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(54) INK CARTRIDGE FILLING APPARATUS

FÜLLVORRICHTUNG FÜR EINE TINTENPATRONE

APPAREIL DE REMPLISSAGE DE CARTOUCHE D'ENCRE

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Description

FIELD OF THE TECHNOLOGY

[0001] The present invention relates to the technical field of inkjet printers, in particular to an ink cartridge refilling device for ink refilling under negative pressure.

BACKGROUND

[0002] An inkjet printer is driven by a print signal to eject ink to a recording medium such as a piece of paper via a nozzle of a printhead to complete the recording of characters or graphics. With the continuous development of inkjet technology, the volume of the inkjet printer is smaller and smaller. Correspondingly, the volume of the ink cartridge as an ink storage container is also limited. Therefore, a user needs to replace the ink cartridge continuously and discard a used ink cartridge. However, the ink cartridge contains plastics and other parts which cannot be naturally degraded, which would cause resource waste and environmental pollution. Consequently, there are a plurality of ink cartridge refilling devices for refilling ink into ink cartridges on the market, in which the ink cartridges do not need to be replaced again but are refilled with ink for reuse.

[0003] Most ink cartridge refilling devices in the prior art utilize negative pressure to refill ink into ink cartridges. The device may comprise an ink container for receiving ink for refilling, a suction channel and a needle cylinder for suction and pressure reduction. When the device is used, an ink cartridge to be refilled can be placed on the ink container; the needle cylinder is connected with the suction channel and stretched by hand to suck air, so that the volume of air in the ink cartridge can be reduced; and ink in the ink container can be injected into the ink cartridge due to the action of gas-pressure balance after the hand is let go.

[0004] However, the ink cartridge refilling device also has the disadvantages that: a piezoelectric transducer is usually arranged inside the ink cartridge to detect whether there is ink in the ink cartridge in order to remind a user of the in-time replacement of the ink cartridge and prevent the printhead from being burned down due to empty print. Due to the reasons such as the refilling speed and the ink performance, air bubbles tend to gather on the upper part of the piezoelectric transducer after the ink cartridge is fully refilled. When the ink cartridge is installed on a printer at the moment, the piezoelectric transducer cannot convey a normal response signal to the printer, and then the printer cannot identify the ink cartridge, and consequently a user cannot print.

[0005] Document EP0847861 reveals the preamble of appended claim 1.

SUMMARY

[0006] The objective of the present invention is to provide an ink cartridge refilling device to effectively remove air bubbles gathering on the upper part of a piezoelectric transducer in an ink cartridge and guarantee the identification effect of a printer.

[0007] The present invention provides an ink cartridge refilling device, which comprises an ink container, an air inlet channel and a suction channel, wherein the ink container is used for storing ink to be refilled into an ink cartridge; an ink injection channel communicated with an ink injection opening of the ink cartridge is formed on the ink container; the air inlet channel is communicated with the ink container and used for introducing outside air into the ink container; and the suction channel is communicated with the ink cartridge and connected with an aspirator to suck air in the ink cartridge. The ink cartridge refilling device also comprises a re-suction channel which is communicated with an ink outlet of the ink cartridge and connected with the aspirator to suck ink at the ink outlet after the ink cartridge is refilled.

[0008] According to the ink cartridge refilling device, one end of the suction channel is directly connected with the ink outlet of the ink cartridge.

[0009] According to the ink cartridge refilling device, the air inlet channel and the suction channel are coaxially arranged.

[0010] According to the ink cartridge refilling device, the ink cartridge refilling device also comprises a valve component which is arranged on the air inlet channel and used for controlling the on-off of the air inlet channel.

[0011] According to the ink cartridge refilling device, the valve component comprises a valve seat, an elastic component and a seal ring, wherein the valve seat is arranged on a sucking opening of the suction channel; the elastic component is sleeved on the outerwall of the suction channel; the seal ring is arranged between the valve seat and the elastic component; and one end of the seal ring is engaged with the elastic component and the other end of the seal ring is engaged with the valve seat.

[0012] According to the ink cartridge refilling device, the valve component also comprises a bushing having an engagement section and a sliding section, wherein the engagement section is engaged with the seal ring; the diameter of the engagement section is equal to that of the seal ring; the sliding section is connected with the engagement section; the diameter of the sliding section is more than that of the suction channel; and the sliding section is used for sliding

along the outerwall of the suction channel.

[0013] According to the ink cartridge refilling device, a sealing component is arranged on the end part of the ink injection channel and comprises a rubber plug and a sleeve connected with the rubber plug.

[0014] According to the ink cartridge refilling device, the ink cartridge refilling device also comprises a positioning component which is connected with the ink container and used for fixing the ink cartridge.

[0015] According to the ink cartridge refilling device, the positioning component comprises a holding section formed on the outerwall of the positioning component.

[0016] According to the ink cartridge refilling device, the air inlet channel and the suction channel are separately arranged.

[0017] The ink cartridge refilling device provided by the present invention has the advantage that: as the re-suction channel is formed on the ink cartridge refilling device and communicated with the ink outlet on the ink cartridge, air bubbles can be prevented from being attached to the upper part of the piezoelectric transducer near the ink outlet, and then the phenomenon that a user cannot print as the ink cartridge after refilling cannot be identified when installed on a printer can be avoided.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] For more clear description of the embodiments of the present invention or the technical proposal in the prior art, simple description is given to the embodiments or the attached drawings required to be used in the description of the prior art. Obviously, the attached drawings as illustrated below are only a quantity of embodiments of the present invention and those skilled in the art can also obtain other drawings based on these drawings without providing creative labor.

Fig. 1 is overall structure diagram of an embodiment of the ink cartridge refilling device provided by the present invention;

Fig. 2 is an exploded view of the embodiment of the ink cartridge refilling device provided by the present invention;

Fig. 3 is a schematic diagram illustrating the off state of a first embodiment of a valve component for an air inlet channel in the ink cartridge refilling device provided by the present invention;

Fig. 4 is a schematic diagram illustrating the on state of the first embodiment of the valve component for the air inlet channel in the ink cartridge refilling device provided by the present invention;

Fig. 5 is a structure diagram of a second embodiment of the valve component for the air inlet channel in the ink cartridge refilling device provided by the present invention;

Fig. 6 is a schematic diagram illustrating the use state I of the ink cartridge refilling device provided by the present invention;

Fig. 7 is a schematic diagram illustrating the use state II of the ink cartridge refilling device provided by the present invention; and

Fig. 8 is a schematic diagram illustrating the use state III of the ink cartridge refilling device provided by the present invention.

Brief description of reference signs in the drawings:

[0019]

11- ink container;	12- air inlet channel;	13- suction channel;
14- re-suction channel;	15- ink injection channel;	16- sealing element;
17- gasket;	18- silicone gasket;	19- sucking opening;
20- valve seat;	21- seal ring;	22- elastic component;
23- engagement section;	24- sliding section;	25- rubber plug;
26- sleeve;	27- positioning component;	28- holding section;
29- ink cartridge;	30- aspirator.	

DETAILED DESCRIPTION

[0020] For more clear understanding of the objectives, the technical proposals and the advantages of the embodiments of the present invention, clear and complete description is given to the technical proposals in the embodiments of the present invention with the attached drawings in the embodiments of the present invention. Obviously, the embodiments

illustrated are only one part of embodiments of the present invention but are not all the embodiments. All the other embodiments obtained by those skilled in the art on the basis of the embodiments of the present invention without providing creative labor shall be all within the scope of protection of the present invention.

[0021] The main technical proposal of the present invention is as follows: a re-suction channel is formed on an ink cartridge refilling device and communicated with an ink outlet on an ink cartridge and can be connected with an aspirator to suck a small amount of ink at the ink outlet from the ink cartridge after the ink cartridge is refilled, so that air bubbles can be prevented from being attached to the upper part of a piezoelectric transducer near the ink outlet, and then the phenomenon that a user cannot print as the ink cartridge after refilling cannot be identified when installed on a printer can be avoided.

[0022] Further detailed description is given to the technical proposal of the present invention with the attached drawings and preferred embodiments.

[0023] First of all, for convenient understanding of the structure of the ink cartridge refilling device provided by the present invention, simple description is given to the structure of the ink cartridge first. The ink cartridge is made of plastics; an ink storage cavity for receiving ink supplied to the printer can be formed inside the ink cartridge; and the ink cartridge is also provided with an ink outlet engaged with an ink supply needle of the printer to convey ink to a printhead of the printer, an ink injection opening used for replenishing ink to the ink storage cavity, and an elastic handle engaged with a corresponding structure on the printer to fix the ink cartridge on the printer. Wherein, a one-way membrane valve is arranged on an ink flow channel between the ink storage cavity and the ink outlet and can be selectively opened or closed according to the pressure difference between the ink storage cavity and the ink outlet.

[0024] Moreover, a piezoelectric transducer is also arranged near the ink outlet on the ink cartridge, so that the ink level in the ink cartridge can be known in real time and a user can be reminded of the replacement of the ink cartridge in time when the ink is out, and consequently the phenomenon that the printhead of the printer is burned down due to empty print can be avoided. The piezoelectric transducer is mainly made of piezoelectric ceramics and produces different vibration frequencies based on a fluid attached thereto. That is to say, the vibration frequency produced by the piezoelectric transducer is different when the fluid is ink or air attached on it. Therefore, the consumption condition of the ink in the ink cartridge at the moment can be determined simply by the identification of the vibration frequency produced by the piezoelectric transducer.

[0025] Fig. 1 is an overall structure diagram of an embodiment of the ink cartridge refilling device provided by the present invention, and Fig. 2 is an exploded view of the embodiment of the ink cartridge refilling device provided by the present invention. The ink cartridge refilling device of the embodiment can comprise an ink container 11, an air inlet channel 12, a suction channel 13 and a re-suction channel 14.

[0026] Detailed description of specific structures of various parts of the ink cartridge refilling device of the embodiment is given below first:

[0027] Wherein, the ink container 11 is used for storing ink to be refilled into the ink cartridge; an ink injection channel 15 connected with an ink injection opening on the ink cartridge to inject ink into the ink cartridge can be formed on the ink container 11, for example, on the top of the ink container 11; and the air inlet channel 12 and the suction channel 13 can be arranged inside the ink container 11. Moreover, when the ink cartridge refilling device is used, the air inlet channel 12 can be communicated with the ink container 11 and used for introducing outside air into the ink container 11 to adjust the internal pressure of the ink container 11; and the suction channel 13 can be communicated with the ink cartridge and connected with an aspirator to suck air in the ink cartridge, so that negative pressure can be formed in the ink cartridge.

[0028] The main characteristic of the ink cartridge refilling device of the embodiment is the arrangement of the re-suction channel 14. The re-suction channel 14 can be formed on the ink container 11 and communicated with the ink outlet on the ink cartridge, and a silicone gasket 18 can be arranged between the re-suction channel 14 and the suction channel 13 to seal the ink container 11. Due to the arrangement of the re-suction channel 14, the aspirator can be connected to suck a small amount of ink in the ink cartridge after the ink cartridge is refilled, so that air bubbles can be prevented from gathering on the upper part of the piezoelectric transducer near the ink outlet of the ink cartridge, and then the phenomenon that the user cannot print as the ink cartridge after refilling cannot be identified when installed on the printer can be avoided.

[0029] Moreover, a sealing component can be arranged on the end part of the re-suction channel 14. More specifically, a sealing element 16 can be arranged. The sealing element 16 is made of silicone, on which a small hole can be formed; the diameter of the small hole is equal to that of a needle tube of the aspirator; and the aspirator can pass through the sealing element 16 via the small hole and be connected with the re-suction channel 14. When the aspirator is pulled out, the section of the sealing element 16 passed through by the aspirator can be sealed automatically under the elasticity of the silicone, so that air can be prevented from entering into the ink container 11. In addition, in the embodiment, a gasket 17 can be also arranged above the sealing element 16 and used for fixing the sealing element 16 and preventing the sealing element 16 from being pulled out when the aspirator is removed.

[0030] Furthermore, the ink cartridge refilling device of the embodiment also improves the suction channel. More

specifically, the suction channel 13 can be set to pass across the ink container 11 and be directly connected with the ink outlet of the ink cartridge. That is to say, the suction channel 13 is positioned inside the ink container 11 and not communicated with the ink container 11 but only communicated with the ink cartridge.

[0031] As the suction channel 13 is directly communicated with the ink cartridge rather than the ink container, only air in the ink cartridge is sucked and air in the ink container 11 is not sucked when the suction channel is used for suction, and thus the amount of air sucked when the ink cartridge is refilled for a plurality of times can be guaranteed to be constant, namely the amount of ink refilled each time can be guaranteed to be constant, and consequently stable user operation can be guaranteed. Therefore, the problems of unstable refilling quality and poor printing effect in the prior art due to the fact that the amount of air sucked is more and more and the amount of ink refilled into the ink cartridge is less and less when the ink cartridge is subjected to suction and ink injection for a plurality of times as a communicated closed space is formed between the ink container and the ink cartridge can be effectively solved.

[0032] In addition, the air inlet channel 12 and the suction channel 13 can be separately arranged at different positions of the ink container 11 and can also be coaxially arranged as illustrated in the embodiment, and then simple structure and simplified manufacturing technique can be achieved.

[0033] Moreover, when the air inlet channel and the suction channel are coaxially arranged, a valve component can be arranged at a sucking opening 19 in the suction channel 13, so that the on-off of the air inlet channel 12 can be controlled by the valve component. Two specific application structures are given below to illustrate the structural forms of the valve component. However, the structure of the valve component is not limited by the two forms.

[0034] One structure of the valve component can be as illustrated in Figs. 3 and 4 (Fig. 3 is a schematic diagram illustrating the off state of a first embodiment of the valve component for the air inlet channel in the ink cartridge refilling device provided by the present invention, and Fig. 4 is a schematic diagram illustrating the on state of the first embodiment of the valve component for the air inlet channel in the ink cartridge refilling device provided by the present invention). The valve component is arranged on the air inlet channel and can comprise a valve seat 20, a seal ring 21 and an elastic component 22, wherein the elastic component 22 can be a spring; the valve seat 20 is positioned at the sucking opening 19 of the suction channel; the elastic component 22 is sleeved on the outerwall of the suction channel; the seal ring 21 is positioned between the valve seat 20 and the elastic component 22; one end of the seal ring 21 is engaged with the elastic component 22 and the other end of the seal ring 21 is engaged with the valve seat 20; and the valve component can selectively open or close the air inlet channel.

[0035] The principle thereof is as follows: when the ink cartridge refilling device as illustrated in Fig. 3 is not used, the valve component is in the off state and the seal ring 21 is tightly engaged with the valve seat 20 under an elastic force of the elastic component 22, so that the air is prevented from entering into the ink container. When the ink cartridge refilling device as illustrated in Fig. 4 is used for refilling the ink cartridge, a downward acting force is produced due to the engagement of the aspirator and the sucking opening 19 and is more than the elastic force of the elastic component 22, so that the elastic component 22 is driven to be deformed and move down, and then the seal ring 21 is driven to move down and be disengaged from the valve seat 20, namely the valve component is driven to move down to open the air inlet channel, so that outside air is replenished into the ink container along a track as illustrated in the figure. When the ink cartridge is refilled and the aspirator is pulled out, the downward acting force produced is canceled. Herein, the seal ring 21 is tightly engaged with the valve seat 20 again under the action of the elastic component 22, and the air inlet channel is closed again, and then the ink leakage can be avoided.

[0036] The other structure of the valve component can be as illustrated in Fig. 5 (Fig. 5 is a structure diagram of a second embodiment of the valve component for the air inlet channel in the ink cartridge refilling device provided by the present invention). The difference between the valve component in this structure and the valve component in the above structure is the additional arrangement of a component, namely a bushing. The bushing can comprise an engagement section 23 and a sliding section 24, wherein the engagement section 23 is engaged with the seal ring 21; the diameter of the engagement section 23 is equal to that of the seal ring 21; the sliding section 24 is used for sliding along the outerwall of the suction channel; and the diameter of the sliding section 24 is slightly more than that of the suction channel 13. Therefore, the seal ring 21 is tightly engaged with the valve seat 20; the bushing is engaged with the seal ring 21; and the bushing can slide along the suction channel 13. Preferably, the bushing can be made of engineering plastics and the seal ring can be made of rubber or silicone.

[0037] The principle thereof is as follows: when the ink cartridge refilling device is used, the seal ring 21 may be disengaged from the valve seat 20 under the action of the acting force produced due to the engagement of the aspirator and the sucking opening. Herein, as the bushing and the seal ring 21 are also engaged with each other, the bushing also moves down along the suction channel 13. Obviously, the valve component is opened at the moment and the air can enter into the ink container to adjust the pressure in the ink container.

[0038] In addition, when only the seal ring is adopted, as the seal ring is made of materials such as rubber and silicone, the seal ring has large elasticity and tends to be greatly deformed when the aspirator is inserted, and then the phenomenon that both sides of the seal ring are deformed and the air inlet channel is difficult to open tends to occur. In the embodiment, by adoption of the bushing, as the bushing is made of engineering plastics, the bushing cannot be subjected to elastic

deformation but directly slides down when the aspirator is inserted after a force is conveyed to the bushing via the seal ring. Moreover, as the bushing and the seal ring are engaged with each other, a force can be also produced to drive the seal ring to slide down, and then the air inlet channel can be opened without an overlarge acting force when the aspirator is inserted, and consequently the control precision can be improved.

[0039] Moreover, a sealing component for sealing can also be arranged on the end part of the ink injection channel 15, so that the ink leakage during the conveying can be avoided. More specifically, as illustrated in Fig. 2, the sealing component can be arranged at one end of the ink injection channel 15, which is connected with the ink injection opening on the ink cartridge. The sealing component can comprise a rubber plug 25 and a sleeve 26, wherein the sleeve 26 is made of engineering plastics; the rubber plug is made of rubber or silicone; and the sleeve 26 is engaged with the rubber plug and is easy to assemble and disassemble. The arrangement of the sleeve 26 is for the miniaturization of the ink cartridge refilling device. As the space on the upper part of the ink cartridge refilling device, for receiving the ink cartridge, is relatively narrow, if only the rubber plug 25 is used for sealing, a user needs to stretch a hand into the narrow space to take out the rubber plug when the ink cartridge refilling device is used, which is very troublesome. By adoption of the sleeve 26, the sleeve 26 can be integrated into a whole with the rubber plug 25 and the length of the sleeve 26 is relatively long but slightly less than that of the ink cartridge. Therefore, the user can pull out the rubber plug 25 by pulling out the sleeve 26 when the ink cartridge refilling device is used, and then the ink injection channel 15 can be opened, and thus the operation is simple and convenient.

[0040] Furthermore, the ink cartridge refilling device of the embodiment can also comprise a positioning component 27 which can have a cavity for receiving the ink cartridge to be refilled. When the ink cartridge is refilled with ink by the ink cartridge refilling device, the ink cartridge is placed into the cavity and then fixed and the ink injection opening and the ink outlet of the ink cartridge are respectively communicated with corresponding interfaces in the ink container. The positioning component 27 and the ink container can be integrated into a whole by clamped connection and can also be arranged into an integrated structure.

[0041] In addition, for convenient holding of the ink cartridge refilling device, a holding section 28 can be further arranged on the outerwall of the positioning component 27 and can be formed by a plurality of grooves parallel to the outerwall of the device. Moreover, the holding section 28 can be also used as a connecting section between adjacent ink cartridge refilling devices. Herein, a lug (not illustrated in the figure) of which the shape is matched with that of the grooves is only required to be formed outside another refilling device, and then convenience is provided for the user to connect a plurality of refilling devices for receiving ink with different colors.

[0042] Further detailed description is given below to the use process of the ink cartridge refilling device of the embodiment in replenishing ink into the ink cartridge with Figs. 6 to 8:

[0043] Firstly, the ink cartridge refilling device of the embodiment can be placed on a plane; the sealing component on the ink injection channel 15 is pulled out; and the ink cartridge is placed in the positioning component of the ink cartridge refilling device. Herein, the elastic handle of the ink cartridge is engaged with the positioning component to fix the ink cartridge, and the ink outlet and the ink injection opening of the ink cartridge are respectively connected with the suction channel 13 and the ink injection channel 15 of the ink cartridge refilling device.

[0044] Secondly, as illustrated in Fig. 6 (Fig. 6 is a schematic diagram illustrating the use state I of the ink cartridge refilling device provided by the present invention), the overall fixed ink cartridge and ink cartridge refilling device are inverted, so that the ink container 11 is positioned above the ink cartridge 29. The aspirator 30 prepared in advance is connected with the sucking opening 19 of the suction channel 13 to suck air at the ink outlet. Obviously, due to the pressure difference between the ink storage cavity and the ink outlet, the one-way membrane valve in the ink cartridge 29 is opened herein, and air in the ink storage cavity is also sucked, namely vacuum is produced in the ink cartridge 29. Herein, as illustrated in Fig. 6, due to the pressure balance principle, the ink in the ink container 11 is refilled into the ink cartridge 29; the valve component positioned at the sucking opening 19 of the suction channel 13 is opened; and outside air can enter into the ink container 11 via the air inlet channel 12, so that constant pressure in the ink container 11 can be guaranteed. When there is ink in the aspirator 30, the ink cartridge 29 is fully refilled and can be used for printing. Herein, the aspirator 30 must be removed first, and the valve component can close the air inlet channel 12 to seal the ink container 11 under the elastic force of the spring.

[0045] Thirdly, as illustrated in Fig. 7 (Fig. 7 is a schematic diagram illustrating the use state I I of the ink cartridge refilling device provided by the present invention), the ink cartridge 29 and the ink cartridge refilling device are inverted again, so that the ink cartridge 29 is positioned above the ink container 11. Moreover, the aspirator 30 is connected with the re-suction channel 14 to suck a small amount of ink in the ink cartridge 29.

[0046] Finally, as illustrated in Fig. 8 (Fig. 8 is a schematic diagram illustrating the use state III of the ink cartridge refilling device provided by the present invention), the ink cartridge is removed; the aspirator 30 is connected with the ink injection channel 15; residual ink sucked in the above step is injected into the ink container 11; and the aspirator 30 is removed at last, and the original sealing component is used for sealing the ink injection channel 15.

[0047] The ink cartridge refilling device of the embodiment has the advantage that: as the re-suction channel is formed on the ink cartridge refilling device and communicated with the ink outlet on the ink cartridge, air bubbles can be prevented

from being attached to the upper part of the piezoelectric transducer near the ink outlet, and then the phenomenon that the user cannot print as the ink cartridge after refilling cannot be identified when installed on the printer can be avoided. Therefore, the printing effect can be fully guaranteed and the use cost of users can be greatly reduced.

[0048] It shall be finally noted that the above embodiments are only used for illustrating the technical proposal of the present invention and not intended to limit the present invention. Although detailed description is given to the present invention with the preferred embodiments, it shall be understood by those skilled in the art that the technical proposals illustrated in various embodiments can be also modified or partial technical characteristics can be subjected to equivalent replacement and the modifications or replacements shall not allow the essence of corresponding technical proposals to be departed from the scope of the present invention, which is defined by the appended claims.

Claims

1. An ink cartridge refilling device, comprising:

an ink container (11), for storing ink to be refilled into an ink cartridge (29),
an ink injection channel (15) communicating with an ink injection opening arranged on said ink container (11);
an air inlet channel (12), communicating with said ink container (11) for introducing outside air into said ink container (11); and
a suction channel (13), to communicate with said ink cartridge (29) and to be connected with an aspirator (30) to suck air from said ink cartridge (29), **characterized in that** said ink cartridge refilling device also comprises:
a re-suction channel (14), for communication with an ink outlet of said ink cartridge (29) and to be connected with said aspirator (30) to suck ink at said ink outlet after said ink cartridge (29) is refilled.

2. The ink cartridge refilling device according to claim 1, wherein one end of said suction channel (13) is directly to be connected with said ink outlet of said ink cartridge (29).

3. The ink cartridge refilling device according to claim 2, wherein said air inlet channel (12) and said suction channel (13) are coaxially arranged.

4. The ink cartridge refilling device according to claim 3, wherein said ink cartridge refilling device also comprises:

a valve component which is arranged on said air inlet channel (12) and used for controlling the on-off of said air inlet channel.

5. The ink cartridge refilling device according to claim 4, wherein said valve component comprises:

a valve seat (20), in which said valve seat is arranged on a sucking opening of said suction channel;
an elastic component (22), in which said elastic component is sleeved on the outerwall of said suction channel (13); and
a seal ring (21), in which said seal ring is arranged between said valve seat and said elastic component; and one end of said seal ring is engaged with said elastic component (22) and the other end of said seal ring is engaged with said valve seat (20).

6. The ink cartridge refilling device according to claim 5, wherein said valve component also comprises a bushing having:

an engagement section, in which said engagement section is engaged with said seal ring (21), and the diameter of said engagement section is equal to that of said seal ring (21); and
a sliding section, in which said sliding section is connected with said engagement section; the diameter of said sliding section is more than that of said suction channel (13), and said sliding section is used for sliding along the outerwall of said suction channel.

7. The ink cartridge refilling device accordin to claim 1, wherein a sealing component is arranged on the end part of said ink injection channel (15) and comprises:

a rubber plug (25); and
a sleeve (26) connected with said rubber plug (25).

8. The ink cartridge refilling device according to any one of claims 1 to 7, wherein said ink cartridge refilling device also comprises:

a positioning component (27) which is connected with said ink container (11) and used for fixing said ink cartridge (29).

9. The ink cartridge refilling device according to claim 8, wherein said positioning component (27), comprises:

a holding section (28) formed on the outerwall of said positioning component (27).

10. The ink cartridge refilling device according to claim 1, wherein said air inlet channel (12) and said suction channel (13) are separately arranged.

Patentansprüche

1. Eine Tintenkartuschenwiederbefüllungsvorrichtung, enthaltend:

einen Tintenbehälter (11) zum Speichern von Tinte, die in eine Tintenkartusche (29) wiederbefüllt werden soll,
einen Tinteneinspritzkanal (15), der in Verbindung steht mit einer Tinteneinspritzöffnung, die an dem genannten Tintenbehälter (11) angeordnet ist,
einen Lufteinlasskanal (12), der in Verbindung steht mit dem genannten Tintenbehälter (11) zum Einführen von Außenluft in den genannten Tintenbehälter (11); und
einen Saugkanal (13) zur Verbindung mit der genannten Tintenkartusche (29) und zum Verbinden mit einer Saugvorrichtung (30), um Luft aus der genannten Tintenkartusche (29) zu saugen,
dadurch gekennzeichnet, dass
die genannte Tintenkartuschenwiederbefüllungsvorrichtung auch enthält:

einen Zurücksaugkanal (14) zur Verbindung mit einem Tinteriauslass der genannten Tintenkartusche (29) und zum Verbinden mit der genannten Saugvorrichtung (30), um Tinte an dem genannten Tintenauslass zu saugen, nachdem die genannte Tintenkartusche (29) wieder befüllt ist.

2. Die Tintenkartuschenwiederbefüllungsvorrichtung nach Anspruch 1, wobei ein Ende des genannten Saugkanals (13) direkt mit dem genannten Tintenauslass der genannten Tintenkartusche (29) zu verbinden ist.

3. Die Tintenkartuschenwiederbefüllungsvorrichtung nach Anspruch 2, wobei der genannte Lufteinlasskanal (12) und der genannte Saugkanal (13) koaxial angeordnet sind.

4. Die Tintenkartuschenwiederbefüllungsvorrichtung nach Anspruch 3, wobei die genannte Tintenkartuschenwiederbefüllungsvorrichtung auch enthält:

eine Ventilkomponente, die an dem genannten Lufteinlasskanal (12) angeordnet ist und verwendet wird, um das An-Aus des genannten Lufteinlasskanals zu steuern.

5. Die Tintenkartuschenwiederbefüllungsvorrichtung nach Anspruch 4, wobei die genannte Ventilkomponente enthält:

einen Ventilsitz (20), bei dem der genannte Ventilsitz an einer Saugöffnung des genannten Saugkanals angeordnet ist;
eine elastische Komponente (22), bei welcher die genannte elastische Komponente auf die Außenwand des genannten Saugkanals (13) aufgebracht ist; und
einen Dichtring (21), bei welchem der genannte Dichtring zwischen dem genannten Ventilsitz und der genannten elastischen Komponente angeordnet ist; und wobei ein Ende des genannten Dichtrings im Eingriff ist mit der genannten elastischen Komponente (22) und das andere Ende des genannten Dichtrings im Eingriff ist mit dem genannten Ventilsitz (20).

6. Die Tintenkartuschenwiederbefüllungsvorrichtung nach Anspruch 5, wobei die genannte Ventilkomponente weiterhin eine Buchse aufweist, die aufweist:

einen Eingriffsabschnitt, bei welchem der genannte Eingriffsabschnitt in Eingriff ist mit dem genannten Dichtring (21), und
wobei der Durchmesser des genannten Eingriffsabschnittes gleich ist zu demjenigen des genannten Dichtringes (21); und
einen gleitenden Abschnitt, bei welchem der genannte gleitende Abschnitt mit dem genannten Eingriffsabschnitt verbunden ist; wobei der Durchmesser des genannten gleitenden Abschnittes größer ist als derjenige des genannten Saugkanals (13); und wobei der genannte gleitende Abschnitt verwendet wird, um längs der Außenwand des genannten Saugkanals zu gleiten.

7. Die Tintenkartuschenwiederbefüllungsvorrichtung nach Anspruch 1, wobei eine Dichtkomponente an dem Endbereich des genannten Tinteneinspritzkanals (15) eingeordnet ist und enthält:

einen Gummistecker (25); und
eine Hülse (26), die mit dem genannten Gummistecker (25) verbunden ist.

8. Die Tintenkartuschenwiederbefüllungsvorrichtung nach einem der Ansprüche 1 bis 7, wobei die genannte Tintenkartuschenwiederbefüllungsvorrichtung auch enthält:

eine Positionierungskomponente (27), die mit dem genannten Tintenbehälter (11) verbunden ist und verwendet wird, um die genannte Tintenkartusche (29) zu fixieren.

9. Die Tintenkartuschenwiederbefüllungsvorrichtung nach Anspruch 8, wobei die genannte Positionierungskomponente (27) enthält:

einen Halteabschnitt (28), der an der Außenwand der genannten Positionierungskomponente (27) ausgebildet ist.

10. Die Tintenkartuschenwiederbefüllungsvorrichtung nach Anspruch 1, wobei der genannte Lufteinlasskanal (12) und der genannte Saugkanal (13) getrennt voneinander angeordnet sind.

Revendications

1. Dispositif de remplissage d'une cartouche d'encre, comprenant :

un contenant d'encre (11), destiné à stocker de l'encre de façon à remplir une cartouche d'encre (29) ;
un canal d'injection d'encre (15) qui communique avec une ouverture d'injection d'encre agencée sur ledit contenant d'encre (11) ;
un canal d'entrée d'air (12), qui communique avec ledit contenant d'encre (11) destiné à introduire de l'air extérieur dans ledit contenant d'encre (11) ; et
un canal d'aspiration (13), qui communique avec ladite cartouche d'encre (29) et à connecter à un dispositif d'aspiration (30) destiné à aspirer l'air de ladite cartouche d'encre (29) ;
caractérisé en ce que :

ledit dispositif de remplissage d'une cartouche d'encre, comprend en outre :
un canal de réaspiration (14), destiné à communiquer avec une sortie d'encre de ladite cartouche d'encre (29) et à être connecté audit dispositif d'aspiration (30) de façon à aspirer l'encre au niveau de ladite sortie d'encre une fois que ladite cartouche d'encre (29) a été remplie.

2. Dispositif de remplissage d'une cartouche d'encre selon la revendication 1, dans lequel une extrémité dudit canal d'aspiration (13) doit être connectée directement à ladite sortie d'encre de ladite cartouche d'encre (29).

3. Dispositif de remplissage d'une cartouche d'encre selon la revendication 2, dans lequel ledit canal d'entrée d'air (12) et ledit canal d'aspiration (13) sont agencés de manière coaxiale.

4. Dispositif de remplissage d'une cartouche d'encre selon la revendication 3, dans lequel ledit dispositif de remplissage d'une cartouche d'encre comprend en outre :

un composant soupape qui est agencé sur ledit canal d'entrée d'air (12) et qui est utilisé pour commander l'ouverture/la fermeture dudit canal d'entrée d'air.

5. Dispositif de remplissage d'une cartouche d'encre selon la revendication 4, dans lequel ledit composant soupape comprend :

un siège de soupape (20), ledit siège de soupape étant agencé sur une ouverture d'aspiration dudit canal d' aspiration ;
un composant élastique (22), ledit composant élastique étant manchonné sur la paroi extérieure dudit canal d'aspiration (13) ; et
une bague d'étanchéité (21), ladite bague d'étanchéité étant agencée entre ledit siège de soupape et ledit composant élastique ; et une extrémité de ladite bague d'étanchéité étant mise en prise avec ledit composant élastique (22) et l'autre extrémité de ladite bague d'étanchéité étant mise en prise avec ledit siège de soupape (20).

6. Dispositif de remplissage d'une cartouche d'encre selon la revendication 5, dans lequel ledit composant soupape comprend également une douille qui présente :

une section mise en prise, ladite section mise en prise étant mise en prise avec ladite bague d'étanchéité (21) et le diamètre de ladite section mise en prise étant égal à celui de ladite bague d'étanchéité (21) ; et
une section coulissante, ladite section coulissante étant connectée à ladite section mise en prise ; le diamètre de ladite section coulissante étant supérieur à celui dudit canal d'aspiration (13) ; et ladite section coulissante étant utilisée pour coulisser le long de la paroi extérieure dudit canal d'aspiration.

7. Dispositif de remplissage d'une cartouche d'encre selon la revendication 1, dans lequel un composant d'étanchéité est agencé sur la pièce d'extrémité dudit canal d'injection d'encre (15) et comprend :

un bouchon en caoutchouc (25) ; et
un manchon (26) connecté audit bouchon en caoutchouc (25).

8. Dispositif de remplissage d'une cartouche d'encre selon l'une quelconque des revendications 1 à 7, dans lequel ledit dispositif de remplissage d'une cartouche d'encre comprend en outre :

un composant de positionnement (27) qui est connecté audit contenant d'encre (11) et qui est utilisé pour fixer ladite cartouche d'encre (29).

9. Dispositif de remplissage d'une cartouche d'encre selon la revendication 8, dans lequel ledit composant de positionnement (27) comprend :

une section support (28) formée sur la paroi extérieure dudit composant de positionnement (27).

10. Dispositif de remplissage d'une cartouche d'encre selon la revendication 1, dans lequel ledit canal d'entrée d'air (12) et ledit canal d'aspiration (13) sont agencés de manière séparée.

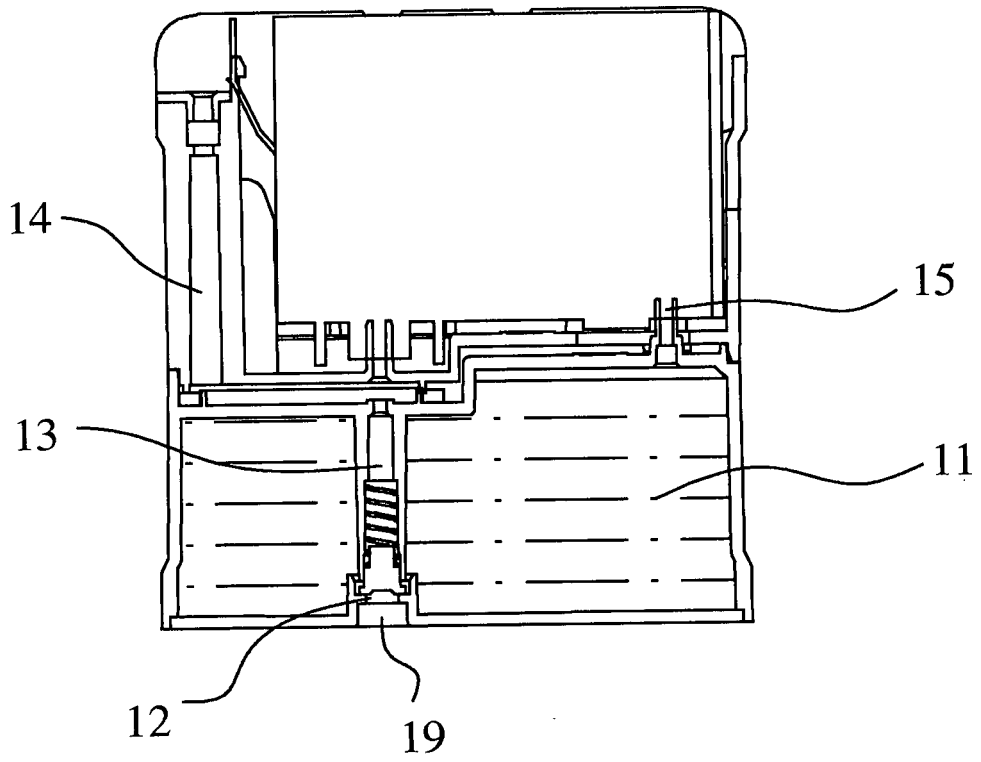


Fig. 1

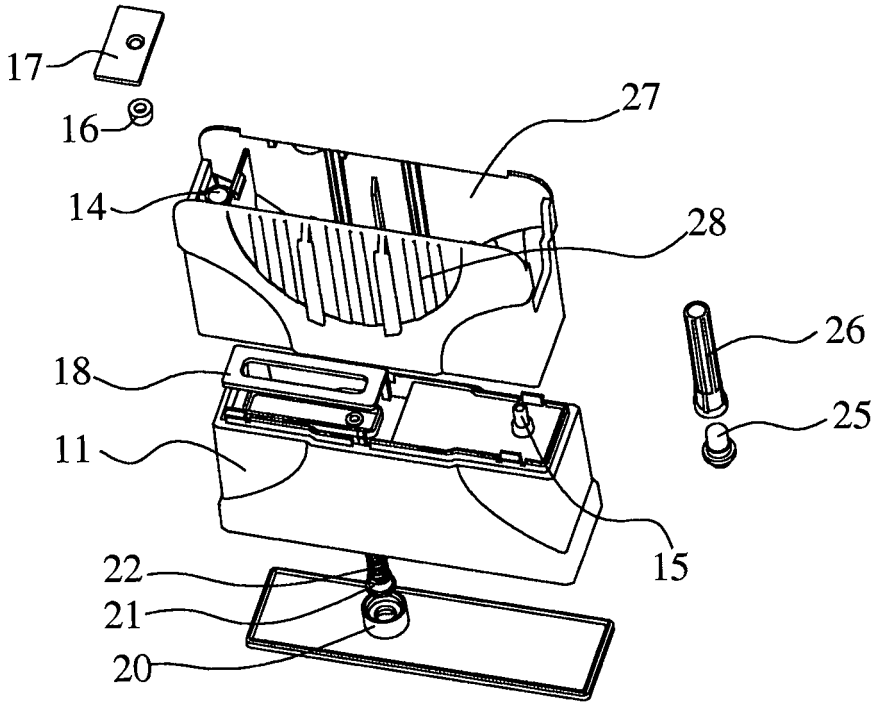


Fig. 2

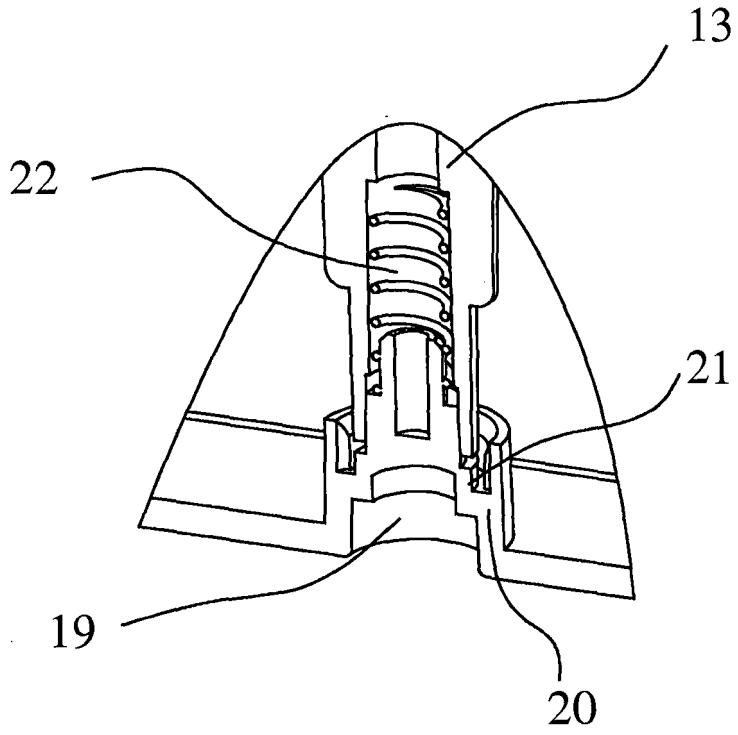


Fig. 3

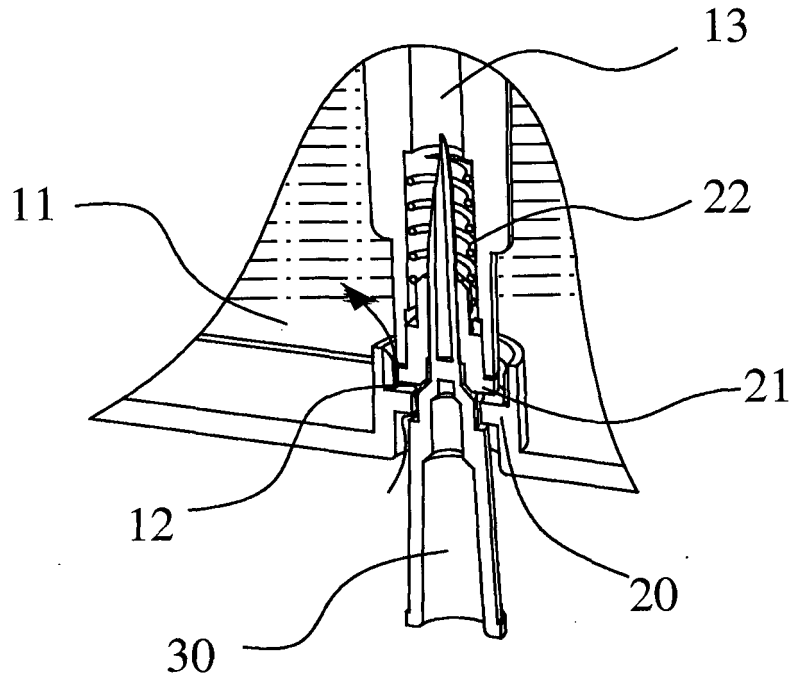


Fig. 4

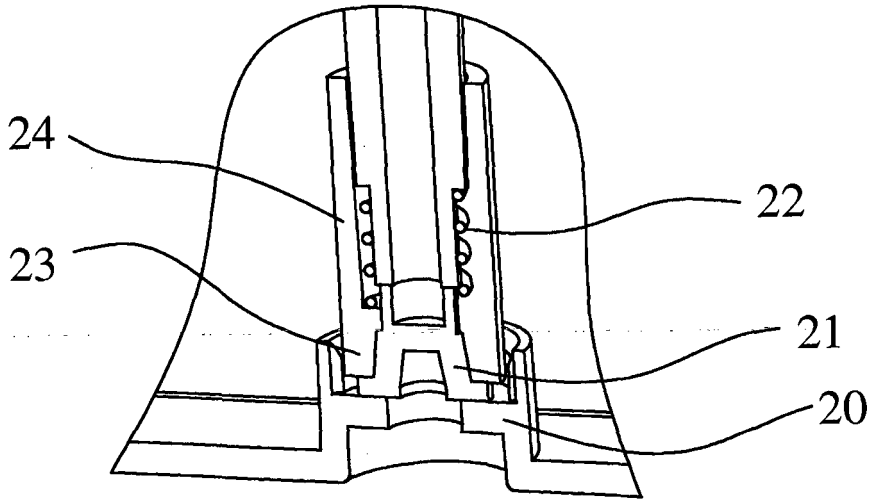


Fig. 5

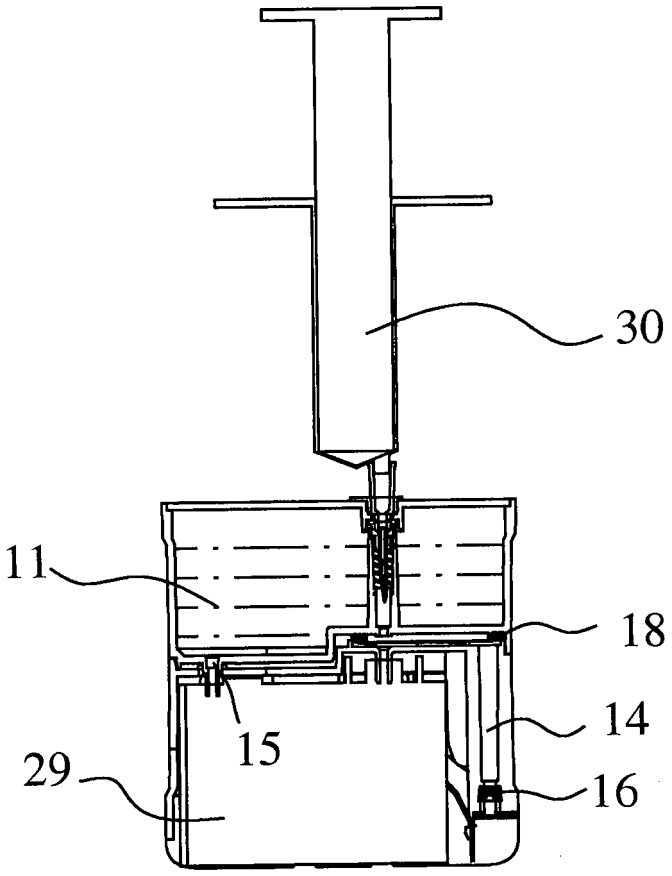


Fig. 6

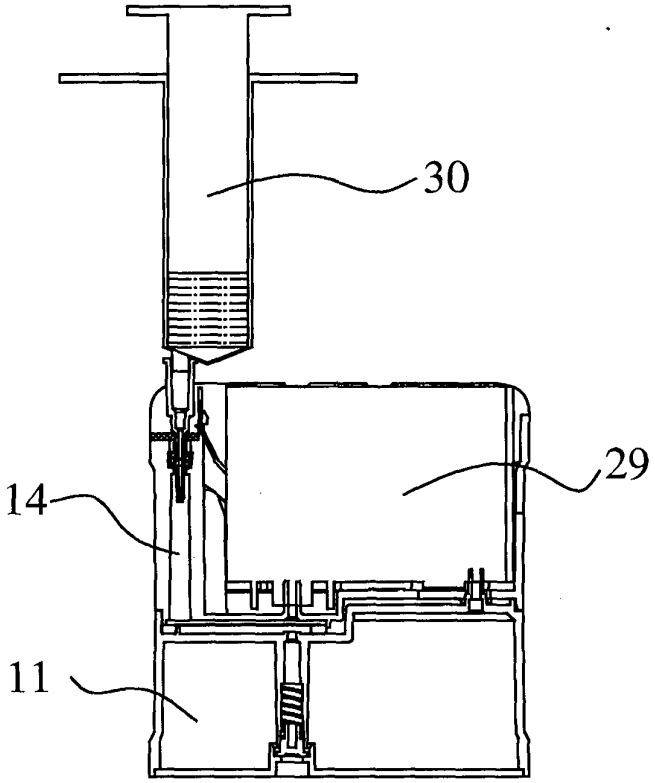


Fig. 7

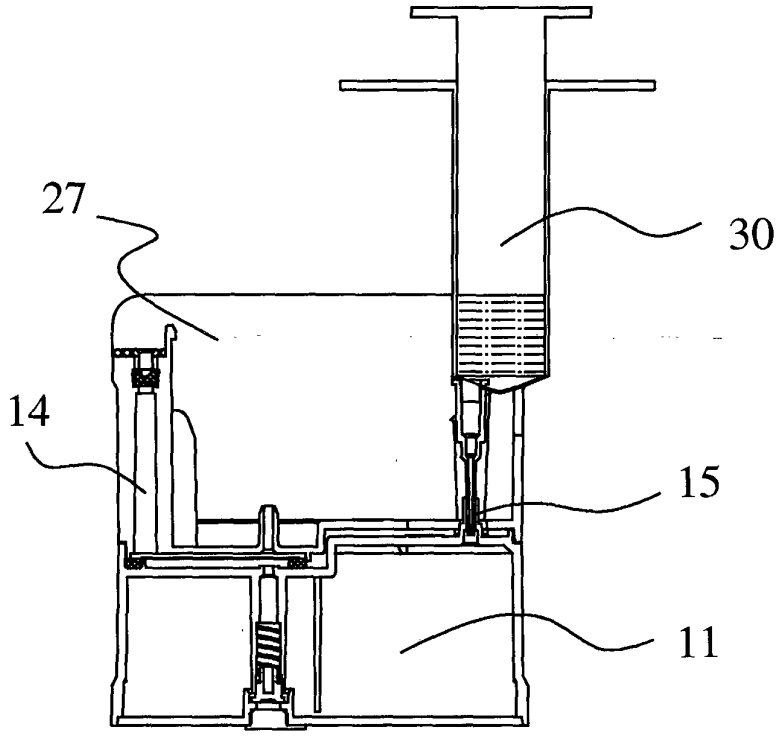


Fig. 8

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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