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(54) Ink supplying device and ink jet recording apparatus using the same

Tintenversorgungsvorrichtung und zugehöriges Tintenstrahlzeichnungsgerät

Dispositif d'alimentation en encre et appareil d'enregistrement à jet d'encre utilisant un même dispositif

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Description

The present invention relates to an ink container according to the preamble of claim 1. The invention relates further to an ink jet recording apparatus for using such ink container.

Recently, it has been recognized that an ink jet recording apparatus is excellent in that it can perform a high speed recording since a noise during the recording is very small and it can be easily constructed as a high density multiple discharge port type ink jet printer. Further, it has been interested in that the ink jet printer has good color reproducibility for a color image. In general, an ink jet recording system (ink jet recording apparatus) is so constructed that ink droplets are caused to be discharged and fly from a discharge port of a recording head, and recording is carried out with their sticking on a recording sheet. So, in the ink jet recording apparatus, it is needed to supply surely ink to the ink jet recording head. In the past, various contrivances have been made for this purpose.

Hereinafter, its several examples and related problems will be explained. First, an example which employs an exchangeable ink tank is described. In the past, there have been developed many arrangements which are provided with a cartridge type ink tank in the ink jet recording apparatus permitting easy supplement of ink by exchanging the ink tank by a user when ink has been lost. As for the cartridge, type ink tanks, an arrangement is widely known wherein it is provided with a flexible bag which accommodates ink therein and which is caused to have both of opening to the air pressure and evaporation preventing at the same time, as shown in Japanese Laid-Open Patent Application No. 56-41148, for example. This arrangement is very effective as means for forming a low-priced and compact ink tank since it need no additional complicated mechanism for communicating to the air.

Also, as for positioning and alignment means for a joint part for conducting out ink from the ink tank, a method is known of obtaining a sure connection of the flow path with the connecting portion of the ink cartridge side by causing the member of the device side to have a degree of freedom, as shown in Japanese Patent Laid-Open Application No. 60-137658.

However, in the above-mentioned prior art connecting arrangement, it can be easily constructed in a case where the flow path to be connected is one, but in an arrangement having a plurality of flow paths or connecting portions, moving parts at the device side must be large in size, or its construction becomes very intricate, and thus, in a case where a plurality of ink paths are used, for example, seal portions for connecting portions between the joint portions of the device body which are movable and the ink paths to the recording head must be increased in number, or distribution of tubes forming the ink paths would become complex.

On the other hand, the above-mentioned cartridge type ink tank arrangement is weak in vibration and

shock because it holds ink with a soft bag, and if the manners in which the bags collapse are nonuniform, then the pressure with which ink is let to flow would be often caused to change. Accordingly, this arrangement is not suitable to a large volume ink tank, and in fact it is realized as a relatively small ink tank.

In order to overcome the above problems, an ink tank shown in Japanese Laid-Open Patent Application No. 56-13456, for example has been developed, which has a construction which is strong in vibration and shock and permits it to be voluminous by holding ink between the outside of the bag which communicates to the air and a frame. However, the problem relating to the change of the pressure with which ink flows out, which is due to a difference between the manners in which the bags collapse (or swell) is not solved entirely, and it is needed to cause ink to flow out compulsively with an ink pump, store ink temporarily in a sub-tank which is provided with special means communicating to the air and then supply it to the head, so as thereby to carry out stabilized ink supplying.

According to the document DE-A-3 220 939, there is known a generic ink container according to the preamble of claim 1. This container comprises a plurality of flexible bags formed on a single strip which can be folded in order to place it into a container body, wherein the joint member comprises a single supply inlet for each of the individual bags serving as ink tanks.

The object of the present invention is to provide an ink container as well as an ink jet recording apparatus by means of which ink can be suitably supplied.

This object is achieved by means of the features defined in claims 1 and 7, respectively. Preferable embodiments of the invention are defined in the sub-claims.

In the following the invention is further illustrated by embodiments with reference to the enclosed figures.

Fig. 1 is a cross-sectional side view showing a facsimile apparatus to which an embodiment of the present invention is applied.

Fig. 2 is a cross-sectional side view showing another state of the apparatus shown in Fig. 1.

Fig. 3 is a typical view schematically showing a structural example of the ink supply passage of an ink jet recording apparatus according to the present invention.

Fig. 4 is a perspective view showing a structural example of ink supplying means of an ink jet recording apparatus according to the present invention.

Fig. 5 is an exploded perspective view showing a structural example of an ink cartridge installed in an ink jet recording apparatus according to the present invention.

Figs. 6A and 6B are a partially cutaway sectional side view showing the structural example of the ink cartridge and a partially enlarged view thereof to show the state of mating with the ink supplying means.

Fig. 7 is a partially cutaway sectional front view of the structural example of the ink cartridge.

Fig. 8 is a schematic top view showing the structural example of the ink cartridge.

Research was made by the inventors of this invention to resolve the above-mentioned problems raised in the prior art, and as a result thereof, it could be found that with such a construction that connecting portions of the device side are stationary and the corresponding connecting portions of the ink cartridge side are movable, the connection therebetween can be carried out suitably. The present invention which will be explained hereinafter was made on the bases thereof, and relates to a ink jet recording apparatus comprising ink supplying means for permitting the supply of ink to an ink jet recording head and an ink cartridge detachably mounted on said ink supplying means and providing with an ink tank accommodating therewithin ink to be supplied, said ink supplying means having a stationary ink supplying side joint portion adapted to be connected to said ink tank, said ink tank within said cartridge having an ink tank side joint portion connected to said ink supplying side joint portion and supplying ink, and said ink tank having a freedom of motion in the rotation direction with respect to the central axis of its joint portion to permit said ink tank to displace when said ink supply side joint portion and said ink tank side joint portion are connected to each other.

In accordance with this invention, the ink container is retained movably within the frame enclosing it, specially in the direction of its rotation with respect to the central axis of the connecting portion (joint portion), and thus, a freedom in connection of the connecting portion of the device side and the corresponding connecting portion of the ink cartridge side is easily secured, and even though there are provided a plurality of flow paths to be connected, the positioning of the device side joint portions to the ink container side joint portion is made easily and surely.

Also, since the joint portion of the device side (ink supplying means side) is made to be stationary, the distribution of the ink tube form here to the recording head can be made to be compact and simple.

Further, the inventors of this invention studied a construction with which ink is supplied suitably from a voluminous ink tank to the recording head directly without the use of any sub-tank, and as a result thereof, obtained a construction defined by the following. That is, this invention relates to in an ink supplying device having a plurality of ink paths adapted to be connected to an ink jet recording head, joint means comprising a first ink coupling portion connected to said ink jet recording head through an ink pump, a second ink coupling portion different from said first ink coupling portion and connected to said ink jet recording head, and a connecting portion for performing communication to the air, whereby an ink tank with said portions is detachably mounted to said ink jet recording head.

Therefore, in accordance with the above mentioned construction, the ink supply can be carried out very suitably without the use of not only the ink bag but also the

sub-tank since the ink supporting port is jointed directly to the member constituting the ink supplying path. Also, since the port of the ink tank opening to the air is jointed to the connecting portion for performing the communication to the air so that the ink tank can be caused to communicate to the air, it is possible to provide the ink tank which does not request that it be in the form of the above-mentioned bag arrangement, which is strong in vibration and shock and which is voluminous.

Hereinafter the present invention will specifically be described in accordance with embodiments.

Fig. 1 is a central sectional view showing an embodiment of facsimile apparatus characteristically representing the present invention. The facsimile apparatus of the present embodiment roughly comprises original conveying system A, optical system B, power source unit C, electric circuit board D, recording sheet conveying system E, decurling system F, ink supply system G, and recovery system H.

Fig. 2 is a view illustrating the concept of an embodiment according to the present invention. In Fig. 2, an ink cartridge comprises recording head 38, ink pump 76, ink tank 86, waste ink absorber 96, and air duct 87 which is called breezer.

The initial ink supply to recording head 38 is carried out in a manner given below. In other words, ink pump 76 is actuated in a state where cap 41 is closely contacted with the recording head (a state shown in Fig. 2 where projection in cap 41 is in contact with nozzle section of recording head 38) to circulate ink from ink cartridge 86 in the direction indicated by arrow E, so that the inside of the tubes including the inside of the recording head is filled with ink. At this time, some ink is flown out to cap 41, but it is returned to ink cartridge 86 through waste ink tube 45 and collected to built-in ink absorber 96.

When the initial ink supply is completed, recording head 38 is ready to discharge ink. The ink pump used in the present embodiment, however, is a pump which does not close the flow passage when the pump is at rest. Therefore, the ink supply at the time of discharging is carried out from both front and rear head ink couplers 38d and 38e.

When ink is reduced due to discharging, air should be drawn into the tank in an amount equal to the reduced amount of ink. Breezer 87 functions as an air duct for this purpose. In this breezer 87, check valves capable of being opened by an extremely small difference in pressures are respectively arranged in both directions. Therefore, the valves function if a slight pressure, either negative or positive, is generated in the tank, and operate as air holes substantially. However, the valves are also arranged to control dust intrusion and evaporation.

A reference numeral 92 designates a no-ink detector for detecting no-ink condition in tank 94. The detection is carried out in a manner given below. In other words, since float chamber 90 is open to the atmosphere through breezer 87 which is commonly provided

for ink tank 94, the liquid level therein and float 89 which floats thereon indicate the same water level 91a as liquid ink level 91 in ink tank 94. Therefore, at an appropriate location in the lower part of float chamber 90, sensor 88 is arranged for detecting a light interruption. Thus, when liquid level 91 is lowered, i.e., float 89 is lowered following the lowering of water level 91a in the area for detection, the emitting light from the sensor 88 is interrupted, thereby detecting the no-ink condition.

Next, the recovery operation is described. The recovery operation is an action to remove bubbles and cloggings which hinder the normal discharging, and is performed in accordance with the recovery sequence, which will be described later, controlled by the recovery system. The recovery operation, however, is exactly the same as the initial ink supply operation. In other words, ink pump 76 is actuated while cap 41 is in contact with recording head 38 (the current state is illustrated in Fig. 2) to circulate ink in the direction indicated by arrow A, so that bubbles are collected into the ink tank to release them to the outside through the breezer. Also, the contacting condition between projection in cap 41 and the nozzle of the recording head is released to drive the pump for the removal of any clogging in the nozzle. At this time, pressurized ink is flown into float chamber 90. Then, float 89 is raised to closely contact with upper face of float chamber 90 to cover the passage to breezer 87. Therefore, no ink is flown into breezer 87.

Fig. 4 is a perspective view showing the construction of supply and recovery systems, in which the structure of the present embodiment is actually employed. In Fig. 4, a reference numeral 73 designates the base of this unit which also functions as a base for installing ink cartridge 86, which will be described later. Also, a reference numeral 74 designates a member called joint plate which is formed by fixing each of various passage couplers. To this joint plate 74, there are coupled cartridge guide 78 for positioning ink cartridge 86, cartridge joints 79a, 79b, and 79c for connecting tubes to release air, waste ink joint 81 for guiding waste ink produced at the time of recording to waste ink absorber 96 built in ink cartridge 86 through waste ink tank, air joint 80 for connecting the breezer for releasing air with air tube 83, first and second supply tube joints 84 and 85 for connecting first and second ink supply tubes 71 and 72 with ink pump 76 which is driven by pump motor 77. Thus, ink joint 79 connected to ink tank 94 accommodated in ink cartridge 79a provides three functional sections intensively, first ink supply section 79a, second ink supply section 79b, and air passage connecting section 79c, and with its structure, enables first ink supply inlet 95a, second ink supply inlet 75b and air inlet 95c to be coupled altogether, which are operationally related to the function of ink tank 94.

For this purpose, the air passage section leading to the ink tank is formed by joints, thereby making it possible to construct the ink tank with hard resin material to reserve a large quantity of ink without employing ink bags.

Furthermore, by connecting first ink supply inlet 95a and second ink supply inlet 95b, and first ink supply section 79c and second ink supply section 79b, an ink circulation passage is formed to perform ink supply from both of the ink supply regions at the time of recording and to circulate ink from the ink tank through the passage with the pump inbetween, and to circulate ink from the recording head to the ink tank again at the time of initial ink filling and recovery operation.

In other words, since the passage is formed by directly joining the tank and the supply passage, and further the air passage as described earlier, it becomes possible to eliminate, in spite of the ink tank being made of hard plastic resin, such function as a sub-tank which has conventionally been indispensable for a stable ink supply. In the present embodiment, these members are separately fixed to joint board 74, but the structure may also be such that these members are integrally formed with the joint board.

Further, to joint board 74, flow passage board 75 is coupled with flow passage groove 75a which functions as ink flow passage. In this portion, most of the ink flow passage pipings and connections are installed.

In other words, by fixedly arranging joint section 79 which is annexed to joint board 74 connected to ink tank 94, it becomes possible to provide a structure thereby eliminating the operation related to ink passage 75a in that particular portion.

As a result, a part of ink passage from ink tank 94 to the recording head can be formed only by coupling to the reverse side of joint board 79 the flow passage plate 75 which constitutes a flow passage.

On the other hand, as described later, ink tank 94 built in ink cartridge 86 is flexibly accommodated in housings 93a and 93b which constitute the cartridge 86.

By accommodating the ink tank flexibly, it is possible to reliably adjust with ease the coupling condition of the cartridge which should be installed against joint section 79 which is flexibly arranged, and in this way, the installation of cartridge is carried out with assurance.

It is also possible to construct the ink passage from the ink tank without complicated piping arrangements simply by coupling joint board 74 and flow passage plate 75 to form the required flow passage.

As shown in Fig. 5, there are accommodated in ink cartridge 86, the common housings 93a and 93b made of material having a good impact resistance, ink tank 94 made of resin having a good property against fluid and waste ink absorber 96 made of a water absorptive material having an excellent ink absorptive property such as felt or porous material. The ink supply and air releasing are performed by connecting these members with cartridge 79 on the side of joint plate 74 through joint section 95. Thus, the entire ink cartridge 86 is structured to be detachably installed as a whole on base 73 provided on the side of the apparatus.

Figs. 6A and 6B illustrate the structure of this part further in detail. Fig. 6A is a partially cutaway cross-sectional side view showing the principal parts of ink car-

tridge main body 86. Fig. 6B is a partially cutaway cross-sectional view showing joint section 95 connected to the cartridge joint of the ink supply system. In order to prevent any ink leakage when ink cartridge 86 is removed, metal ball 99 is provided in joint section 95 to press it against joint port 95a by the compression of spring 98. When the ink cartridge is detached from the unit, metal ball 99 is closely in contact with shealing rubber 101 to close the port 95a of the joint section.

Also, as shown in Figs. 6A and 6B and Fig. 7 showing the front cross-section of ink tank, ink tank has sloped surfaces or slants 94a, 94b at its bottom. In other words, there are provided slant 94a for gathering ink flow into joint section 95 from behind, and slant 94b for gathering ink flow into joint section 95 from the side of ink tank 94. Ink is supplied to the ink supply system through guiding tube 100 which is bent to be opened at the lowest bottom of the ink tank. A bottom support 93b supports the rear portion of the sloped surface 94a of the ink tank 94. Thus, it is possible to collect all ink in the vicinity of guiding tube 100 by forming slants 94a and 94b at the bottom of ink tank, and to use ink without any waste. Also, it is possible to draw ink without a waste even if the apparatus is installed with a slight inclination. With a structure such as this, the area is provided in the housing to accommodate the aforesaid waste ink absorber 96 substantially in U shape.

Furthermore, in the present embodiment, it is necessary to couple three-flow passages, i.e., two ink supply passage and one air releasing passage, in joint section 95, but in order to obtain reliable couplings, ink tank 94 is held in housings 93a and 93b as shown in Fig. 7 with space 97 to allow the ink tank to move freely in an appropriate amount.

Especially, it is necessary to provide flexibility not only vertically and horizontally but rotatably when a plurality of joints should be connected. In the present embodiment, a slight rotatability is maintained to obtain a rotatable flexibility against the central axis of joint section 95 by supporting ink tank 94 with spaces 97 (in this embodiment, for example about 1.0 mm) and spaces 97a (for example, about 1.0 - 2.0 mm) provided for both ends of ink tank 94 and by waste ink absorber 96 which is soft like felt. A projection 93d supports a front bottom of the ink tank 94. Hence it is possible to make connections reliably without any deviations in positioning. In this embodiment the ports 95a, 95b and 95c of the ink tank are provided about 0.5 mm lower with respect to the body joints 79a, 79b and 79c so that the ink tank 94 is connected to the body joints in a state which it floats about 0.5 mm to the body joints. Furthermore, in order to prevent any abnormal sound generated by the movement of ink tank 94 by vibrating impact, etc. or breakage of housing as well as to effectively utilize space, the central part of waste ink absorber 96 is removed as shown in Fig. 5 to allow the lowest bottom ink tank 94 to be fitted into the removed part, so that the ink tank is held by the remaining portion of circumference. With this structure, impact can be absorbed by the softness

of waste ink absorber 96 and the required flexibility is maintained. In this way, the ink tank is protected from the external impact and the clattering of ink tank is also prevented because in this structure the waste ink absorber is fitted at the lowest bottom of the ink tank and at the same time, the ink tank is held by soft material such as felt of the circumferential portion of the waste ink absorber.

In the above-mentioned embodiment, the ink container relating to three flow paths was explained as a sample, but it is possible to remove any extra backlash by limiting the degree of freedom in a certain direction depending on the construction or number of the flow paths.

In the above-mentioned embodiment, specially, the engagement of the container with the device is made only with the cylindrical portion at the periphery of the joint portions, but if such cylindrical portion for the engagement is changed in number or shape (for example to a polygonal or elliptic cylinder shape), then it is possible to reduce an extra degree of freedom after the mounting, and improve the stability of the seal for the connecting portion. The above-mentioned embodiment is so constructed that three connections relating to the communicating port to the air, the supplying side to the recording head at the time of the ink circulation and the returning side, respectively are made, but in order to achieve more effectively the removal of the babbles due to the ink circulation by decreasing the flow path resistance, correspondingly to the structure of the recording head, more supplying tubes may be used. At that time, it is possible to divide the supplying side and the returning side to plural ones, respectively, by applying thereto the above-mentioned embodiment.

Further, in the above-mentioned embodiment, the structure in which the waste ink absorbing body is positioned on the bottom of the ink tank was explained. However, it is also possible to attain a more certain shock absorbing effect by adding it to the sides and top of the ink tank as well as the bottom. Also, it is possible to use a waste ink absorbing body with appropriate elasticity to prevent waste ink which has been absorbed from being squeezed out by the weight of the ink tank.

Further, in the above-mentioned embodiment, the soft member positioned at the bottom of the ink tank are used to have the waste ink and mechanical shock absorbing functions, but it is possible to achieve the similar effect to the above even when an additional member with a superior shock absorbing capability, etc. is provided separately to said soft member, or the frame itself is formed with a soft material.

Furthermore, in the above-mentioned embodiment, the recording head having at its both ends the supplying tubes and carrying out the recovery operation by the circulation is used, but this invention may be applied to a recording head having one supplying tube and of which recovery operation is carried out by suction from the front face of the nozzle. Also, it is possible to decrease

the cost by forming both of the babble sensor and the recording head in a body.

As explained above, in accordance with the embodiments according to the present invention, the ink jet recording apparatus is provided in which easy registration in position of the joint portion of the ink supplying side to the joint portion of the cartridge side is accomplished so that the ink cartridge is surely mounted.

Also, since the joint portion of the ink supplying side is stationary, the complicated distribution of the ink supplying path from this joint portion to the recording head can be avoided and the sealing security after the connection can be improved. Therefore, the ink jet recording apparatus is provided which has the reliable joint portions from which any ink leakage due to vibration or shock does not occurred. Further, in accordance with the embodiments according to the present invention, three connections for the paths for supplying ink at the time of the circulation, the returning path and the communicating port to the air are used detachably between the ink tank side and the joint sides, and thus, it is possible to provide the ink supplying device which is voluminous, and strong in vibration and shock and which has no use for the sub-tank. Accordingly, it is possible to provide the ink jet recording apparatus having the ink supplying device which is low-priced, compact and moreover highly reliable. Also, in the above-mentioned embodiments, by not only holding the ink tank at its periphery with a soft member and but also using such soft member as the waste ink absorbing body, it is possible to achieve an ink cartridge which is strong in vibration and shock, which can use effectively the space and which is compact and low-priced. In this connection, it is also possible to provide the ink jet recording apparatus which is miniaturized and has its decreased running cost and improved reliability. Further, in accordance with the above-mentioned embodiments, it is possible to provide an ink jet recording apparatus in which by controlling the operation of the ink pump using the means for sensing a babble in the ink supplying paths, the recovery operation can be reduced in frequency and time to minimum necessary values, the volume of waste ink can be decreased and the number of the recording papers which are recorded with a predetermined amount of ink can be increased, and thus, its running cost can be reduced. Also, in a case where the above-mentioned embodiments are applied to a facsimile machine, since the time necessary to carry out the recovery process is shortened, a long recording enabling time can be achieved, and a probability of disabling facsimile signal reception because the facsimile machine is subject to the recovery process can be made to be small.

Claims

1. An ink container removably attachable to an apparatus, said container comprising

a container body (93) including an ink tank (94) for containing ink and a joint member (95) attached to said container body, said joint member having a first supply port (95a) for forming a fluid connection between said ink tank (94) and said apparatus

characterized in that

said joint member (95) further comprises a second supply port (95b) for forming a fluid connection between said ink tank (94) and said apparatus, and

an air port (95c) for forming a connection between said container body (93) and the atmosphere and for maintaining ink in said ink tank (94) at atmospheric pressure.

2. An ink container according to claim 1, **characterized in that** said ink container is received in a case member (93c) to define a dual-construction ink tank.
3. An ink container according to claim 1 or 2, **characterized in that** said ink tank (94) is provided with an ink absorbing member (96) between said case member (93c) and a bottom (93b) of said ink container.
4. An ink container according to claim 3, **characterized in that** said ink absorbing member (96) stores waste ink ejected by a recovery operation of a head portion.
5. An ink container according to claim 1 or 2, **characterized in that** said ink container has a slanted surface (94a) for allowing ink to flow to an ink support port.
6. An ink container according to claim 5, **characterized in that** said ink tank is provided with an ink absorbing member between said case member and a bottom of said ink container.
7. An ink jet recording apparatus comprising a single joint member (74, 79) connectable to a removable ink container, and mounting means (78) for holding said removable ink container securely, wherein by means of said single joint member (74, 79)

a first ink supply path (71) connected with a recording head (38) is connectable with a first supply inlet of said removable ink container, said first ink supply path having therein pump means (76) for forcibly supplying ink under pressure;

a second ink supply path (72) connected with said head is connectable with a second supply inlet of said removable ink container when said head records; and

an atmosphere communicating path for communicating with the atmosphere is connectable with an air inlet of said removable ink container.

8. An apparatus according to claim 7, **characterized in that** ink is forcibly supplied to said head (38) from said first ink supply path (71) connected to said ink container through said pump means (76) when ink is initially filled into said head, and a forcible pressure recovery is performed and said second ink supply path (72) returns ink to said ink container forcibly supplied through said head from said first to the second supply path. 5
9. An apparatus according to claim 7, **characterized in that** ink is supplied to said head (38) from both first and second joints (79a, 79b) of said single joint member (79) when said head (38) records. 10 15

Patentansprüche 20

1. Tintenbehälter, der abnehmbar an ein Gerät angebracht werden kann, aufweisend

einen Behälterkörper (93), der einen Tintenbehälter (94) zur Aufnahme von Tinte und ein an den Behälterkörper angebrachtes Anschlußbauteil (95) aufweist, wobei das Anschlußbauteil einen ersten Förderanschluß (95a) aufweist, der der Bildung einer Flüssigkeitsverbindung zwischen dem Tintenbehälter (94) und dem Gerät dient 25 30

dadurch gekennzeichnet, daß

das Anschlußbauteil (95) außerdem einen zweiten Förderanschluß (95b) zur Bildung einer Flüssigkeitsverbindung zwischen dem Tintenbehälter (94) und dem Gerät aufweist, und 35

einen Luftanschluß (95c) zur Bildung einer Verbindung zwischen dem Behälterkörper (93) und der Atmosphäre und um den atmosphärischen Druck auf der Tinte im Tintenbehälter (94) zu halten. 40

2. Tintenbehälter gemäß Anspruch 1, dadurch gekennzeichnet, daß der Tintenbehälter in einem Gehäusebauteil (93c) gehalten wird, um einen zweischaligen Tintenbehälter zu bilden. 45
3. Tintenbehälter gemäß Anspruch 1 oder 2, dadurch gekennzeichnet, daß sich zwischen dem Gehäusebauteil (93c) und einem Boden des Tintenbehälters (94) ein tintenabsorbierendes Bauteil (96) befindet. 50
4. Tintenbehälter gemäß Anspruch 3, dadurch gekennzeichnet, daß das tintenabsorbierende Bauteil (96) Verlusttinte speichert, die durch einen Regenerierungsbetrieb eines Kopfteils anfällt. 55

5. Tintenbehälter gemäß Anspruch 1 oder 2, dadurch gekennzeichnet, daß der Tintenbehälter eine geneigte Fläche (94a) aufweist, die es ermöglicht, daß die Tinte zu einem Tintennachschubanschluß fließt.

6. Tintenbehälter gemäß Anspruch 5, dadurch gekennzeichnet, daß sich zwischen dem Gehäusebauteil und einem Boden des Tintenbehälters ein tintenabsorbierendes Bauteil befindet.

7. Tintenstrahlauzeichnungsgerät aufweisend einen einzelnen Anschlußabschnitt (74, 79), anschließbar an einen abnehmbaren Tintenbehälter, und eine Befestigungsvorrichtung (78), um den abnehmbaren Tintenbehälter sicher zu halten, wobei durch den einzelnen Anschlußabschnitt (74, 79)

ein erster Tintenförderpfad (71), welcher mit einem Aufzeichnungskopf (38) verbunden ist, an einen ersten Fördereingang des abnehmbaren Tintenbehälters angeschlossen werden kann, wobei sich innerhalb des ersten Tintenförderpfades eine Pumpvorrichtung (76) befindet, zur Zwangsförderung der Tinte unter Druck;

ein zweiter Tintenförderpfad (71), welcher mit dem Aufzeichnungskopf verbunden ist, an einen zweiten Fördereingang des abnehmbaren Tintenbehälters angeschlossen werden kann, während der Kopf aufzeichnet; und ein mit der Atmosphäre verbundener Pfad zur Kommunikation mit der Atmosphäre an einen Lufteingang des abnehmbaren Tintenbehälters angeschlossen werden kann. 50

8. Gerät gemäß Anspruch 7, dadurch gekennzeichnet, daß Tinte durch den ersten Tintenförderpfad (71), der an den Tintenbehälter angeschlossen ist, mittels einer Pumpvorrichtung (76) zwangsweise zum Kopf (38) gefördert wird, wenn der Kopf anfänglich mit Tinte gefüllt wird, und wenn eine zwangsweise Druckregenerierung durchgeführt wird und die Tinte durch den zweiten Tintenförderpfad (72) in den Tintenbehälter zurückfließt, wenn die Tinte zwangsweise vom ersten Tintenförderpfad durch den Kopf zum zweiten Tintenförderpfad gefördert wird.

9. Gerät gemäß Anspruch 7, dadurch gekennzeichnet, daß Tinte sowohl durch den ersten als auch durch den zweiten Anschluß (79a, 79b) des einzelnen Anschlußbauteils (79) zum Kopf (38) gefördert wird, während der Kopf (38) aufzeichnet.

Revendications

1. Conteneur d'encre pouvant être relié de façon amovible à un appareil, ledit conteneur comportant

un corps (93) de conteneur comprenant un réservoir d'encre (94) destiné à contenir de l'encre et un élément de jonction (95) relié audit corps du conteneur, ledit élément de jonction ayant un premier orifice (95a) d'alimentation en encre pour former un raccordement de fluide entre ledit réservoir d'encre (94) et ledit appareil,

caractérisé en ce que

ledit élément de jonction (95) comporte en outre un second orifice (95b) d'alimentation destiné à former un raccordement de fluide entre ledit réservoir d'encre (94) et ledit appareil, et

un orifice (95c) pour l'air destiné à former un raccordement entre ledit corps (93) du conteneur et l'atmosphère et à maintenir à la pression atmosphérique l'encre se trouvant dans ledit réservoir d'encre (94).

2. Conteneur d'encre selon la revendication 1, caractérisé en ce que ledit conteneur d'encre est reçu dans un élément d'enveloppe (93c) pour définir un réservoir d'encre de construction double.
3. Conteneur d'encre selon la revendication 1 ou 2, caractérisé en ce que ledit réservoir d'encre (94) est pourvu d'un élément (96) d'absorption d'encre entre ledit élément d'enveloppe (93c) et un fond (93b) dudit conteneur d'encre.
4. Conteneur d'encre selon la revendication 3, caractérisé en ce que ledit élément (96) d'absorption d'encre stocke de l'encre résiduaire éjectée par une opération de restauration d'une partie à tête.
5. Conteneur d'encre selon la revendication 1 ou 2, caractérisé en ce que ledit conteneur d'encre présente une surface inclinée (94a) pour permettre à de l'encre de s'écouler vers un orifice de support d'encre.
6. Conteneur d'encre selon la revendication 5, caractérisé en ce que ledit réservoir d'encre est pourvu d'un élément d'absorption d'encre entre ledit élément d'enveloppe et un fond dudit conteneur d'encre.
7. Appareil d'enregistrement par jet d'encre comportant un élément de jonction unique (74, 79) pouvant être raccordé à un conteneur d'encre amovible, et un moyen de montage (78) destiné à maintenir fermement ledit conteneur d'encre amovible, dans lequel, au moyen dudit élément de jonction unique (74, 79)

un premier circuit (71) d'alimentation en encre raccordé à une tête (38) d'enregistrement peut être raccordé à une première entrée d'alimen-

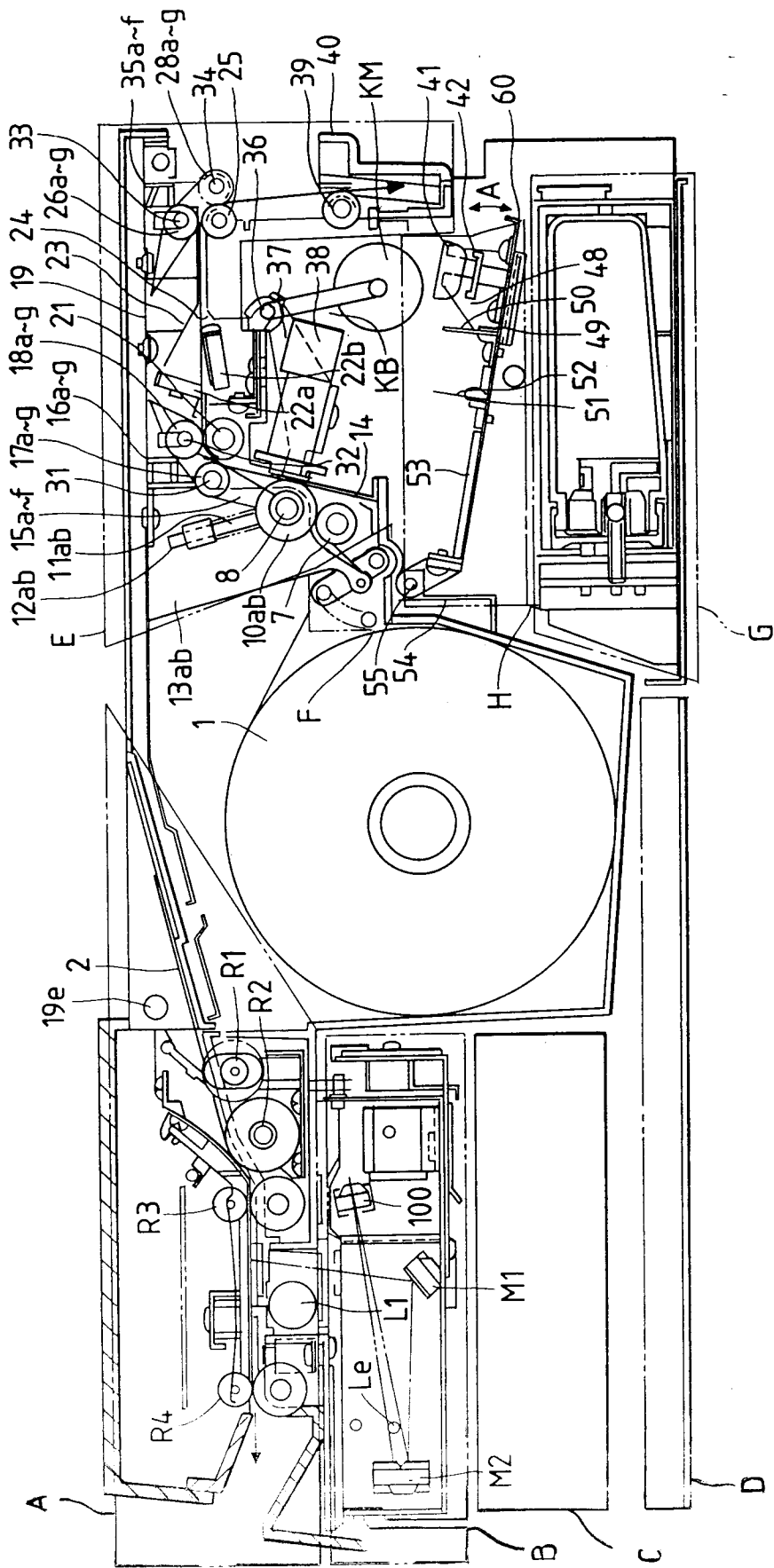
tation dudit conteneur d'encre amovible, ledit premier circuit d'alimentation en encre contenant un moyen à pompe (76) pour une alimentation forcée en encre sous pression ;

un second circuit (72) d'alimentation en encre raccordé à ladite tête peut être raccordé à une seconde entrée d'alimentation dudit conteneur d'encre amovible lorsque ladite tête enregistre ; et

un circuit de communication avec l'atmosphère, destiné à communiquer avec l'atmosphère, peut être raccordé à une entrée d'air dudit conteneur d'encre amovible.

8. Appareil selon la revendication 7, caractérisé en ce que de l'encre est amenée à force à ladite tête (38) à partir dudit premier circuit (71) d'alimentation en encre raccordé audit conteneur d'encre par l'intermédiaire dudit moyen à pompe (76) lors du remplissage initial en encre de ladite tête, et une restauration sous pression forcée est effectuée et ledit second circuit (72) d'alimentation en encre renvoie de l'encre audit conteneur d'encre alimenté à force à travers ladite tête dudit premier au second circuit d'alimentation.
9. Appareil selon la revendication 7, caractérisé en ce que de l'encre est amenée à ladite tête (38) à partir des deux premier et second raccords (79a, 79b) dudit élément de jonction unique (79) lorsque ladite tête (38) enregistre.

FIG. 1



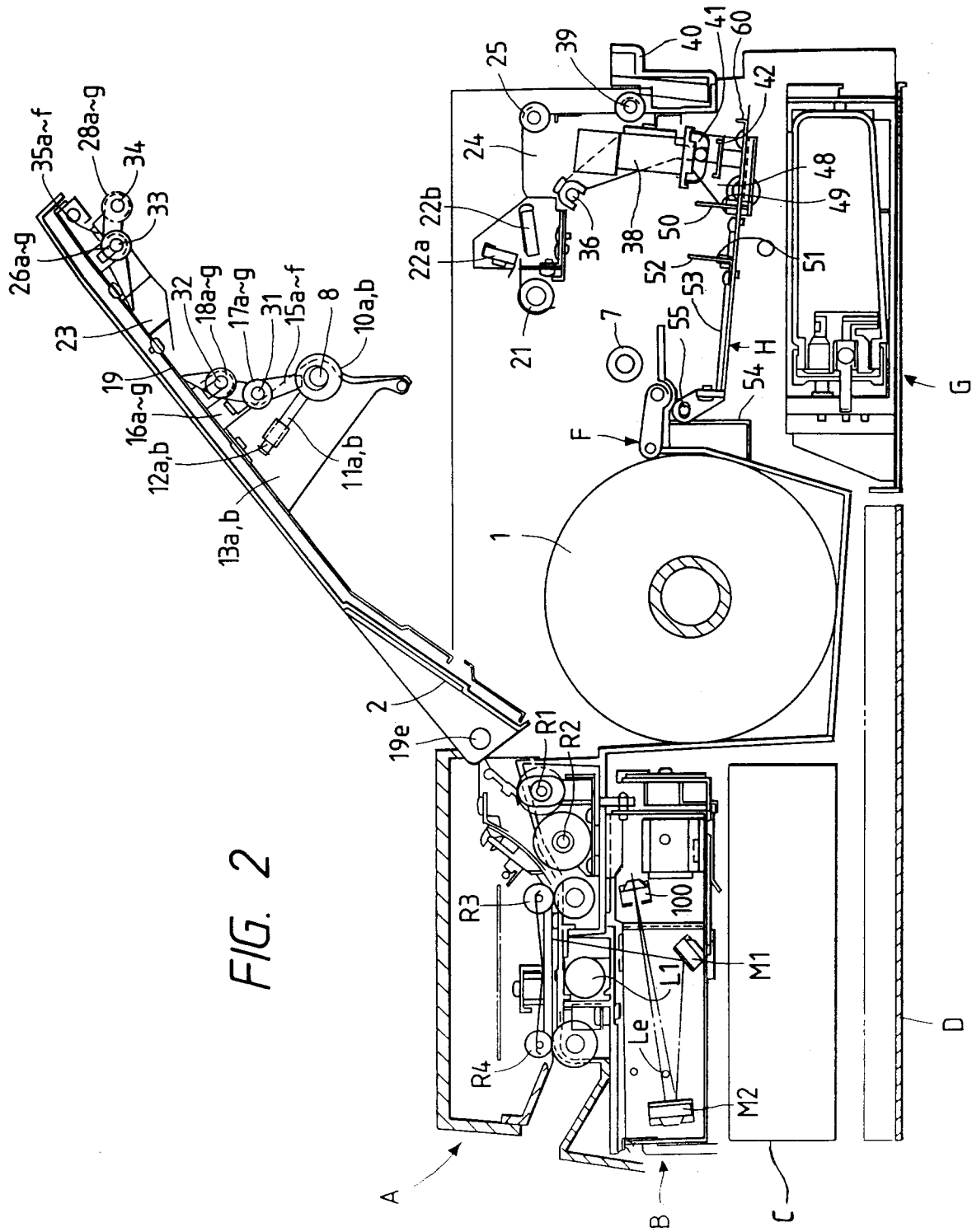


FIG. 2

FIG. 3

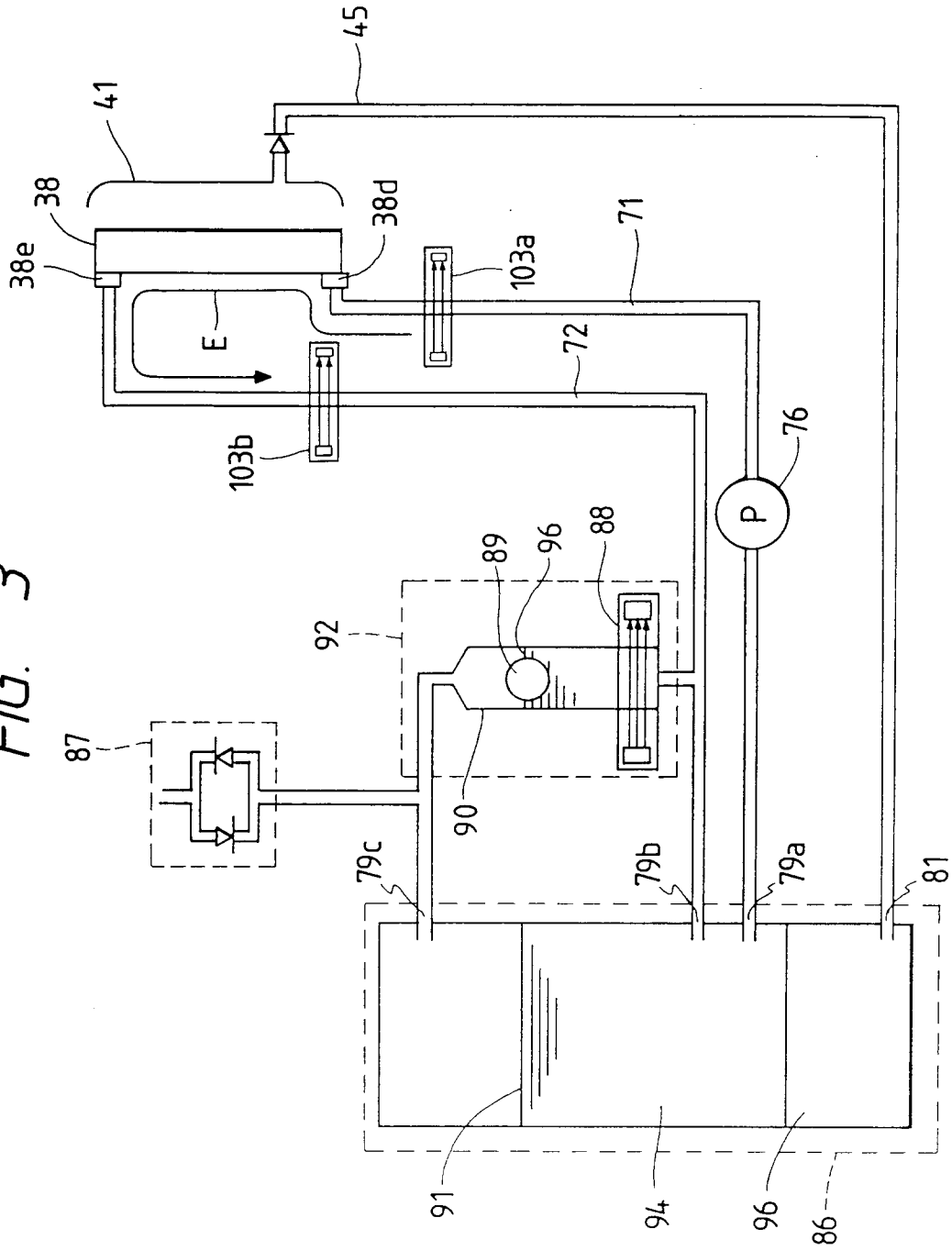


FIG. 4

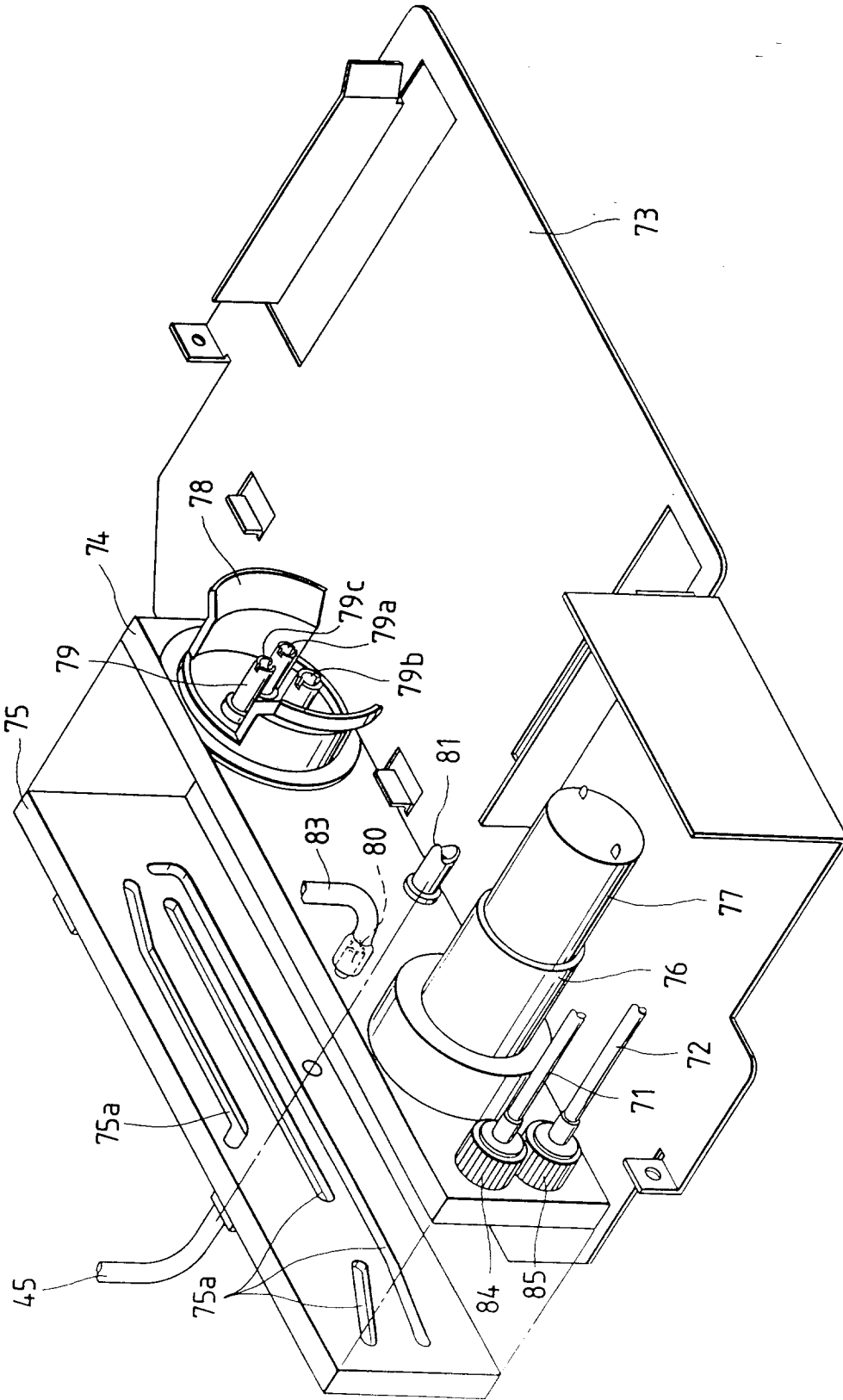


FIG. 5

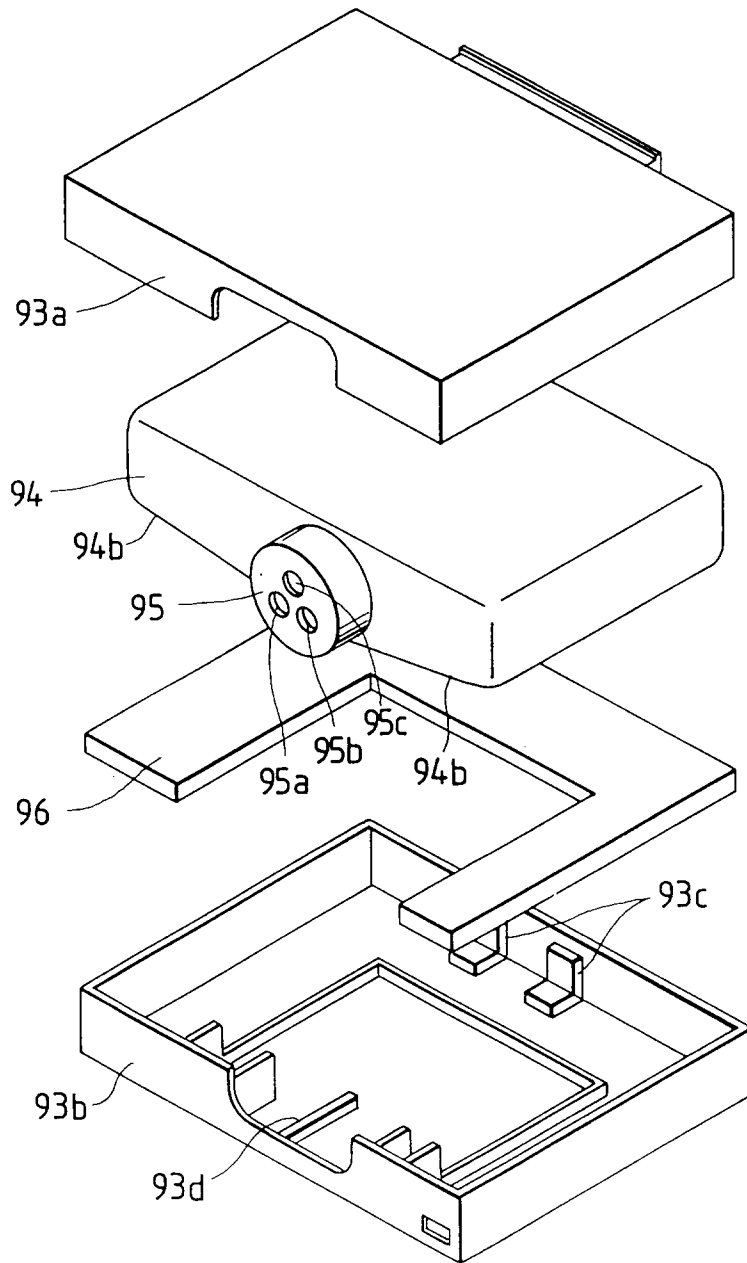


FIG. 6 A

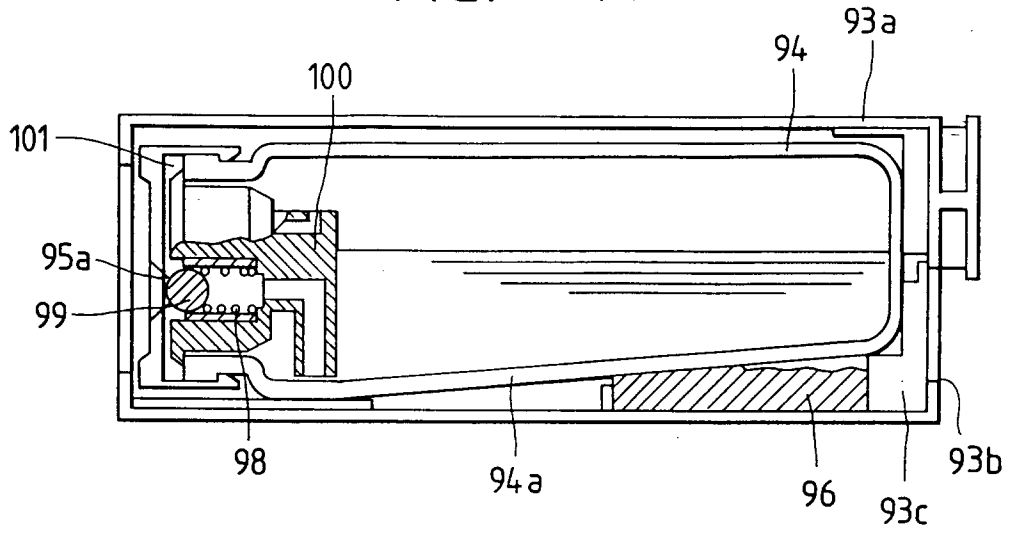


FIG. 6 B

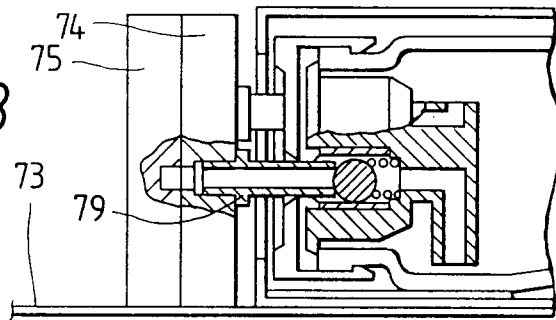


FIG. 7

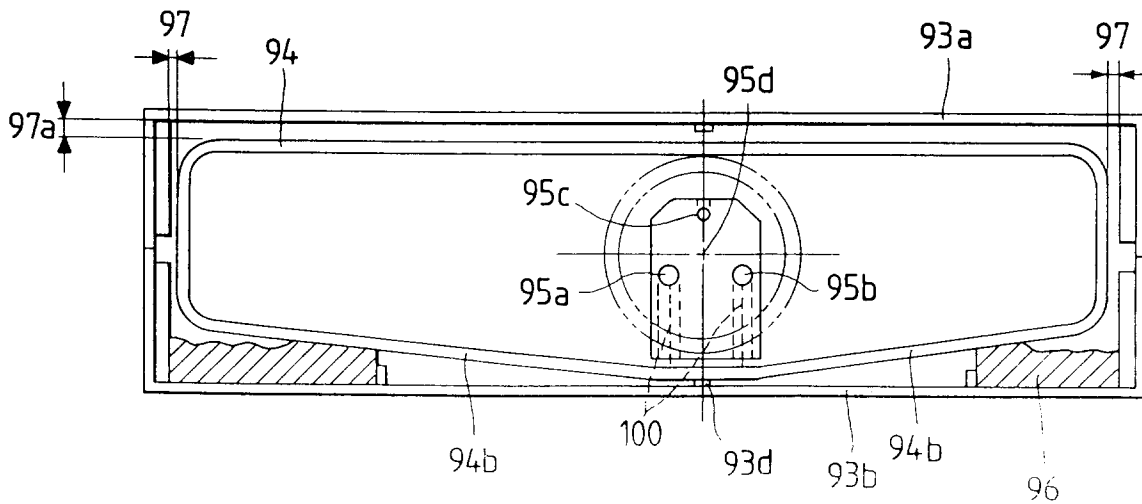


FIG. 8

