a distal end portion. More preferably, the liquid-material discharge head includes a negative-pressure operating unit that adjusts the negative pressure.

[0011] The liquid reservoir may be configured as a liquid chamber that temporarily stores liquid supplied from a tank, but is preferably a syringe that accommodates a necessary amount of liquid material for one-time attachment work. The liquid material can be discharged from the nozzle by manually pressing the liquid reservoir that is flexible. However, the liquid reservoir is preferably configured to be supplied with pressurized air. The liquid-material discharge head may include a discharge operating unit that performs on/off control of the pressurized air applied to the liquid reservoir.

[0012] To realize easy pickup and application operations, the nozzle and the pickup member are preferably arranged such that the distance between the distal ends of the pickup member and the nozzle is larger than the distance between the roots thereof. In other words, the central axis of the pickup member and the central axis of the nozzle are preferably arranged such that they spread apart toward the distal ends of the pickup member and the nozzle.

[0013] A liquid-material discharge device according to embodiments will be described below with reference to the drawings.

<First Embodiment>

[0014] As shown in Fig. 1, a liquid-material discharge device 1 according to the first embodiment includes a discharge head 10, a controller 20, and an air compressor 30. This liquid-material discharge device 1 is a handy type and, for example, used to apply adhesive for sticking a decorative member (attachment member S) such as a stone to an accessory such as a pendant.

[Configuration]

[0015] As shown in Fig. 2, the discharge head 10 includes a nozzle 11, a syringe 12, holders 13, 14, a pickup member 15, a suction tube 16, and a cap member 18.

[0016] The nozzle 11 is made of resin or metal, and has a discharge port 11a at a distal end portion thereof. The nozzle 11 that is suitable for use is selected to be utilized out of a plurality of nozzles different in diameter of discharge port 11a. The diameter of the discharge port 11a ranges from 0.2 to 2 mm, for example.

[0017] The syringe 12 is a liquid reservoir made of resin or metal, and has a connecting portion at the lower end (distal end) for detachably fitting the nozzle 11. The syringe 12 that is suitable for use is selected to be utilized out of a plurality of syringes different in volume. The syringe 12 is filled with, for example, epoxy adhesive or ultraviolet curing resin. The syringe 12 includes a flange portion at the upper end (proximal end), and a cap member 18 can be fitted to the flange portion.

[0018] The holder 13 includes a nozzle insertion hole through which the nozzle 11 is inserted and a pickup member insertion hole through which the pickup member 15 is inserted, and supports the lower portion of the syringe 12. The nozzle 11 is inserted through the nozzle insertion hole of the holder 13, and the pickup member 15 is inserted through a pickup-member insertion hole. The holder 13 includes a fixing tool 13a that detachably fixes the pickup member 15, which can be easily exchanged by loosening the fixing tool 13a.

[0019] The holder 14 includes a syringe insertion hole through which the syringe 12 is inserted and a suction-tube insertion hole through which the suction tube 16 is inserted, and supports the syringe 12 in the vicinity of the flange portion. The holder 14 includes a through-hole with which a hook portion 41 of a stand 40 is engaged.

[0020] In the present embodiment, the holder 13 and the holder 14 are configured as separate members. However, they may be configured as a single member.

[0021] The pickup member 15 is made of resin or metal, and has a suction port 15a at a distal end portion thereof. An end opening opposite to the suction port 15a of the pickup member 15 is detachably connected to the suction tube 16. In the first embodiment, the pickup member 15 is constituted by a general-purpose nozzle. The pickup member 15 that has a

diameter to exhibit desired suction power is selected to be utilized out of a plurality of nozzles different in diameter of suction port.

[0022] The nozzle 11 and the pickup member 15 are arranged such that the distance between the central axis of the nozzle 11 and the central axis of the pickup member 15 increases toward the distal ends. In other words, the pickup member 15 is arranged such that the distance between the distal ends of the pickup member 15 and the nozzle 11 is larger than the distance between the roots of the pickup member 15 and the nozzle 11. This configuration can prevent the nozzle 11 from interfering with a pickup operation and a placement operation for an attachment member S, and thus enhance workability.

[0023] Note that the nozzle 11 and the pickup member 15 according to the first embodiment are made of resin and disposable.

[0024] The suction tube 16 is a flexible tube made of resin, and includes a negative-pressure operating unit 17 alongside the syringe 12. The negative-pressure operating unit 17 is a cylinder made of resin, and has an opening 17a. Closing the opening 17a with a finger while applying negative pressure to the suction tube 16 yields negative pressure within the suction tube 16, which enables generation of suction power at the suction port 15a. A plurality of openings 17a may be provided so that suction power generated at the suction port 15a is adjustable by adjusting the number of openings that are closed. The suction tube 16 preferably has a backflow prevention mechanism (valve or filter) that prevents backflow of liquid material and foreign substances.

[0025] Unlike the present embodiment, as the negative-pressure operating unit, a mechanism based on a button operation that opens and closes an opening to release the negative pressure may be utilized and arranged at the suction tube 16 or the holder 13. Instead of providing the holder 14, a suction-tube insertion hole may be provided in the cap member 18 which thereby support the suction tube 16.

[0026] The suction tube 16 makes a negative-pressure-air supply port 21 of the controller 20 communicate with the pickup member 15. The controller 20 includes a negative-pressure generating device (for example, ejector) in a main body, and causes it to generate desired negative pressure at the negative-pressure-air supply port 21 via a negative-pressure adjusting device (for example, regulator for negative pressure). The negative pressure generated at the negative-pressure-air supply port 21 is adjustable by a negative-pressure adjustment knob 25.

[0027] The controller 20 includes a pressurized-air supply port 22, which communicates with the cap member 18 via a pressurizing tube 23. The controller 20 is equipped with a timing discharge mode to control timing of applying pressure to the pressurizing tube 23. The timing discharge mode is a mode for applying a fixed amount of adhesive or the like in a uniformly-dotted form, in which timer control is performed to cause pressurized air to be supplied to the pressurizing tube 23 at a predetermined interval.

[0028] The controller 20 includes a pressurized-air inlet (not illustrated) that communicates with the air compressor 30. Pressurized air is supplied from the air compressor 30 to the pressurized-air inlet, and generates desired pressure at the pressurized-air supply port 22 via a pressure adjustment regulator in the controller 20. The pressure generated at the pressurized-air supply port 22 is adjustable by a pressure adjustment knob 26.

[0029] The controller 20 includes a discharge operating unit that performs on/off control of a liquid-material discharge action. In the first embodiment, the discharge operating unit is constituted by a foot switch 24 electrically connected to the controller 20 via a signal cable. An operator can control turning on and off of a liquid-material discharge action through operating the foot switch 24 by a foot. Unlike the present embodiment, pressurized air with pressure depending on a stepped amount of the foot switch 24 may be supplied to the discharge head 10 to adjust a discharge amount.

[0030] Aside from the foot switch 24, a button, knob, or the like that serves as the discharge operating unit may be provided to the main body of the controller 20 or the discharge head 10. For example, a mechanism according to Patent Document 2 may be utilized as the discharge operating unit.

[Usage]

[0031] Usage of the liquid-material discharge device 1 according to the first embodiment will be described with reference to Fig. 3 in an operation example where stones (attachment members) S are attached to a workpiece W in a desired pattern.

(STEP 1) The stones S are arranged on a surface of the workpiece W in the desired pattern.

(STEP 2) As shown in Fig. 3(a), an operator closes the opening 17a of the negative-pressure operating unit 17 with a finger to cause generation of suction power at the suction port 15a of the pickup member 15, and picks up a target stone S to be attached.

(STEP 3) As shown in Fig. 3(b), while holding the stone S by the pickup member 15, the operator moves the discharge port 11a of the nozzle 11 to a position from which the stone S has been picked up, and operates the foot switch 24 to apply adhesive L. Here, the discharge port 11a can be moved simply by inclining a wrist.

(STEP 4) As shown in Fig. 3(c), the operator places the picked-up stone S on the applied adhesive L. Here, the stone S

can be moved simply by inclining the wrist. The stone S may be pressed down with the distal end (the suction port 15a) of the pickup member 15 to be surely attached.
(STEP 5) As shown in Fig. 3(d), the operator opens the opening 17a of the negative-pressure operating unit 17 to extinguish the suction power of the pickup member 15, and releases the held stone S.

[0032] According to the liquid-material discharge device 1 of the first embodiment described above, it is possible to perform operations of picking up an attachment member S, applying adhesive L, and placing the attachment member S without switching the discharge head 10 to another device. That is, conventional usage of different devices for operations of picking up and placing an attachment member S and an operation of applying adhesive L is no longer necessary.

[0033] Since the distance between the distal ends of the pickup member 15 and the nozzle 11 is larger than the distance between the roots of the pickup member 15 and the nozzle 11, it is possible to prevent the nozzle 11 from interfering with a pickup operation and a placement operation for an attachment member S.

[0034] Further, since attachment members S can be attached after their actual arrangement pattern on a workpiece W is checked, it is also possible to enhance workability of an operator. Conventionally, to perform an application operation after a pickup operation with a device for pickup operation, switching would be done twice between the device for pickup operation and a device for application operation, and thus it would be difficult to achieve the operation procedure of the present invention.

<Second and Third Embodiments>

[0035] Fig. 4(a) is a configuration diagram of a discharge head 10 according to a second embodiment, and (b) is a configuration diagram of a discharge head 10 according to a third embodiment. The second embodiment is different from the first embodiment in that a pickup member 19 having a bending tube 19b is connected to the suction tube 16. The third embodiment is different from the second embodiment in that the holder 13 includes a pickup member insertion hole which is arranged such that a trunk portion 19a of the pickup member 19 and the nozzle 11 are aligned in parallel. Hereinafter, differences will be mainly described. Configurations common to the first embodiment are denoted by the same reference symbols in the figures and description thereof will be omitted.

[0036] The pickup member 19 of the second embodiment includes a trunk portion 19a, and a bending tube 19b extending from the trunk portion 19a. In the second embodiment, as in the first embodiment, the distance between the distal ends of the pickup member 19 and the nozzle 11 is larger than the distance between the roots thereof.

[0037] The pickup member 19 of the third embodiment is configured in the same way as that of the second embodiment, and only the holder 13 is different. In the third embodiment, the trunk portion 19a of the pickup member 19 is arranged in parallel to the nozzle 11, but the distal end of the bending tube 19b is arranged in a direction away from the nozzle 11, resulting in an arrangement where the distance between the distal ends of the pickup member 19 and the nozzle 11 is still larger than the distance between the roots thereof.

[0038] As far as the distance between the distal ends of the pickup member 19 and the nozzle 11 is larger than the distance between the roots thereof, the pickup member 19 may be arranged such that an opening of a suction port 19c is deviated laterally (to a front or back side of Fig. 4). That is, as shown in Fig. 5, the pickup member 19 may be arranged such that the suction port 19c of the pickup member 19 is positioned away from a straight line R passing through the centers of the nozzle 11 and the pickup member 19 (for example, at one of positions 'a' to 'd' in Fig. 5).

[0039] In the second and third embodiments described above, as in the first embodiment, it is possible to perform operations of picking up an attachment member S, applying adhesive L, and placing the attachment member S without switching the discharge head 10 to another device.

[0040] As in the first embodiment, it is also possible to prevent the nozzle 11 from interfering with a pickup operation and a placement operation for an attachment member S, and enhance workability.

[0041] The preferred embodiments of the present invention have been described above. However, the technical scope of the present invention is not limited to the description of the above-mentioned embodiments. Various alterations and modifications can be applied to the above embodiments, and such altered or modified modes also fall within the technical scope of the present invention, which is defined by the appended claims. For example, the first to third embodiments employ a configuration example 1 in Table 1 below, but the technical ideas of the present invention can be realized even when any one of configuration examples 2 to 4 in Table 1 below is employed.

[Table 1]

	Suction action control	Discharge action control
Configuration example 1	Operating unit of discharge head	Foot switch
Configuration example 2	Foot switch	Operating unit of discharge head

(continued)

	Suction action control	Discharge action control
Configuration example 3	Operating unit of discharge head	Operating unit of discharge head
Configuration example 4	Foot switch	Foot switch

List of Reference Symbols

[0042]

1 liquid-material discharge device
10 discharge head
11 nozzle
12 syringe (liquid reservoir)
13 (lower) holder
14 (upper) holder
15 pickup member
16 suction tube
17 negative-pressure operating unit
18 cap member
19 pickup member
20 controller
21 negative-pressure-air supply port
22 pressurized-air supply port
23 pressurizing tube
24 foot switch
25 negative-pressure adjustment knob
26 pressure adjustment knob
30 air compressor
40 stand

Claims

1. A liquid-material discharge device (1), comprising:

a liquid-material discharge head (10) of handy type including a nozzle (11), a liquid reservoir (12), and a pickup member (15; 19) that is arranged next to the nozzle (11) and;
a suction tube (16) configured to supply negative-pressure air to the pickup member (15; 19);
characterized in that it further comprises

a pressurizing tube (23) configured to supply pressurized air to the liquid reservoir (12); and
a controller (20) configured to supply pressurized air to the pressurizing tube (23) and supply negative-pressure air to the suction tube (16);
whereby, the pickup member (15; 19) is configured to pick up and releasably hold a target object by generating negative pressure at a distal end portion.

2. The liquid-material discharge device (1) according to Claim 1, wherein the liquid-material discharge head (10) comprises a negative-pressure operating unit (17) configured to adjust the negative pressure.

3. The liquid-material discharge device (1) according to Claim 1 or 2, wherein the liquid-material discharge head (10) comprises a holder (13) configured to detachably hold the liquid reservoir (12) and the pickup member (15; 19).

4. The liquid-material discharge device (1) according to any one of Claims 1 to 3, wherein the pickup member (15; 19) is arranged such that a distance between distal ends of the pickup member (15; 19) and the nozzle (11) is larger than a distance between roots of the pickup member (15; 19) and the nozzle (11).

5. The liquid-material discharge device (1) according to any one of Claims 1 to 4, wherein a central axis of the pickup member (15; 19) and a central axis of the nozzle (11) are arranged such that they spread apart toward distal ends of the pickup member (15; 19) and the nozzle (11).

6. The liquid-material discharge device (1) according to any one of Claims 1 to 5, wherein the liquid-material discharge head (10) comprises a discharge operating unit configured to perform on/off control of pressurized air applied to the liquid reservoir (12).

7. The liquid-material discharge device (1) according to any one of Claims 1 to 6, wherein the suction tube (16) has a backflow prevention mechanism.

8. The liquid-material discharge device (1) according to Claim 1, 2 or 7, comprising a discharge operating unit configured to perform on/off control of pressurized air supplied from the controller (20) to the pressurizing tube (23).

9. The liquid-material discharge device (1) according to Claim 8, wherein the discharge operating unit is a footswitch (24) electrically connected to the controller (20).

10. A member attachment method using the liquid-material discharge device (1) according to any of Claims 1 to 9, comprising:

holding an attachment member (S) by the pickup member (15; 19);
applying liquid material (L) from the nozzle (11) to a workpiece surface while holding the attachment member (S) by the pickup member (15; 19); and
placing the attachment member (S) held by the pickup member (15; 19) on the liquid material (L) applied to the workpiece surface.

11. A member attachment method using the liquid-material discharge device (1) according to any of Claims 1 to 9, comprising:

applying liquid material (L) from the nozzle (11) to a workpiece surface; and
holding an attachment member (S) by the pickup member (15; 19) and placing the attachment member (S) on the liquid material (L) applied to the workpiece surface.

Patentansprüche

1. Flüssigmaterialabgabevorrichtung (1) mit:

einem Flüssigmaterialabgabekopf (10) einer handlichen Bauart, der eine Düse (11), ein Flüssigkeitsreservoir (12) und ein Aufnahmeelement (15; 19) aufweist, das neben der Düse (11) angeordnet ist, und;
einem Ansaugrohr (16), das konfiguriert ist, dem Aufnahmeelement (15; 19) Unterdruckluft zuzuführen;
dadurch gekennzeichnet, dass es ferner

ein Druckbeaufschlagungsrohr (23), das konfiguriert ist, dem Flüssigkeitsreservoir (12) Druckluft zuzuführen; und
eine Steuerungseinrichtung (20) aufweist, die konfiguriert ist, dem Druckbeaufschlagungsrohr (23) Druckluft zuzuführen und dem Ansaugrohr (16) Unterdruckluft zuzuführen;
wobei
das Aufnahmeelement (15; 19) konfiguriert ist, ein Zielobjekt aufzunehmen und lösbar zu halten, indem Unterdruck an einem distalen Endabschnitt erzeugt wird.

2. Flüssigmaterialabgabevorrichtung (1) nach Anspruch 1, wobei der Flüssigmaterialabgabekopf (10) eine Unterdruckbetriebseinheit (17) aufweist, die konfiguriert ist, den Unterdruck anzupassen.

3. Flüssigmaterialabgabevorrichtung (1) nach Anspruch 1 oder 2, wobei der Flüssigmaterialabgabekopf (10) einen Halter (13) aufweist, der konfiguriert ist, das Flüssigkeitsreservoir (12) und das Aufnahmeelement (15; 19) lösbar zu halten.

4. Flüssigmaterialabgabevorrichtung (1) nach einem der Ansprüche 1 bis 3, wobei das Aufnahmeelement (15; 19) so angeordnet ist, dass ein Abstand zwischen distalen Enden des Aufnahmeelements (15; 19) und der Düse (11) größer als ein Abstand zwischen Füßen des Aufnahmeelements (15; 19) und der Düse (11) ist.

5. Flüssigmaterialabgabevorrichtung (1) nach einem der Ansprüche 1 bis 4, wobei eine Mittelachse des Aufnahmeelements (15; 19) und eine Mittelachse der Düse (11) so angeordnet sind, dass sie sich in Richtung von distalen Enden des Aufnahmeelements (15; 19) und der Düse (11) auseinander ausbreiten.

6. Flüssigmaterialabgabevorrichtung (1) nach einem der Ansprüche 1 bis 5, wobei der Flüssigmaterialabgabekopf (10) eine Abgabebetriebseinheit aufweist, die konfiguriert ist, eine EIN/AUS-Steuerung von Druckluft auszuführen, die dem Flüssigkeitsreservoir (12) zugeführt wird.

7. Flüssigmaterialabgabevorrichtung (1) nach einem der Ansprüche 1 bis 6, wobei das Ansaugrohr (16) einen Rückströmverhinderungsmechanismus hat.

8. Flüssigmaterialabgabevorrichtung (1) nach Anspruch 1, 2 oder 7, die eine Abgabebetriebseinheit aufweist, die konfiguriert ist, eine EIN/AUSSteuerung von Druckluft auszuführen, die dem Druckbeaufschlagungsrohr (23) von der Steuerungseinrichtung (20) zugeführt wird.

9. Flüssigmaterialabgabevorrichtung (1) nach Anspruch 8, wobei die Abgabebetriebseinheit ein Fußschalter (24) ist, der mit der Steuerungseinrichtung (20) elektrisch verbunden ist.

10. Elementbefestigungsverfahren unter Verwendung der Flüssigmaterialabgabevorrichtung (1) nach einem der Ansprüche 1 bis 9 mit:

    Halten eines Befestigungselements (S) durch das Aufnahmeelement (15; 19);
    Auftragen von Flüssigmaterial (L) aus der Düse (11) auf eine Werkstückoberfläche, während das Befestigungselement (S) durch das Aufnahmeelement (15; 19) gehalten wird; und
    Platzieren des Befestigungselements (S), das von dem Aufnahmeelement (15; 19) gehalten wird, auf dem Flüssigmaterial (L), das auf die Werkstückoberfläche aufgetragen wird.

11. Elementbefestigungsverfahren unter Verwendung der Flüssigmaterialabgabevorrichtung (1) nach einem der Ansprüche 1 bis 9 mit:

    Auftragen von Flüssigmaterial (L) aus der Düse (11) auf eine Werkstückoberfläche; und
    Halten eines Befestigungselements (S) durch das Aufnahmeelement (15; 19) und Platzieren des Befestigungselements (S) auf dem Flüssigmaterial (L), das auf die Werkstückoberfläche aufgetragen wird.

Revendications

1. Dispositif de décharge de matière liquide (1), comprenant :

    une tête de décharge de matière liquide (10) du type maniable comprenant une buse (11), un réservoir de liquide (12), et un élément de prise (15 ; 19) qui est disposé à côté de la buse (11) et ;
    un tube d'aspiration (16) configuré pour fournir de l'air à pression négative à l'élément de prise (15 ; 19) ;
    caractérisé en ce que le dispositif comprend en outre

        un tube de pressurisation (23) configuré pour fournir de l'air sous pression au réservoir de liquide (12) ; et un contrôleur (20) configuré pour fournir de l'air sous pression au tube de pressurisation (23) et pour fournir de l'air à pression négative au tube d'aspiration (16) ;
        dans lequel l'élément de prise (15 ; 19) est configuré pour prendre et maintenir de manière amovible un objet cible en générant une pression négative à une partie d'extrémité distale.

2. Dispositif de distribution de matière liquide (1) selon la revendication 1, dans lequel la tête de décharge de matière liquide (10) comprend une unité opérationelle de pression négative (17) configurée pour ajuster la pression négative.

3. Dispositif de décharge de matière liquide (1) selon la revendication 1 ou 2, dans lequel la tête de décharge de matière

liquide (10) comprend un support (13) configuré pour maintenir de manière amovible le réservoir de liquide (12) et l'élément de prise (15 ; 19).

4. Dispositif de décharge de matière liquide (1) selon l'une quelconque des revendications 1 à 3, dans lequel l'élément de prise (15 ; 19) est disposé de telle sorte qu'une distance entre des extrémités distales de l'élément de prise (15 ; 19) et la buse (11) est supérieure à une distance entre des racines de l'élément de prise (15 ; 19) et la buse (11).

5. Dispositif de décharge de matière liquide (1) selon l'une quelconque des revendications 1 à 4, dans lequel un axe central de l'élément de prise (15 ; 19) et un axe central de la buse (11) sont disposés de manière à s'écarter vers des extrémités distales de l'élément de prise (15 ; 19) et de la buse (11).

6. Dispositif de décharge de matière liquide (1) selon l'une quelconque des revendications 1 à 5, dans lequel la tête de décharge de matière liquide (10) comprend une unité opérationnelle de décharge configurée pour effectuer une commande marche/arrêt de l'air sous pression appliqué au réservoir de liquide (12).

7. Dispositif de décharge de matière liquide (1) selon l'une quelconque des revendications 1 à 6, dans lequel le tube d'aspiration (16) comporte un mécanisme anti-retour.

8. Dispositif de décharge de matière liquide (1) selon la revendication 1, 2 ou 7, comprenant une unité opérationnelle de décharge configurée pour effectuer une commande marche/arrêt de l'air sous pression fourni par le contrôleur (20) au tube de pressurisation (23).

9. Dispositif de décharge de matière liquide (1) selon la revendication 8, dans lequel l'unité opérationnelle de décharge est une pédale (24) connectée électriquement au contrôleur (20).

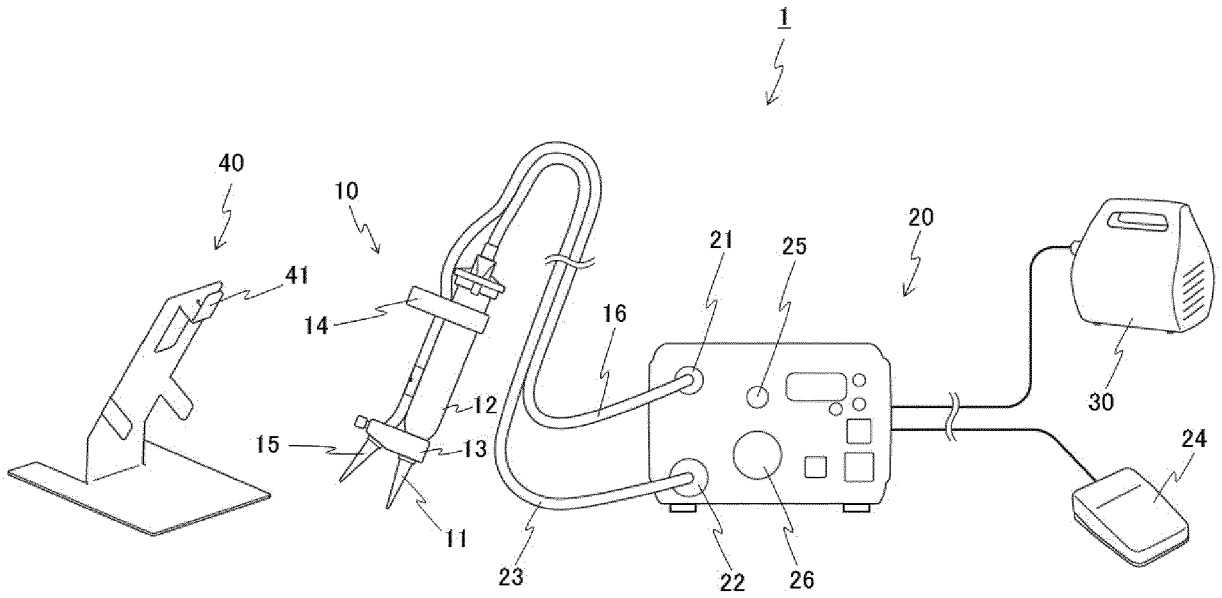
10. Procédé de fixation d'un élément utilisant le dispositif de décharge de matière liquide (1) selon l'une quelconque des revendications 1 à 9, comprenant :

le maintien d'un élément de fixation (S) par l'élément de prise (15 ; 19) ;
l'application de matière liquide (L) à partir de la buse (11) sur la surface d'une pièce à usiner tout en maintenant l'élément de fixation (S) par l'élément de prise (15 ; 19) ; et
le placement de l'élément de fixation (S) maintenu par l'élément de prise (15 ; 19) sur la matière liquide (L) appliquée sur la surface de la pièce à usiner.

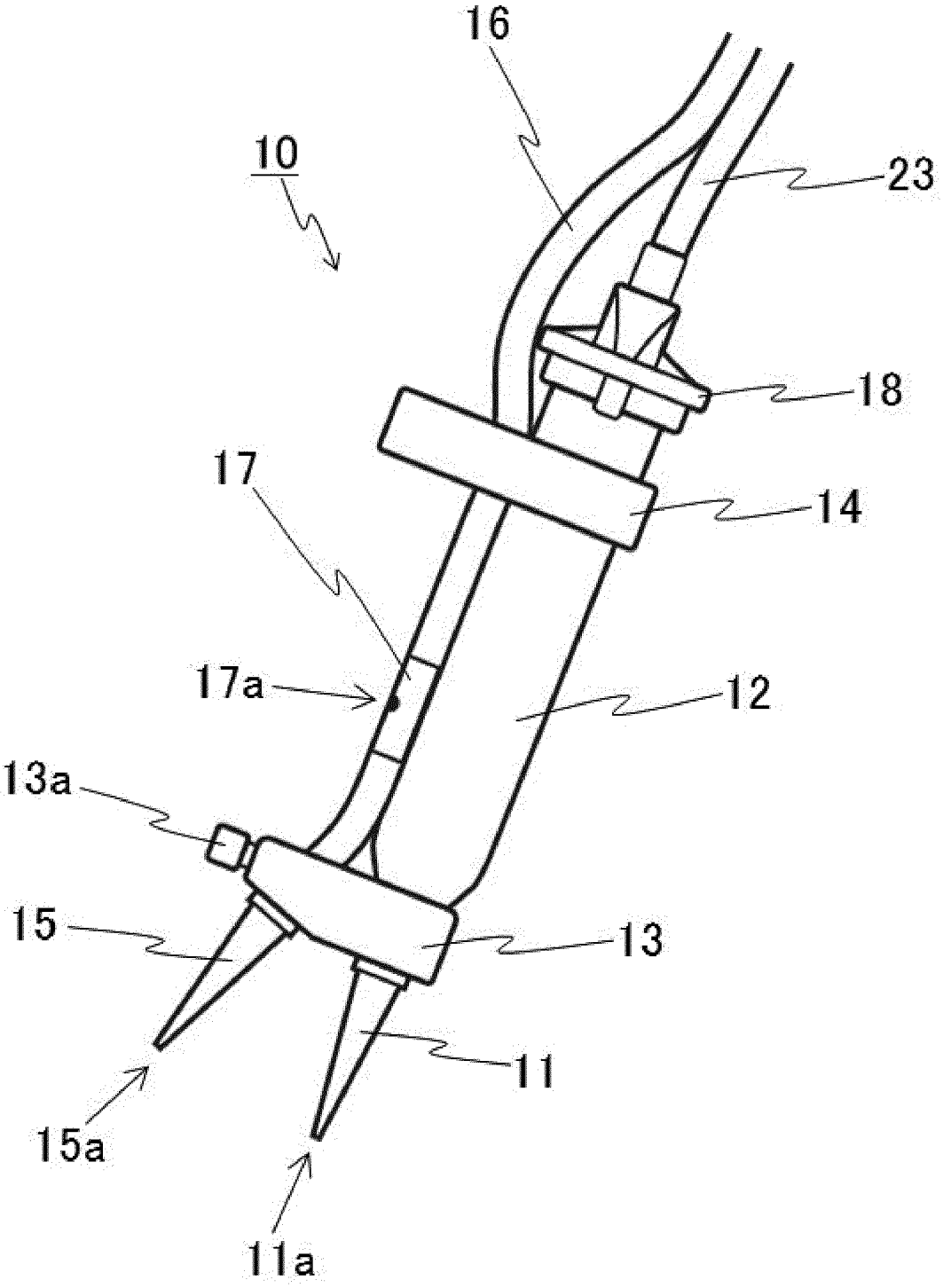
11. Procédé de fixation d'un élément utilisant le dispositif de décharge de matière liquide (1) selon l'une quelconque des revendications 1 à 9, comprenant :

l'application de matière liquide (L) à partir de la buse (11) sur la surface d'une pièce à usiner ; et
le maintien d'un élément de fixation (S) par l'élément de prise (15 ; 19) et le placement de l'élément de fixation (S) sur la matière liquide (L) appliquée sur la surface de la pièce à usiner.

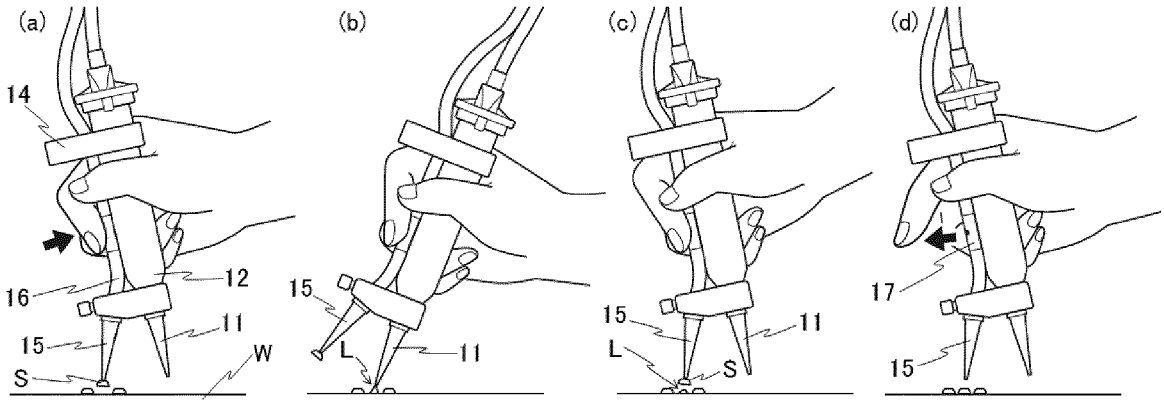
[Fig.1]



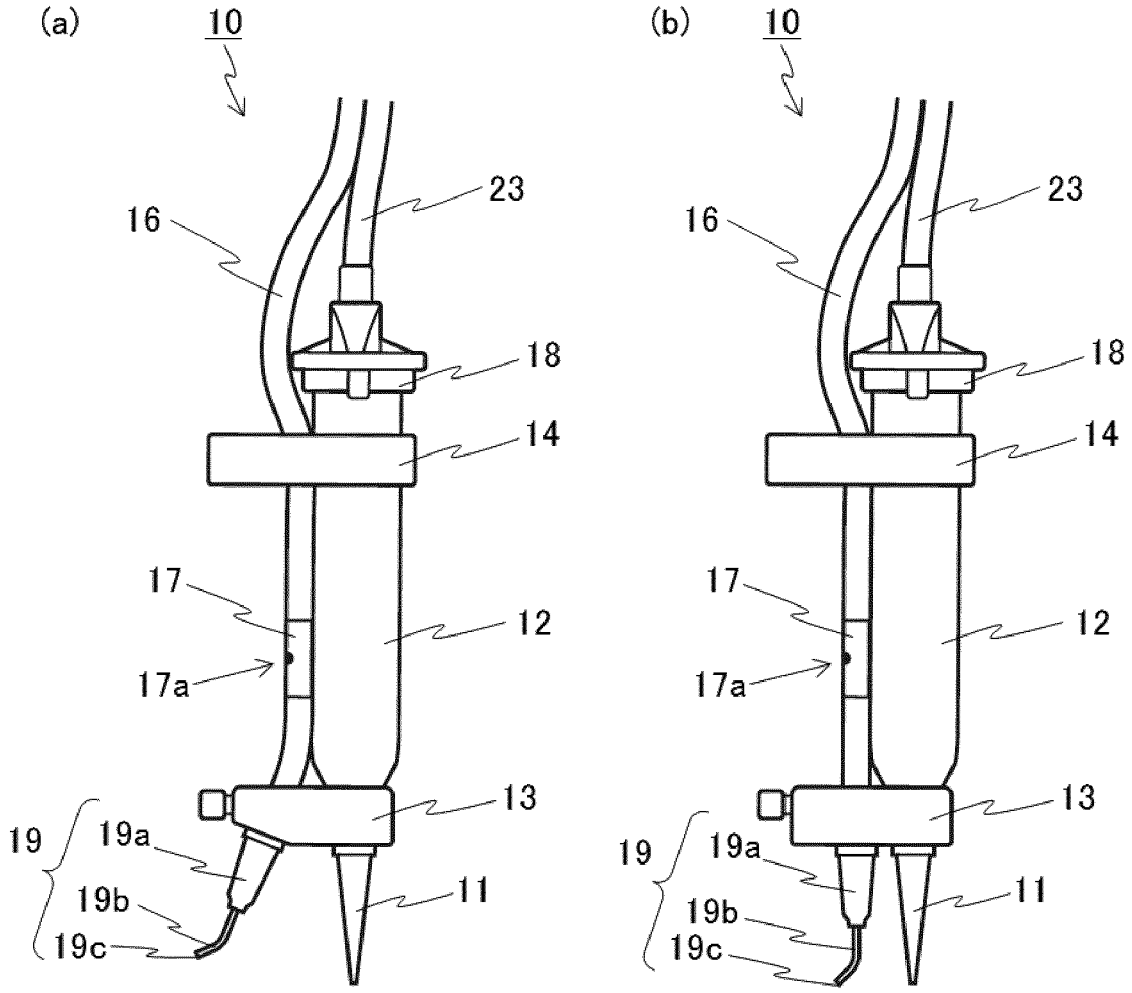
[Fig.2]



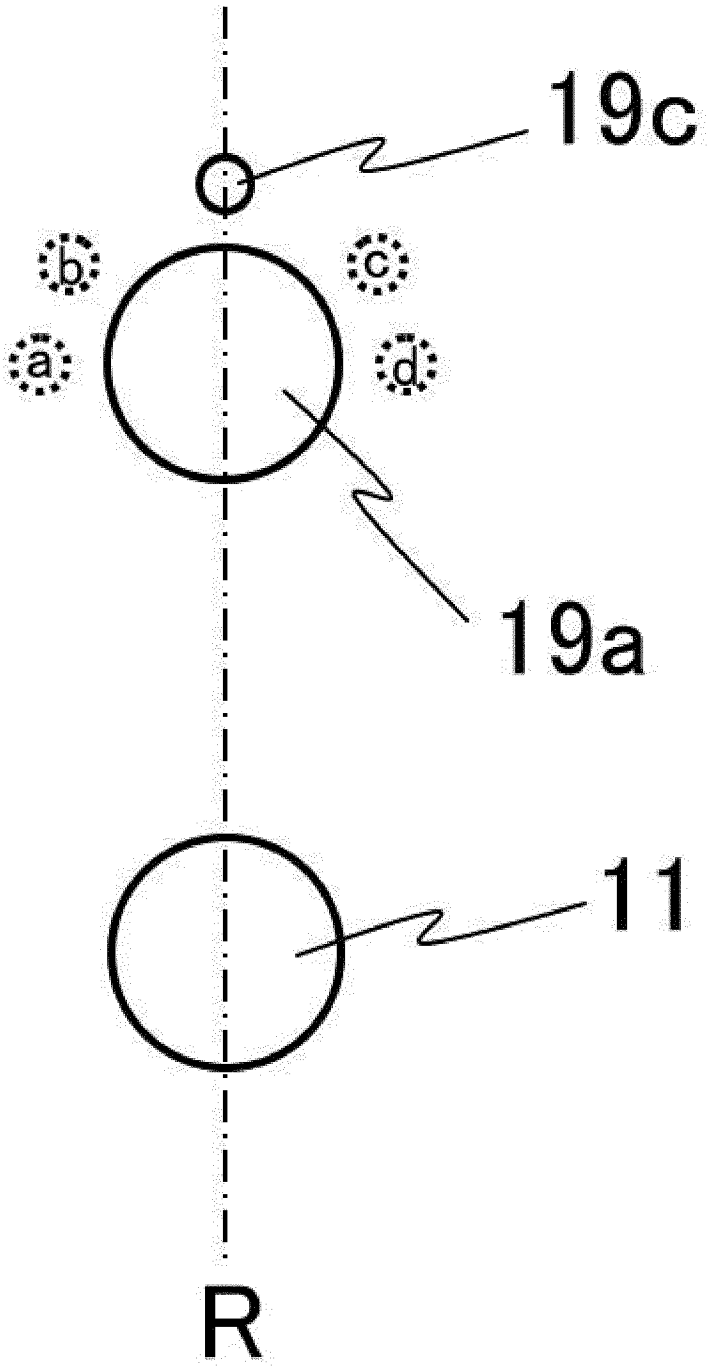
[Fig.3]


(a)
14
16
12
11
15
S
W
(b)
15
L
11
(c)
15
L
11
S
(d)
17
15

[Fig.4]


(a)
10
23
16
18
14
17
12
17a
13
19
19a
19b
19c
11
(b)
10
23
16
18
14
17
12
17a
13
19
19a
19b
19c
11

[Fig.5]



REFERENCES CITED IN THE DESCRIPTION

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