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An ink replenishment pack (7000) for insertion into an ink tank cartridge (6100, Fig. 4) comprises a storage unit (6510) having a top wall (6511) with an air inlet hole (6512) openable via a releasable seal (6513) and a bottom wall (6514) with an ink supply hole (6515) openable via a releasable seal (6516) and connectable to an ink supply port (620, Fig. 4) of the tank cartridge. An ink impregnated member (6500) is held in a compressed state within the housing.

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Invention Title: An Ink Replenishment Pack for Ink Supplied Recording
Apparatus

The following statement is a full description of this invention, including the
best method of performing it known to me/us:-

AN INK REPLENISHMENT PACK FOR INK
SUPPLIED RECORDING APPARATUS

5 The present invention relates generally to an ink supplied printer being supplied with ink from an ink supply tank more particularly to a replenishment pack and a method of replenishing an ink tank with ink.

10 Various kinds of ink tanks for ink jet printers are known from the prior art. For example, Japanese Patent Publication (Kokai) No. SHO.63-87242 discloses an ink tank in which ink absorbing members made of a porous material are respectively housed in a plurality of chambers. Japanese Patent Publication (Kokai) No. HEI.6-40043 discloses an ink tank in which a sealed container is divided by a partition so that a chamber housing an ink absorbing member, and an ink chamber storing only ink are juxtaposed.

15 In the ink tanks of above-mentioned prior art examples, the ink tanks can store a large quantity of ink so that ink may be supplied to a recording head for a long print head life. When the previously charged ink is consumed, however, such an ink tank must be replaced with a fresh one. Replacement of the cartridge is cumbersome and has the additional disadvantage that the replacement process may cause the user's hands or the like to be soiled with ink. Furthermore, the disposal of depleted ink tanks involves large costs and causes environmental pollution.

20 Accordingly, it is desired to provide an ink cartridge for an ink jet printer which may be reused, refilled quickly and cleanly upon depletion of ink from the ink tank and which overcomes the other limitations of the prior art.

25 Generally speaking, in accordance with the invention, an ink replenishment pack which houses an ink absorbing member, the ink absorbing member absorbing ink and being in a compressed state within the pack is provided. The pack includes at least a top wall and bottom wall and has a first through hole formed in the top wall and a second through hole formed in the bottom wall. A respective replenishment pack may contain an absorbing member of different colour ink than another replenishment pack, the

replenishment pack being detachably attached within a chamber. The ink absorbing member has a larger volume than the capacity of the chamber.

5 An ink injection device has a container for holding ink to be injected into an ink tank. The container allows for visible observation of the ink. A scale indicative of a quantity of consumed ink is formed on the container portion. A needle is coupled to the container. A scale indicating penetration depth of the needle is formed on the needle. The ink injection device, when combined with a replenishment pack or ink absorbing member, forms an ink replenishment set for recording apparatus.

10 In a preferred embodiment there may be a plurality of chambers having ink absorbing members and the ink absorbing members have a larger volume than the capacity of the chamber.

In another embodiment, the partition forming the chambers is removed and an ink replenishment pack is then loaded therein.

15 Accordingly, it is an object of the invention to provide an improved ink cartridge for an ink jet printer.

20 It is an object of the present invention to provide a high-quality and highly reliable ink-supplied printer head of a simple construction which is capable of supplying a stable and appropriate quantity of ink from an ink tank to the printer head and is less subject to the influence of environmental changes such as temperature or atmospheric variations.

Accordingly, it is another object of the invention to provide an improved ink tank for an ink jet printer.

It is another object of the invention to provide a system having an ink tank which can be refilled, prolonging the life of the ink tank.

25 Yet another object of the invention is to prevent the environment from being polluted by providing a replenishable ink tank.

Another object of the invention is to provide an ink tank in which only the chamber housing an ink absorbing member can be opened, and the ink absorbing member and other chambers in the tank can be replenished with ink.

A further object of the invention to provide an ink tank in which a plurality of chambers of the ink tank respectively house ink absorbing members and the ink absorbing members can be replenished with ink.

5 A still further object of the invention is to provide an ink tank in which a partition of the ink tank is detachably and slidably attached so that the quantity of absorbed ink contained therein can be adjusted.

Yet another object of the invention is to provide an ink tank in which an ink absorbing member is loaded in a compressed state.

10 A further object of the invention is to provide an ink tank in which an ink absorbing member is loaded in a compressed state.

Still another object of the invention is to provide a replenishment pack in which an ink absorbing member is housed in a storage unit and the ink absorbing member can be used to replenish a depleted ink absorbing member in a clean manner.

15 Yet a further object of the invention is to provide a replenishment tool for an ink tank which can separately replenish a plurality of chambers of the ink tank.

Still a further object of the invention is to provide a replenishment set which comprises a set of ink injection devices and an ink absorbing member.

Yet another object of the invention is to provide a method for replenishing a plurality of chambers within an ink tank.

20 Still other objects, features and advantages of the present invention will become more apparent from the following description when taken in conjunction with the accompanying drawings in which preferred embodiments of the present invention are shown by way of illustrative example and not in a limiting sense.

The invention accordingly comprises the several steps and relation of one or more 25 of such steps with respect to each of the others, and the apparatus embodying features of construction, combinations of elements and arrangement of parts which are adopted to effect such steps, all as exemplified in the following detailed disclosure, and the scope of the invention will be indicated in the claims.

For a full understanding of the invention, reference is had to the following description taken in connection with the accompanying drawings, in which:

FIG. 1 is a schematic view showing an ink supply system of an in-jet type recording apparatus according to one embodiment of the present invention;

5 FIG. 2 is a cross-sectional view of an example of an ink tank;

FIG. 3 is a cross-sectional side view of the ink tank of FIG. 2;

FIG. 4 is a cross-sectional view of a further example of an ink tank;

FIG. 5 is a schematic diagram illustrating the steps of supplying ink to the ink tank of FIG. 4;

10 FIG. 6 is a cross-sectional view of an ink replenishment pack constructed in accordance with the invention;

FIG. 7 is a perspective view depicting the ink replenishment pack of FIG. 6 showing the ink port in phantom;

15 FIG. 8 is a cross-sectional view of an example of an ink replenishment tool and an ink tank usable with the invention;

FIG. 9 is a cross-sectional view of an example of an ink tank being replenished;

FIG. 10 is a side elevational view of an example of an ink injection device usable with the invention;

20 FIG. 11 is an enlarged fragmented side elevational view of a supply needle of the ink injection device of FIG. 10;

FIG. 12 is a top plan view of an ink replenishment set usable with the invention; and

FIG. 13 is a cross-sectional view taken along line 39-39 of FIG. 12.

25 A printer head according to the present invention may be used in four-colour printer plotter or colour image printer and has four-colour ink systems and ink jets corresponding respectively to four ink colours. The four-colour printer plotter employs black, red, green and blue inks, and moves the head or a sheet of print paper or both and then ejects ink as in a conventional ink jet print head, corresponding to a desired one of the colours against the print paper at a prescribed position thereon to form an ink dot.

Desired characters and figures can thus be recorded by repeating the above cycle. The present invention is applicable to ink jet printers of all varieties, including print heads using heat from heated resistors or the like or the displacement of piezoelectric or with transducers to project a drop of ink from a chamber upon application of a print signal.

5 The ink supply tanks according to the invention can supply ink continuously to said chambers through capillary paths.

In a colour image printer using inks of four colours, that is, black, red, green and blue, a sheet of print paper is scanned by a printer head in a direction perpendicular to the direction of feed of the print paper to form one-dot line in one scanning stroke, and the print paper is fed along by line pitches to record images. In seven-colour printers, 10 inks of four colours, that is, black, yellow, magenta and cyan, are used, and the colours of red, green and blue are formed on a sheet of print paper by superimposing inks of two out of the three desired colours other than black, thereby recording colour images of seven colours.

15 The present invention is concerned primarily with the printer head, and in particular with the ink tanks, and detailed description of the overall printer construction will be given only by way of a single example.

Fig. 1 is a schematic view showing an ink supply system of an ink-jet type recording apparatus according to one embodiment of the present invention.

20 A print head unit 1 of an ink-jet type is connected to an ink tank 3 through a connecting member 2. Ink is supplied from the ink tank 3 to the print head unit 1 through a hollow needle 2a and an ink supply passage 2b of the connecting member 2, so that the print head unit 1 emits ink droplets in accordance with print signals.

25 The apparatus shown in Fig. 1 also includes a cap member 4 disposed at non-printing area, which cap member cones into abutment against the nozzle plate of the print head unit 1 by a drive mechanism (not shown) for preventing the nozzle openings from drying. The cap member 4 is connected through a tube 8 to a suction pump 5 which is operated by a control device 6 to suck ink from the print head unit 1 through

the cap member 4. The apparatus shown in Fig. 1 is also provided with an effluent tank 7 connected to an outlet port of the suction pump 5 through a tube 9.

The recording head may be of any structure such as described in European Patent Publications Nos. 581,531, 609,863, 584,823 and so on.

Reference is next made to FIGS. 2 and 3 which depict an ink tank 1000 having a partition 610 disposed in a container 601 so as to form first and second chambers 611 and 612. In the ink tank 1000, two compartment walls 613A and 613B extend in a direction perpendicular to partition 610 and are situated so as to form three adjacent equal first chambers 611A, 611B, and 611C commonly referred to as 611, one second chamber 612A, 612B and 612C associated respectively with each first chamber 611A, 611B and 611C is provided, but not shown in FIG. 3. The structure and operation of compartments 611A-611C are identical and a representative compartment 611 will be described below for ease of description.

Ink absorbing members 615A, 615B, and 615C (collectively 615) are housed in a respective first chamber 611. In each of the ink absorbing members, yellow, magenta, or cyan ink is absorbed by the associated ink absorbing member 615. Each ink absorbing member 615 is a porous member which may be formed, for example, by foaming a polyurethane material. Each ink absorbing member 615 has a volume which is larger than the capacity of the respective first chamber 611 and is therefore housed in the respective first chamber 611 under compression. An associated ink supply port member 620A, 620B or 620C (collectively 620) is disposed in a bottom of first chamber 611.

First chamber 611 is provided with ink supply port member 620 through which an ink supply needle of a recording head (as shown in Fig. 1) passes and is engaged. Ink supply port member 620 is formed with a tubular shape. Top 622 of ink supply port member 620 which is covered by a filter 621 pushes against ink absorbing member 615 so as to slightly compress the ink absorbing member in the vicinity of ink supply port member 620, thereby enhancing the capillary force by which the ink flows. A packing member 624 having an opening 624' is fitted into a through hole 623 of ink supply port

member 620 through which the ink supply needle is passed and forms a liquid tight seal with packing member 624. Additional ink is stored in each of second chambers 612A, 612B and 612C (collectively 612) which communicate with first chambers 611 respectively via slit-like communicating holes 610 formed in the lower portion of partition 610. A rib 614 extends around container 601.

A lid 630 is placed on the top opening of container 601. Lid 630 hermetically seals second chambers 612 and can be bent along a hinge type portion 631 in order to open lid 630. An engaging portion 632 is formed in the periphery of lid 630 and is directed inward. Engaging portion 632 detachably engages with rib 614 formed at the top of container 601 and is directed outward, whereby the top openings of first chamber 611 can be selectively closed.

An air vent hole 633 is formed in lid 630 so that ambient air of a quantity corresponding to the quantity of consumed ink flows into container 601.

In FIG. 2, reference numerals 634a and 634b designate the pressers which extend vertically from the inner face of lid 630 which compress ink absorbing member 615 against ink supply port 620. (Each chamber 611A, 611B and 611C have corresponding pressers 634a and 634b. This configuration will be generally described, but is applicable to each of the similar containers). When the top opening of container 601 is closed by lid 630, pressers 634a and 634b are urged so as to partially press down on ink absorbing member 615. Presser 634a which opposes ink supply port member 620 is longer than presser 634b which is positioned away from ink supply port member 620. These pressers cooperate with ink supply port member 620 to further compress the portion of ink absorbing member 615 adjacent ink supply port member 620.

During printing, the method of use of ink tank 1000 is similar to that of prior art ink tanks. However, when ink in container 601 is depleted as a result of the printing operation, the ink tank of the invention may be refilled, rather than being discarded.

Reference is now made to FIGS. 4 and 5 which depict an ink tank suitable for use with the invention. Like elements from previous examples being given like reference numerals, the primary difference being a removable partition for defining a single

chamber. Ink tank 5000 includes a partition 6110' which separates a first chamber 6120 from a second chamber 6120A. Partition 6110' is detachably and slidably attached to container 6100 as indicated by the phantom line 6110". Partition 6110' can be removed to form a single chamber as a combination of chambers 6120 and 6120A.

5 As shown in FIG. 5, to refill the ink tank, after removing lid 6130, a depleted ink absorbing member 6400 is removed, and partition 6110' is also removed in the direction indicated by arrow g₄. Thereafter, an integrated ink absorbing member 6500 is loaded so as to fill container 6100. Ink is then injected into absorbing member 6500 by injection device 4000. Lid 6130 is then reattached.

10 Reference is now made to FIGS. 6 and 7 which depict a replenishment pack 7000 according to the invention for use in conjunction with the ink tank described previously. Replenishment pack 7000 allows for clean handling of ink absorbing member 6500.

As shown in FIGS. 6 and 7, replenishment pack 7000 includes a storage unit 6510 having at least a top wall 6511 and bottom wall 6514 and encloses an ink absorbing member 6500 impregnated with ink. Ink absorbing member 6500 has previously been compressed and is housed in cube-like hollow storage unit 6510, which is made of an air-impermeable material which is a lamination of thin plastic sheets or metallic foils by way of example. A through hole 6512 is formed in top wall 6511. Through hole 6512 can be opened by means of releasable seal 6513. Similarly, a through hole 6515 is formed in a bottom wall 6514 and through hole 6515 can be opened by means of a releasable seal 6516.

15 Replenishment pack 7000 is employed in the following manner. Partition 6110' of ink cartridge 6000 is removed from container 6100, and releasable seals 6513 and 6516 are removed from the storage unit 6510. Storage unit 6510 is then loaded into container 6100 and is attached to ink supply port 620 to supply ink to the printer. Storage unit 6510 may be attached to ink supply port 620 by through hole 6515 formed in bottom wall 6514, and a filter 621 which is made of a flexible material such as plastic (for example, see the reference numeral 621 in FIG. 2) may be attached to the opening.

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When compressing ink absorbing member 6500, the compression may be conducted on the whole of the member, or alternatively the compression may be conducted in a selective manner in the lateral directions or in the vertical directions.

A plural number of storage units 6510 may store a plurality of ink absorbing members 6500, respectively absorbing inks of different colours such as yellow, magenta, and cyan. The storage units may selectively be attached and detached in the respective first chamber 611A, 611B, and 611C shown in FIG. 3.

Reference is now made to FIG. 8 which depicts an ink tank 8000 and ink replenishment tool 9000 usable with the invention. Like elements from previous examples are indicated by reference numerals.

An ink tank 8000 has a lid 1300 fixed to a container 1000. Container 1000 is divided into a first chamber 611 and a second chamber 612 which communicate with each other through a communicating hole 610'. An ink absorbing member 615 is disposed in first chamber 611. An air vent hole 1330 is formed in lid 1300.

A replenishment tool 9000 shown in FIG. 8 is used to refill container 1000. Replenishment tool 9000 includes a tank 9100 coupled to a supply needle 9200. An air supply hole 9300 is formed in the top of a replenishment tank 9100 from which a supply needle 9200 extends vertically down. Air supply hole 9300 is closed by a releasable seal 9400. To replenish ink, supply needle 9200 pierces into an ink absorbing member 615 in a first chamber 611. Thereafter, releasable seal 9400 is removed as indicated by the phantom line in FIG. 34 which opens air supply hole 9300, and allows air into tank 9100. Thus, the air entering supply needle 9200 will allow ink to be released through supply needle 9200, into ink absorbing member 615. In order to allow air in the interior of ink absorbing member 615 to escape when ink is being refilled, in a preferred embodiment a small gap is formed between air vent hole 1330 and supply needle 9200 or another air vent hole is provided in another portion of the lid 1300.

When degassed ink is employed, ink can be supplied into container 1000 more effectively since while falling by gravity the ink will absorb any small air bubbles contained in ink absorbing member 615. Thus, ink can be supplied which will enhance

the reliability of the recording head. In a preferred embodiment, an amount of ink which is approximately smaller than half of the capacity of the first chamber 611 should be supplied.

Reference is now made to FIG. 9 which depicts an ink tank usable with the invention. Like elements from previous examples are indicated by like reference numerals, the primary difference between this embodiment and ink tank 8000 being a replenishment hole in the lid over the second chamber.

An ink tank 10000 has a first chamber 611 of container 1000 which houses an ink absorbing member 615. In order to directly supply ink to a second chamber 612 which is adjacent first chamber 611 and does not house ink absorbing member 615, a replenishment hole 2410 is formed in a lid 2400 fixed to container 1000. Replenishment hole 2410 is selectively closed in an openable manner by a releasable seal 2420. When ink tank 10000 is to be refilled, replenishment hole 2410 is opened by removing releasable seal 2420. Thereafter, supply needle 4300 of injection device 4200 is passed through replenishment hole 2410 and ink is supplied to second chamber 612. In a preferred embodiment, it is preferable to form a small gap between replenishment hole 2410 and supply needle 4300 or form an air vent hole 10100 in a portion of lid 2400 of second chamber 612 to allow air to escape during replenishment.

In place of the releasable seal 2420, a rubber sheet having a large resilient recovering force may be used. Supply needle 4300 would then pierce through the rubber sheet and ink would be supplied.

Reference is now made to FIGS. 10 and 11 which depict previously mentioned injection device 4000 which has a syringe-like shape. A scale 4200 is formed on the container portion 4100 of injection device 4000, and scales M_1 to M_7 are formed on supply needle 4300 along the longitudinal direction thereof as shown in FIG. 11. When using injection device 4200, the quantity of ink being supplied can be monitored by viewing the scale 4200. The depth that supply needle 4300 has been inserted into an ink absorbing member can be detected by means of the scales M_1 to M_7 so that ink is injected to the ink absorbing member at the desired depth. Therefore, ink can be

absorbed effectively throughout the entire volume of the ink absorbing member. Preferably, the injection device 4000 is filled with ink which has been previously degassed, and is wrapped and stored in an air-impermeable material such as aluminium or an aluminium laminate before being used in the replenishment process. This improves print quality by removing any air bubbles which might remain in the ink absorbing member. As required, degassed ink is stored in a storage pack (not shown) which is made of a gas-impermeable material. A number of storage packs and an associated empty injection device 4000 may be supplied as an ink refill kit.

Reference is now made to FIGS. 12 and 13 which depict an ink replenishment set 11000 constructed in accordance with the invention. In ink replenishment set 11000, inks of different colours are respectively filled in each of a plurality of ink injection devices 4000A, 4000B, 4000C shown in Fig. 10. The injection devices are arranged on a base plate 11100. An ink absorbing member 12000 may also be placed on base plate 11100. These components may be covered by a cover sheet 11200 having recesses 11300 to 11600 which correspond to the outer shapes of injection devices 4000 and ink absorbing member 12000, thereby constituting the ink replenishment set 11000. When the set is to be used, cover sheet 11200 is removed from base plate 11100, one of the injection devices 4000 and the ink absorbing member 12000 are taken out from the recess and are used to replenish ink.

Further, ink injection device 4000 containing ink and ink absorbing member 12000 may be separately packed in separate ink replenishment sets rather than packed in a single ink replenishment set. If the black ink tank and the colour ink tanks have different volumes, a number of ink absorbing members may be provided, each corresponding to the volume of the associated ink tank. These different ink absorbing members may be provided in the same or different ink replenishment sets. The corresponding ink injection devices would also have an amount of ink sufficient to replenish the associated ink tank and ink absorbing member.

As shown above, the ink injection device may be provided with ink already contained therein. However, it is also possible to provide a storage pack with ink

contained therein, and an empty ink injection device. These may be provided in the same or different replenishment sets. It is possible to provide any combination of ink, ink tanks, ink injection devices and ink absorbing members or any features from any of the aforementioned embodiments without departing from the scope of the invention.

5 The invention as described above results in the following benefits:

(1) The ink tank can be reused.

10 Since ink or an ink absorbing member can easily be supplied to the chambers separated from each other by a partition in the container of the ink tank, the ink tank can be used over and over for a long time. Since the depleted ink tank is not required to be disposed of, moreover, the environment is prevented from being polluted. Therefore, the invention is highly effective.

(2) The ink replenishment process is conducted in a clean manner.

15 By opening the lid of the container of the ink tank, the ink absorbing member may be replenished with ink in a clean manner without staining anything outside the ink tank. Alternatively, since ink can be supplied by using the ink injection device or the ink replenishment tool without opening the lid of the container, the user is prevented from being soiled by the ink.

(3) The ink replenishment process is conducted efficiently.

20 A precise amount of ink can be supplied effectively to the chamber housing the ink absorbing member or ink, by using a replenishment pack, an injection device, or a replenishment set. Therefore, the efficiency of the replenishment work can be improved.

25 It will thus be seen that the objects set forth above, among those made apparent from the preceding description are efficiently attained and, since certain changes may be made in carrying out the above construction and method set forth without departing from the spirit of the invention, it is intended that all matter contained in the above description and shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

Some of the subject matter described herein is protected by co-pending British patent application No. 9608263.1.

In a first aspect, this relates to an ink tank cartridge for an ink-jet type recording apparatus comprising:

a first chamber;

a second chamber in fluid communication with said first chamber;

an ink absorbing member stored in at least one of said first and second chambers;

a partition wall separating said first chamber from said second chamber;

and

a lid attached to the top of said cartridge, at least a portion of said lid being selectively openable, said openable portion of said lid corresponding to at least one of said chambers.

In a second aspect, this relates to an ink-jet type recording apparatus for outputting ink onto a recording medium, comprising:

a recording head for ejecting ink; and

an ink tank cartridge being removably mountable onto said recording head of said ink-jet type recording apparatus for delivering ink thereto, said ink tank cartridge further comprising:

a first chamber;

a second chamber in fluid communication with said first chamber;

an ink absorbing member stored in at least one of said first and second chambers;

a partition wall separating said first chamber from said second chamber; and

a lid attached to the top of said cartridge, at least a portion of said lid being selectively openable, said openable portion of said lid corresponding to at least one of said chambers.

In a third aspect, this relates to a system for supplying ink to an ink-jet type recording apparatus and for outputting ink onto a recording medium, comprising:

a recording head for ejecting ink;



an ink tank cartridge being removably mountable onto said recording head of said ink-jet type recording apparatus for delivering ink thereto, said ink tank cartridge further comprising:

- a first chamber;
- a second chamber in fluid communication with said first chamber;
- an ink absorbing member stored in at least one of said first and second chambers;
- a partition wall separating said first chamber from said second chamber; and
- a lid attached to the top of said cartridge, at least a portion of said lid being selectively openable, said openable portion of said lid corresponding to at least one of said chambers.

In a fourth aspect, this relates to a method of replenishing an ink tank cartridge for an ink-jet type recording device with ink, comprising the steps of:

- partitioning the interior of an ink tank cartridge to form at least one second chamber and at least one first chamber associated with said second chamber, said associated first and second chambers being in fluid communication with each other through an associated communication hole;
- housing an ink absorbing member in at least one first chamber;
- attaching a lid to the top of said ink tank cartridge, said lid opening above said at least one first chamber;
- opening said lid;
- removing a depleted ink absorbing member and loading a replacement ink absorbing member into said at least one first chamber;
- rotating said ink tank cartridge so that said first chamber is positioned above said at least one second chamber and injecting ink into said second chamber with an ink injection device either before rearranging a depleted ink absorbing member, before loading a replacement ink absorbing member or after loading a replacement ink absorbing member;



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injecting ink into said replacement ink absorbing member; and
closing said lid, thereby sealing said first chamber.



CLAIMS

1. An ink replenishment pack for use with an ink tank cartridge for an ink-jet type recording apparatus, comprising:

a housing suitable for loading into the ink tank cartridge and having a first wall and a second wall;

a selectively openable air inlet hole formed in said first wall of said housing;

a selectively openable ink inlet hole formed in said second wall of said housing;

and

an ink absorbing member containing ink, said ink absorbing member being retained in said housing in a compressed state.

2. The ink replenishment pack of claim 1, wherein said ink replenishment pack may be removably connected through said ink outlet hole formed in said second wall to an ink supply port of an ink tank cartridge.

3. The ink replenishment pack of claim 1 or claim 2, wherein said replenishment pack contains a respective one out of a plurality of coloured inks.

4. An ink replenishment pack for use with an ink tank cartridge for an ink-jet type recording apparatus, comprising:

a housing having a first wall and a second wall, at least one portion of said first wall and at least one portion of said second wall being openable; and

an ink absorbing member containing ink, said ink absorbing member being retained in said housing in a compressed state, said ink replenishment pack being shaped and dimensioned to be loaded into said ink tank cartridge.



5. The ink replenishment pack of claim 4, wherein said ink replenishment pack may be removably connected through said openable portion formed in said bottom wall to an ink supply port of an ink tank cartridge.
6. The ink replenishment pack of claim 4 or claim 5, wherein said replenishment pack contains a respective one out of a plurality of coloured inks.
7. A method of replenishing an ink tank cartridge for an ink-jet type recording device with ink, comprising the steps of:
- forming a chamber in said ink tank cartridge formed with an openable lid;
 - opening said lid;
 - housing an ink replenishment pack, said ink replenishment pack comprising:
 - a housing having a first wall and a second wall, at least one portion of said first wall and at least one portion of said second wall being openable;
 - an ink absorbing member containing ink, said ink absorbing member being retained in said housing in a compressed state, said ink replenishment pack being shaped and dimensioned to be loaded into said ink tank cartridge; and closing said lid.
8. An ink replenishment pack substantially as hereinbefore described with reference to any one of figures 1 to 13.



FIG. 1

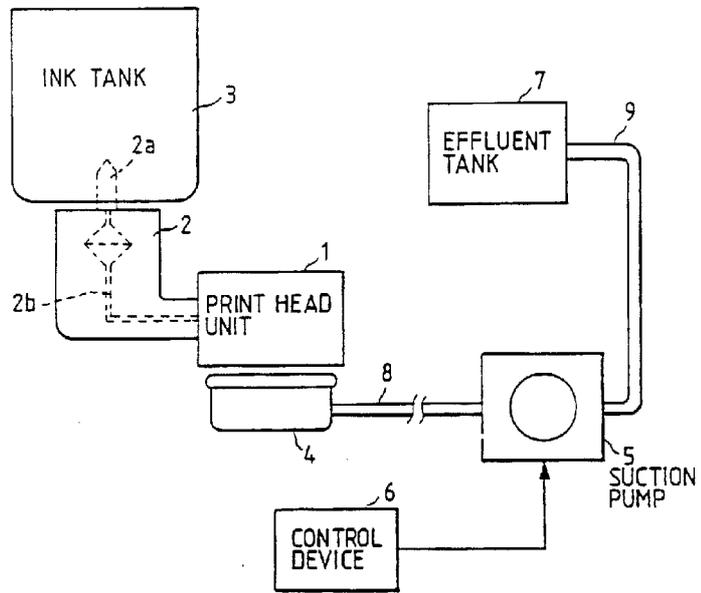


FIG. 2

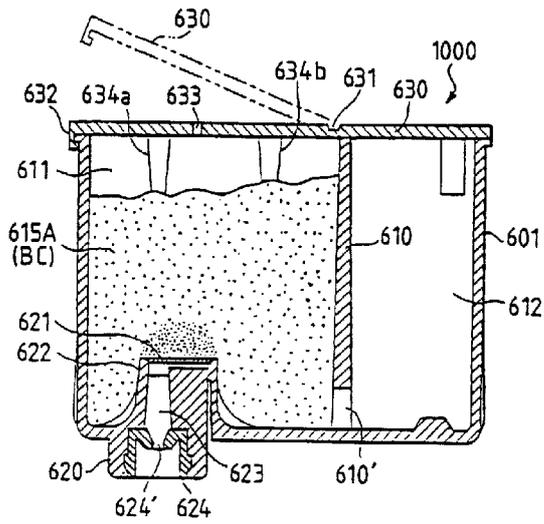


FIG. 3

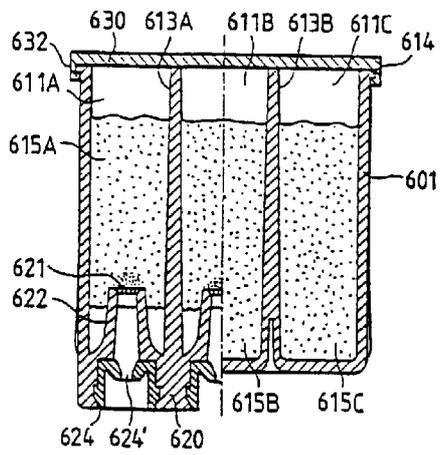


FIG. 4

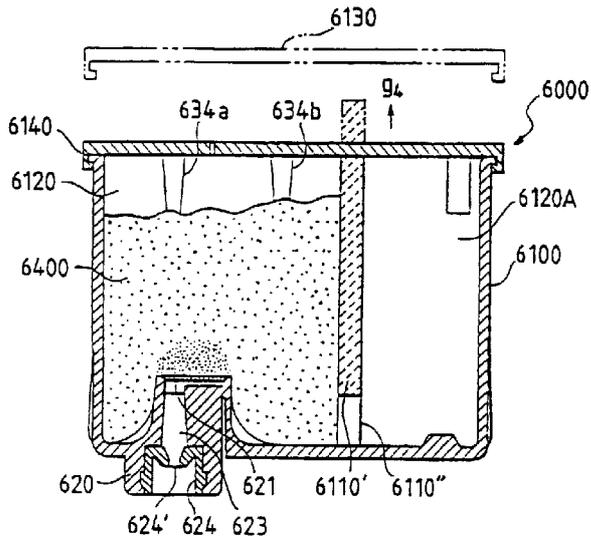
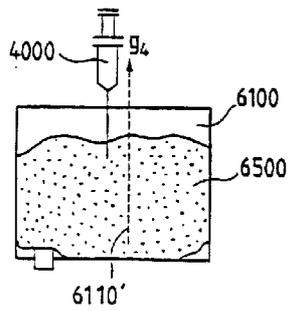


FIG. 5



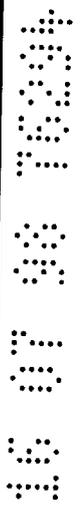
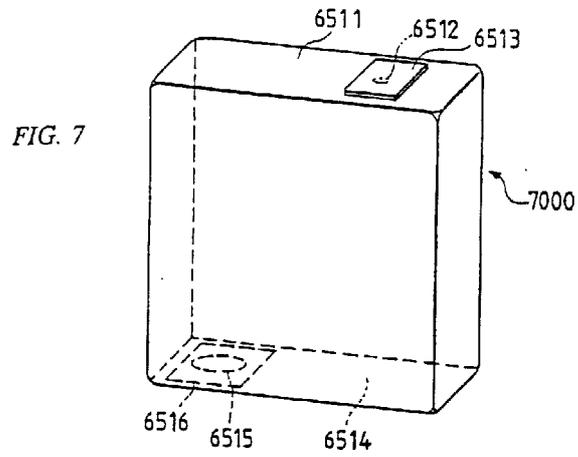
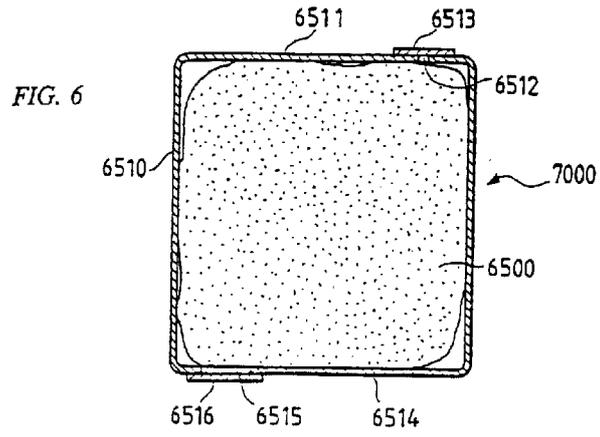


FIG. 8

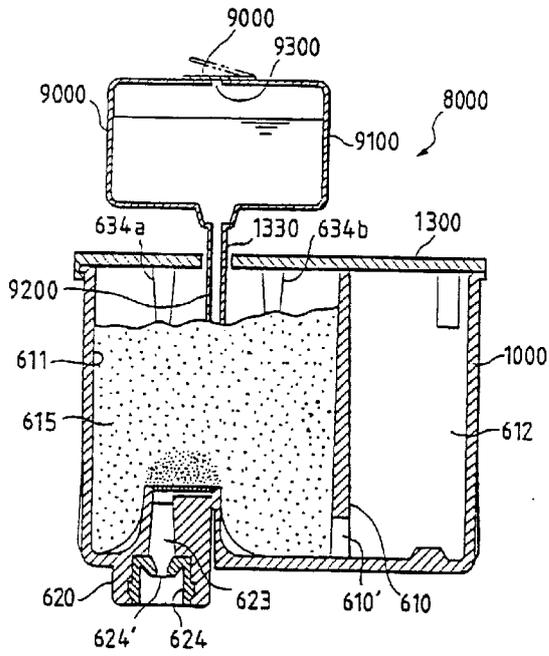


FIG. 9

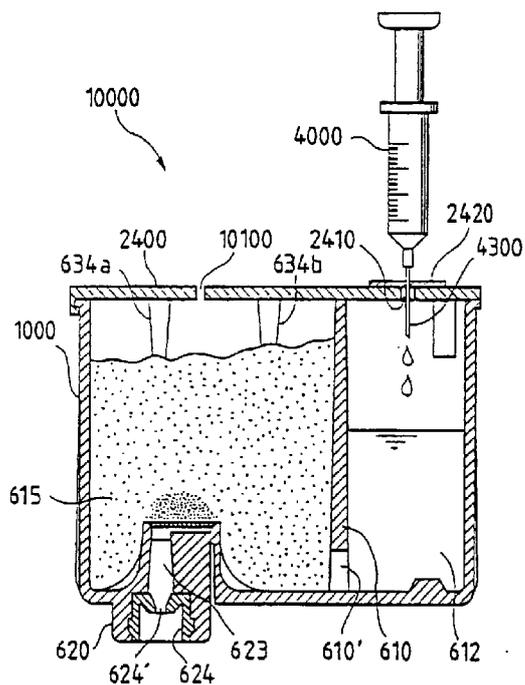


FIG. 10

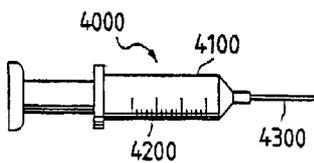


FIG. 11

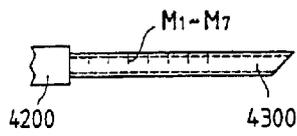


FIG. 12

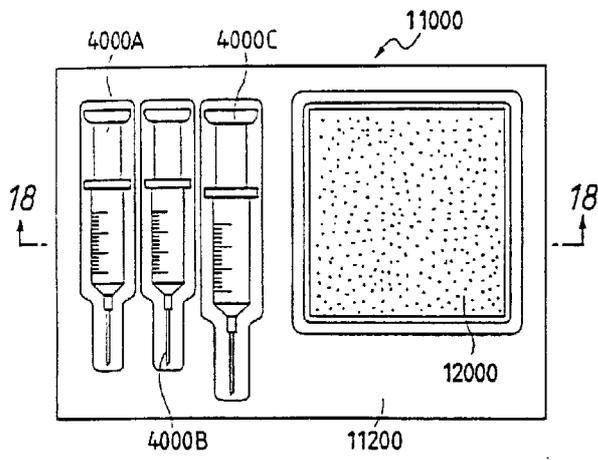


FIG. 13

