

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11)

EP 0 808 717 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
05.12.2001 Bulletin 2001/49

(51) Int Cl.7: **B41J 2/175**, F16L 29/04

(21) Application number: **97303108.1**

(22) Date of filing: **07.05.1997**

(54) **Interlocking connector assembly**

Verriegelungssteckeranordnung

Assemblage de connecteur avec verrouillage

(84) Designated Contracting States:
DE ES FR GB IT

(30) Priority: **20.05.1996 US 650569**

(43) Date of publication of application:
26.11.1997 Bulletin 1997/48

(73) Proprietor: **Hewlett-Packard Company,
A Delaware Corporation
Palo Alto, CA 94304 (US)**

(72) Inventors:

- **Pawlowski, Norman, Jr.
Corvallis, OR 97330 (US)**
- **Hall, Ronald W.
Corvallis, OR 97330 (US)**

- **Cowger, Bruce
Corvallis, OR 97330 (US)**

(74) Representative: **Colgan, Stephen James
CARPMAELS & RANSFORD
43 Bloomsbury Square
London WC1A 2RA (GB)**

(56) References cited:

**EP-A- 0 666 176 EP-A- 0 704 309
GB-A- 482 293 US-A- 3 217 746
US-A- 5 009 393**

- **PATENT ABSTRACTS OF JAPAN vol. 009, no.
007 (M-350), 12 January 1985 & JP 59 156756 A
(RICOH KK), 6 September 1984,**

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 0 808 717 B1

Description

FIELD OF THE INVENTION

[0001] This invention relates to an interlocking connector that can be used to connect an ink supply container to an ink-jet printer.

BACKGROUND AND SUMMARY OF THE INVENTION

[0002] Ink-jet printers typically have pens that traverse a sheet of paper or other material. The pen has a print head that selectively ejects tiny droplets of ink to form desired characters or images. In some ink-jet printers, a supply of ink is contained in a reservoir at the pen. This type of ink supply allows for the simple delivery of ink from the reservoir to the print head. The size and weight of the reservoir, however, may adversely affect printer speed because the entire ink supply is moved with the print head. In other ink-jet printers, the ink supply is contained and located elsewhere on the printer, allowing the pen to traverse the paper at a greater speed. A flexible ink delivery tube connects the pen and a supply container.

[0003] In this latter type of printer, the supply container is occasionally replaced. To facilitate the replacement, ink-jet printers are generally provided with docking stations. The docking station houses the supply container. The supply container can be easily plugged into and uncoupled from the docking station. The docking station includes a fluid interconnect to connect the supply container to the delivery tube.

[0004] A well-sealed fluid interconnect between the docking station and the supply container is necessary. Otherwise, ink may leak from the supply container and damage the printer. In addition, the fluid interconnect should prevent ink from escaping when the supply container is uncoupled from the docking station so no ink comes in contact with the user.

[0005] EP-A-0 704 309 describes an arrangement for coupling an ink reservoir to a print cartridge, wherein the reservoir and the cartridge are provided with respective valves which enter into a mating relationship and together open their respective valve seats to permit transfer of ink to the cartridge.

[0006] In accordance with a first aspect of the present invention there is provided a connector assembly as defined by claim 1.

[0007] In accordance with a second aspect of the present invention there is provided an interlocking connector assembly as defined by claim 7.

[0008] It is also preferred that the components of an ink supply system be as easy to recycle as possible.

[0009] A preferred embodiment of the invention provides an interlocking connector assembly for a well-sealed fluid interconnect between an ink supply container and an ink delivery tube. The connector assembly includes an outlet valve carried on the ink supply container

and an inlet valve carried on the docking station. The outlet and inlet valves resist being opened while they are uncoupled. The outlet and inlet valves are simultaneously movable into an open position once coupled. The outlet and inlet valves cannot be uncoupled until the outlet and inlet valves are simultaneously closed, so that ink cannot escape from the ink supply container or the station.

[0010] As another aspect of this invention, the connector assembly ink supply container has few parts, and the parts are made from similar materials, thus making the ink supply easy to recycle.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] Fig. 1 is an exploded view of a connector assembly of the present invention.

[0012] Fig. 2 is a perspective view of the connector assembly of Fig. 1 in an open, coupled position.

[0013] Fig. 3 is a section view of the connector assembly of Fig. 1 in a closed, uncoupled position.

[0014] Fig. 4 is a section view of the connector assembly of Fig. 1 in an open, coupled position.

DETAILED DESCRIPTION OF THE INVENTION

[0015] An interlocking connector assembly 10 in accordance with the present invention is illustrated in Fig. 1. The connector assembly 10 connects an ink supply container 16 to a docking station 33 on an ink-jet printer (not shown). The illustrated connector assembly 10 has an outlet assembly 12 on the ink container 16 and an inlet assembly 14 connected to the docking station 33.

[0016] In the illustrated embodiment, the supply container 16 has a container base 54, a flexible ink bag 52, and a hard shell 50. The container base 54 is rectangular with rounded corners and has a thickened mid-section 112, as seen in Fig. 3. The thickened mid-section 112 has a frustum-shaped indentation 62. A bore 42 extends between the wall of the frustum-shaped indentation 62 and the inner edge 120 of the thickened mid-section 112 to open into the bag 52 that is attached at one end to the mid-section 112. In the preferred embodiment, the container base 54 is made from polyethylene.

[0017] The edge 114 of the container base 54 has an inwardly protruding skirt 110 over which snap-fits the open end 118 of the shell 50.

[0018] The hard shell 50 is made from a low-cost material such as polyethylene and has an inwardly facing annular groove 116. The shell 50 is snapped onto the container base 54 such that a ridge on the skirt 110 fits snugly into the groove 116 on the shell 50. The shell 50 protects the ink bag 52.

[0019] The ink bag 52 is attached to the thickened mid-section 112 of the container base 54 by, for example, heat-staking. Fluid can flow from the interior of the ink bag 52 through the bore 42 in the mid-section 112. The ink bag 52 is otherwise enclosed.

[0020] The outlet assembly 12 includes a valve holder 36, an outlet valve 20, and a keeper member 18. The valve holder 36 is a projecting tube that is either integrally formed with or attached to the container base 54 by, for example, heat-staking or ultrasonic welding. The valve holder 36 is preferably made from polyethylene.

[0021] The outlet valve 20 is cylindrical with a frustum-shaped protrusion 56 at the center of the inward end 64. The outlet valve 20 has an "L" shaped passageway 44 extending from the outward end 66 of the outlet valve 20, along the axis of the outlet valve 20, and radially to the side of the frustum-shaped protrusion 56. The outward end of the passageway 44 is countersunk, and the passageway 44 tapers slightly before extending radially. Preferably, the outlet valve 20 is injection molded from polyethylene and formed with a void 126 therein to facilitate even cooling of the polyethylene and to reduce material.

[0022] The outlet valve 20 fits tightly within the valve holder 36 and is recessed therein so as to resist rotation by hand. The frustum-shaped protrusion 56 of the outlet valve 20 fits tightly within the frustum-shaped indentation 62 in the container base 54.

[0023] When the outlet assembly 12 is not coupled to the inlet assembly 14, the outlet valve 20 is in a closed position, in which the passageway 44 is not aligned with or intersecting the bore 42. Thus, the walls of the frustum-shaped protrusion 56 block fluid flow from the bore 42 of the supply container 16, as shown in Fig. 3.

[0024] The outlet valve 20 is rotatable into an open position, in which the passageway 44 is aligned with the bore 42 to allow fluid flow from the supply container 16, as shown in Fig. 4 and as will be described in greater detail below.

[0025] The outlet valve 20 also has keyways 28, of which there are three in the preferred embodiment (Fig. 1). Each keyway 28 is a "V"-shaped notch that extends axially along the edge of the outlet valve 20. The keyways 28 are equally spaced around the perimeter of the outlet valve 20.

[0026] The outlet valve 20 is held in the valve holder 36 by the stationary keeper member 18. The keeper member 18 is ring-shaped and its inner diameter fits snugly around the outer diameter of the valve holder 36. The keeper member 18 has legs 68, as best seen in Fig. 1, extending from the outward edge 72 of the keeper member 18 inwardly to the interior of the ring. The legs 68 have feet 70 extending radially inward and perpendicular to the legs 68. The undersides of the feet 70 abut the outward end 66 of the outlet valve 20, thereby to hold the outlet valve 20 tightly against the frustum-shaped indentation 62 in the container base 54.

[0027] The keeper member 18 also has two hooks 24. The hooks 24 extend radially outward from diametrically opposed parts of the outer walls 122 and form a right angle before extending tangential to the keeper member 18. When the outlet and inlet assemblies 12 and 14 are coupled and the outlet and inlet valves 20 and 22 are

rotated into the open position, the hooks 24 latch onto the inlet assembly 14 to prevent the outlet assembly 12 from being uncoupled from the inlet assembly 14, as will become clear below.

[0028] The inlet assembly 14 has an inlet valve 22 and a valve retainer 94. The inlet valve 22 is cylindrical with an outward flange 74 and an inward flange 76. The inward flange 76 has a frustum-shaped projection 82 centered about the axis of the inlet valve 22. The outward flange 74 has three keys 30 extending outward therefrom and evenly spaced about the center of the inlet valve 22. In the preferred embodiment the keys 30 are hexagonal-shaped, although any shape that fits within the keyways 28 could be used.

[0029] When the outlet and inlet assemblies 12 and 14 are coupled, the keys 30 fit into the keyways 28 on the outlet valve 20. Rotating the inlet valve 22 causes the keys 30 to press on the walls of the keyways 28, thereby to rotate the outlet valve 20. Thus, the outlet and inlet valves 20 and 22 can be simultaneously rotated into their open positions, as will be discussed in greater detail below.

[0030] The inlet valve 22 also has a tapered nozzle 80 extending outwardly from the outward flange 74 along the axis of the inlet valve 22. The tip 84 of the nozzle 80 is rounded.

[0031] The inlet valve 22 also has a channel 48 extending from the tip 84 of the nozzle 80 along the axis of the inlet valve 22 to the inward flange 76 as best seen in Fig. 4. The channel 48 widens at the outward edge 86 of the outward flange 74 and tapers until near the end 88 of the frustum-shaped projection 82. At which point, the channel 48 forms a right angle and extends perpendicular to the axis of the inlet valve 22 and opens through the side of the frustum-shaped projection 82.

[0032] As shown in Fig. 1, two elongated latches 26 extend from diametrically opposed sides 124 of the outward flange 74, parallel to the axis of the inlet valve 22. The outermost ends of the latches 26 form a right angle to extend radially from the inlet valve 22. The latches 26 engage the hooks 24 when the inlet valve 22 and outlet valve 20 are rotated into the open position and prevent the outlet and inlet assemblies 12 and 14 from being uncoupled while the outlet and inlet valves 20 and 22 are open.

[0033] The inlet valve 22 also has an arm 78 extending radially from the exterior wall 90 of the inlet valve 22 as shown in Fig. 2. The perimeter 92 of the arm 78 has teeth 38 formed therein. The teeth 38 mesh with a gear 40 that is mounted to the docking station 33. The gear 40 is driven to rotate the teeth 38, which rotate the inlet valve 22. When the inlet valve 22 is coupled with the outlet valve 20 (Fig. 4), as the inlet valve 22 rotates, the keys 30 push against the walls of the keyways 28 to rotate the outlet valve 20 simultaneously.

[0034] In ink-jet printers having multiple ink containers, a rack of teeth could be used instead of the gear 40 to rotate the inlet and outlet valves on all the ink con-

tainers at the same time. Alternatively, a bar linkage could do the same.

[0035] The inlet valve 22 is mounted to the docking station 33, as shown in Figs. 1 and 2. The docking station 33 includes the valve retainer 94 and an ink delivery tube 34. The valve retainer 94 is rectangular with a semi-circular protuberance 100. A frustum-shaped valve seat 96 protrudes from near the center of the semi-circular protuberance 100. The valve seat 96 has a protruding duct 98 attached thereto that extends outwardly, parallel to the axis of the valve seat 96. As shown in Fig. 3, the duct 98 is hollow and extends from an opening 46 on the interior surface 102 of the valve seat 96 to a distal end 104. The distal end 104 of the duct 98 is connected to the ink delivery tube 34.

[0036] The inlet valve 22 is rotatable relative to the valve seat 96 from a closed position, in which the channel 48 is not aligned with the opening 46 of the duct 98, as shown in Fig. 3, to an open position, in which the channel 48 is aligned with the opening 46 to allow fluid flow through the inlet assembly 14, as shown in Fig. 4.

[0037] In the preferred embodiment, the inlet assembly 14 is recessed within the docking station 33 so that a user cannot reach the inlet valve 22 and thus cannot manually turn the inlet valve 22 from the closed to the open position. Preferably, the ink container 16 protrudes only approximately one inch beyond the docking station when coupled into the inlet assembly 14.

[0038] Additionally, it is contemplated that the connector assembly 10 could include an electrical or mechanical switch at the docking station 33 that is triggered upon full insertion of the supply container 16 to actuate a motor (not shown) to drive the gear 40 to rotate the inlet and outlet valves 22 and 20 into the open position.

[0039] The interlocking connector assembly 10 could be made suitable for use in ink-jet printers using various colors or types of ink by keying the latches 26 and hooks 24 to allow insertion only of an ink container with the appropriate color or ink.

[0040] When the outlet and inlet assemblies 12 and 14 are uncoupled, both the outlet and inlet valves 20 and 22 are in the closed position to occlude fluid flow through the outlet and inlet valves 20 and 22 as shown in Fig. 3. As noted, the tight fit and recession of the outlet valve 20 in the valve body 36 prevent the outlet valve 20 from being rotated by hand into the open position. Similarly, the recession of the inlet valve 22 in the docking station 33 prevents the inlet valve 22 from being rotated by hand into the open position. Therefore, neither the outlet valve 20 nor the inlet valve 22 can be rotated inadvertently into the open position when the outlet and inlet assemblies 12 and 14 are uncoupled.

[0041] As the outlet assembly 12 is coupled with the inlet assembly 14, the nozzle 80 extends into the passageway 44 in the outlet valve 20, creating a path through the channel 48 for fluid flow between the outlet and inlet valves 20 and 22, but not between the supply container 16 and the tube 34 because the outlet and inlet

valves 20 and 22 are still in the closed position. Also, as the outlet assembly 12 is inserted into the inlet assembly 14, the keys 30 on the inlet valve 22 engage the keyways 28 on the outlet valve 20. The tapered outer walls of the nozzle 80 form a seal with the passageway 44 to prevent fluid leakage.

[0042] Once the seal is made, the outlet and inlet valves 20 and 22 are rotated into the open positions, as shown in Fig. 4. This is accomplished by rotating the gear 40, which engages the teeth 38 on the arm 78 to thereby rotate the inlet valve 22 into the open position. The rotation of the inlet valve 22, and thereby the keys 30, causes the simultaneous rotation of the outlet valve 20 into the open position.

[0043] Also, as the inlet valve 22 rotates, the latch 26 rotates through the same angle. The keeper member 18 on the outlet assembly 12, and thereby the hooks 24, remains stationary. Thus, when the inlet valve 22 is rotated into the open position, the latches 26 engage the hooks 24 so that the inside edges 106 of the latches 26 abut the side edges 108 of the hooks 24, as illustrated in Figs. 2 and 4. With the hooks 24 and the latches 26 engaged, the outlet assembly 12 cannot be uncoupled from the inlet assembly 14. Rather, the outlet and inlet valves 20 and 22 must be rotated to disengage the hooks 24 and latches 26. Rotating the outlet and inlet valves 20 and 22 through an angle sufficient to disengage them will close the outlet and inlet valves 20 and 22.

[0044] Thus, the hooks 24 and latches 26 prevent the outlet and inlet assemblies 12 and 14 from being uncoupled whenever the outlet and inlet valves 20 and 22 are in the open position. This ensures that ink is not released from the ink container 16 or from the tube 34 during uncoupling and thus prevents ink from contacting the user. This also prevents a user from carelessly extracting the ink container 16 when either the ink container 16 or the tube 34 has a path open for fluid flow.

[0045] Also, this invention provides an ink container that is easy to recycle. This invention also prevents the ink from drying out because the inlet and outlet valves are always closed when the inlet and outlet valves are uncoupled, and thus the ink is never exposed to ambient air. This invention allows multiple couplings and uncouplings.

[0046] This description illustrates various embodiments of the present invention and should not be construed to limit the scope thereof in any way. Other modifications and variations may be made to the assembly described without departing from the invention as defined by the appended claims.

Claims

1. A connector assembly for connecting an ink supply container to a station on an ink-jet printer, the connector assembly comprising:

an outlet assembly (12) connectable to the ink container (16), the outlet assembly including:

a keeper member (18);

an outlet valve (20) mounted for rotation relative to the keeper member into an open position to allow ink to flow from the ink container, and into a closed position to occlude ink flow from the container; and
 an outlet latch member (24) mounted to protrude from the keeper member; and
 an inlet assembly (14) mountable to the station (33) and couplable with the outlet assembly, the inlet assembly including:
 an inlet valve (22) rotatably mountable to the station and movable into an open position to allow ink flow through the inlet valve and into a closed position to occlude ink flow through the inlet valve; and
 an inlet latch member (26) connected to the inlet valve and rotatable with the inlet valve; and wherein the inlet and outlet latch members engage when both the outlet assembly is coupled with the inlet assembly and the inlet valve and the outlet valve are rotated into their open positions, so that the inlet and outlet assemblies cannot be uncoupled when either one of the inlet valve and outlet valve is in the open position.

2. The connector assembly of claim 1 in which moving the inlet and outlet valves (22, 18) into the closed position disengages the inlet and outlet latch members (26, 24), thereby allowing the inlet and outlet assemblies (14, 12) to be uncoupled.

3. The connector assembly of claim 1 in which the inlet assembly (14) further includes a key (30) and the outlet assembly (12) further includes a keyway (28), the key being insertable into the keyway to couple the motion of the inlet assembly with the motion of the outlet assembly.

4. The connector assembly of claim 1 in which the inlet valve (22) includes teeth (38) mounted thereon, the teeth being drivable by a gear (40) on the printer, thereby to move the inlet valve between the open and closed positions.

5. The connector assembly of claim 1 in which the ink container (16) includes a bore (42) and the outlet valve (20) includes a passageway (44), the bore and the passageway being configured such that the passageway is aligned with the bore in the open position to permit the flow of ink from the container and through the outlet valve and such that the passageway is away from the bore in the closed position thereby to occlude ink flow from the container.

6. The connector assembly of claim 1 in which the station (33) on the printer includes an opening (46) and the inlet valve (22) includes a channel (48), the opening and the channel being configured such that the channel is aligned with the opening in the open position to permit the flow of ink through the inlet valve into the printer station and such that the channel is away from the opening in the closed position, thereby preventing ink flow between the inlet valve and the printer station.

7. An interlocking connector assembly for connecting an ink container to an ink-jet printer, the connector assembly comprising:

an outlet valve (20) mountable to the ink container (16) rotatable into an open position to allow flow from the container and into a closed position to occlude the flow from the container, the outlet valve having a keyway (28);

an inlet valve (22) mountable to the printer and rotatable into an open position to allow ink flow through the inlet valve into the printer and into a closed position to occlude ink flow from the printer, the inlet valve being matable with the outlet valve and having a key (30) insertable into the keyway on the outlet valve such that rotation of the inlet valve into the open and closed positions causes rotation of the outlet valve into the open and closed positions, respectively.

8. The connector assembly of claim 7 in which the inlet valve (22) includes teeth (38) mounted thereon that can be driven by a gear (40) on the printer, whereby the inlet valve and thereby the outlet valve (20) are rotated between the open and closed positions.

9. The connector assembly of claim 7 in which the ink container (16) has a bore (42) through which ink may flow out of the container and in which the outlet valve (20) has a passageway (44), the bore and passageway being configured such that the passageway is aligned with the bore in the open position to permit the flow of ink from the container and through the outlet valve and such that the passageway is away from the bore in the closed position to occlude ink flow from the container.

10. The connector assembly of claim 7 in which the station (33) on the printer has an opening (46) through which ink may flow into the printer and in which the inlet valve (22) has a channel (48), the opening and the channel being configured such that the channel is aligned with the opening in the open position to permit the flow of ink through the inlet valve into the printer and such that the channel is away from the opening in the closed position, thereby to prevent ink flow through the inlet valve.

Patentansprüche

1. Eine Verbindieranordnung zum Verbinden eines Tintenvorratsbehälters mit einer Station an einem Tintenstrahldrucker, wobei die Verbindieranordnung folgende Merkmale aufweist:

eine Auslaßanordnung (12), die mit dem Tintenbehälter (16) verbindbar ist, wobei die Auslaßanordnung folgende Merkmale aufweist:

ein Haltebauteil (18);

ein Auslaßventil (20), das für eine Drehung relativ zu dem Haltebauteil in eine offene Stellung, um zu ermöglichen, daß Tinte aus dem Tintenbehälter fließt, und in eine geschlossene Stellung befestigt ist, um einen Tintenfluß aus dem Behälter zu blockieren; und

ein Auslaßklinkenbauteil (24), das befestigt ist, um von dem Haltebauteil vorzustehen; und

eine Einlaßanordnung (14), die an der Station (33) befestigbar ist und mit der Auslaßanordnung koppelbar ist, wobei die Einlaßanordnung folgende Merkmale aufweist:

ein Einlaßventil (22), das drehbar an der Station befestigbar ist und in eine offene Stellung, um einen Tintenfluß durch das Einlaßventil zu ermöglichen, und in eine geschlossene Stellung, um einen Tintenfluß durch das Einlaßventil zu blockieren, bewegbar ist; und

ein Einlaßklinkenbauteil (26), das mit dem Einlaßventil verbunden ist und mit dem Einlaßventil drehbar ist; wobei das Ein- und das Auslaßklinkenbauteil miteinander Eingriff nehmen, wenn sowohl die Auslaßanordnung mit der Einlaßanordnung gekoppelt ist als auch das Einlaßventil und das Auslaßventil in ihre offenen Stellungen gedreht sind, so daß die Einlaß- und Auslaßanordnung nicht entkoppelt werden können, wenn sich entweder das Einlaßventil oder das Auslaßventil in der offenen Stellung befindet.

2. Die Verbindieranordnung nach Anspruch 1, bei der ein Bewegen des Einlaß- und des Auslaßventils (22, 18) in die geschlossene Stellung das Einlaß- und Auslaßklinkenbauteil (26, 24) außer Eingriff gelangen, wodurch ermöglicht wird, daß die Einlaß-

und die Auslaßanordnung (14, 12) entkoppelt werden.

3. Die Verbindieranordnung nach Anspruch 1, bei der die Einlaßanordnung (14) ferner einen Keil (30) und die Auslaßanordnung (12) ferner eine Keilnut (28) aufweist, wobei der Keil in die Keilnut einbringbar ist, um die Bewegung der Einlaßanordnung mit der Bewegung der Auslaßanordnung zu koppeln.

4. Die Verbindieranordnung nach Anspruch 1, bei der das Einlaßventil (22) darauf befestigte Zähne (38) aufweist, wobei die Zähne durch ein Zahnrad (40) auf dem Drucker treibbar sind, um dadurch das Einlaßventil zwischen der offenen und geschlossenen Stellung zu bewegen.

5. Die Verbindieranordnung nach Anspruch 1, bei der der Tintenbehälter (16) eine Bohrung (42) aufweist, und das Auslaßventil (20) einen Durchgang (44) aufweist, wobei die Bohrung und der Durchgang derart konfiguriert sind, daß der Durchgang in der offenen Stellung mit der Bohrung ausgerichtet ist, um den Tintenfluß aus dem Behälter und durch das Auslaßventil zu ermöglichen, und daß der Durchgang in der geschlossenen Stellung von der Bohrung entfernt ist, um so den Tintenfluß aus dem Behälter zu blockieren.

6. Die Verbindieranordnung nach Anspruch 1, bei der die Station (33) auf dem Drucker eine Öffnung (46) aufweist und das Einlaßventil (22) einen Kanal (48) aufweist, wobei die Öffnung und der Kanal derart konfiguriert sind, daß der Kanal in der offenen Stellung mit der Öffnung ausgerichtet ist, um den Tintenfluß durch das Einlaßventil in die Druckerstation zu ermöglichen, und daß der Kanal in der geschlossenen Stellung von der Öffnung entfernt ist, wodurch der Tintenfluß zwischen dem Einlaßventil und der Druckerstation verhindert wird.

7. Eine verriegelbare Verbindieranordnung zum Verbinden eines Tintenbehälters mit einem Tintenstrahldrucker, wobei die Verbindieranordnung folgende Merkmale aufweist:

ein Auslaßventil (20), das an dem Tintenbehälter (16) befestigbar ist, das in eine offene Stellung, um einen Fluß aus dem Behälter zu ermöglichen, und in eine geschlossene Stellung drehbar ist, um einen Fluß aus dem Behälter zu blockieren, wobei das Auslaßventil eine Keilnut (28) besitzt;

ein Einlaßventil (22), das an dem Drucker befestigbar ist, und in eine offene Stellung drehbar ist, um einen Tintenfluß durch das Einlaßventil in den Drucker zu ermöglichen,

und in eine geschlossene Stellung drehbar ist, um den Tintenfluß aus dem Drucker zu blockieren, wobei das Einlaßventil mit dem Auslaßventil zusammenbringbar ist, und einen Keil (30) besitzt, der in die Keilnut auf dem Auslaßventil derart eingebracht werden kann, daß die Drehung des Einlaßventils in die offene und geschlossene Stellung eine Drehung des Auslaßventils in die offene bzw. geschlossene Stellung bewirkt.

8. Die Verbindieranordnung nach Anspruch 7, bei der das Einlaßventil (22) Zähne (38) aufweist, die daran befestigt sind, und die durch ein Zahnrad (40) auf dem Drucker angetrieben werden können, wodurch das Einlaßventil und dadurch auch das Auslaßventil (20) zwischen den offenen und geschlossenen Stellungen gedreht werden.

9. Die Verbindieranordnung nach Anspruch 7, bei der der Tintenbehälter (16) eine Bohrung (42) besitzt, durch die Tinte aus dem Behälter fließen kann und bei dem das Auslaßventil (20) über einen Durchgang (44) verfügt, wobei die Bohrung und der Durchgang derart konfiguriert sind, daß der Durchgang in der offenen Stellung mit der Bohrung ausgerichtet ist, um den Tintenfluß aus dem Behälter und durch das Auslaßventil zu ermöglichen, und daß der Durchgang in der geschlossenen Stellung von der Bohrung entfernt ist, um einen Tintenfluß aus dem Behälter zu blockieren.

10. Die Verbindieranordnung nach Anspruch 7, bei der die Station (33) auf dem Drucker eine Öffnung (46) besitzt, durch die Tinte in den Drucker fließen kann, und bei der das Einlaßventil (22) einen Kanal (48) besitzt, wobei die Öffnung und der Kanal derart konfiguriert sind, daß der Kanal in der offenen Stellung mit der Öffnung ausgerichtet ist, um den Tintenfluß durch das Einlaßventil in den Drucker zu ermöglichen, und daß der Kanal in der geschlossenen Stellung von der Öffnung entfernt ist, um dadurch einen Tintenfluß durch das Einlaßventil zu blockieren.

Revendications

1. Ensemble connecteur pour connecter un logement d'alimentation d'encre à une station dans une imprimante à jet d'encre, l'ensemble connecteur comprenant :

- un ensemble de sortie (12) connectable au logement (16) d'alimentation d'encre, l'ensemble de sortie comprenant :
 - un élément de maintien (18) ;
 - une vanne de sortie (20) montée en rota-

tion par rapport à l'élément de maintien en position ouverte, pour permettre à l'encre de s'écouler depuis le logement d'alimentation d'encre, et en position fermée pour obturer l'écoulement d'encre depuis le logement ; et

- un verrou de sortie (24) monté en dépassant de l'élément de maintien ; et

- un ensemble d'entrée (14) pouvant être monté sur la station (33) et pouvant être couplé à l'ensemble de sortie, l'ensemble d'entrée comprenant :

- une vanne d'entrée (22) montée en rotation sur la station et réglable en position ouverte pour permettre à l'encre de s'écouler à travers la vanne d'entrée et réglable en position fermée pour obturer l'écoulement d'encre à travers la vanne d'entrée ; et
- un verrou d'entrée (26) connecté à la vanne d'entrée et pouvant tourner avec la vanne d'entrée ; et où les verrous d'entrée et de sortie s'engagent l'un dans l'autre lorsque, à la fois, l'ensemble de sortie est couplé à l'ensemble d'entrée et que la vanne d'entrée et la vanne de sortie sont en rotation dans leurs positions ouvertes, de sorte que les ensembles d'entrée et de sortie ne peuvent pas être désaccouplés lorsque l'une ou l'autre de la vanne d'entrée et de la vanne de sortie est en position ouverte.

2. Ensemble connecteur selon la revendication 1, dans lequel le fait de déplacer les vannes d'entrée et de sortie (22, 20) en position fermée libère les verrous d'entrée et de sortie (26, 24), permettant ainsi aux ensembles d'entrée et de sortie (14, 12) d'être désaccouplés.

3. Ensemble connecteur selon la revendication 1, dans lequel l'ensemble d'entrée (14) comprend en outre une clavette (30) et où l'ensemble de sortie (12) comprend en outre une rainure de clavette (28), la clavette pouvant être introduite dans la rainure, pour coupler le déplacement de l'ensemble d'entrée avec le déplacement de l'ensemble de sortie.

4. Ensemble connecteur selon la revendication 1, dans lequel la vanne d'entrée (22) comprend des dents (38) montées sur la vanne, les dents pouvant être entraînées par un pignon (40) sur l'imprimante, permettant ainsi de déplacer la vanne d'entrée entre les positions ouvertes et fermées.

5. Ensemble connecteur selon la revendication 1, dans lequel le logement (16) d'alimentation d'encre

comprend un perçage (42) et où la vanne de sortie (20) comprend un passage (44), le perçage et le passage étant configurés de façon telle, que le passage est aligné avec le perçage en position ouverte, pour permettre l'écoulement d'encre depuis le logement et à travers la vanne de sortie et, de façon telle, que le passage est éloigné du perçage en position fermée, obturant ainsi l'écoulement d'encre provenant du logement.

6. Ensemble connecteur selon la revendication 1, dans lequel la station (33) de l'imprimante comprend une ouverture (46) et où la vanne d'entrée (22) comprend un canal (48), l'ouverture et le canal étant configurés de façon telle, que le canal est aligné avec l'ouverture en position ouverte, pour permettre l'écoulement d'encre dans la station de l'imprimante à travers la vanne d'entrée et, de façon telle, que le canal est éloigné de l'ouverture en position fermée, empêchant ainsi l'écoulement d'encre entre la vanne d'entrée et la station de l'imprimante.

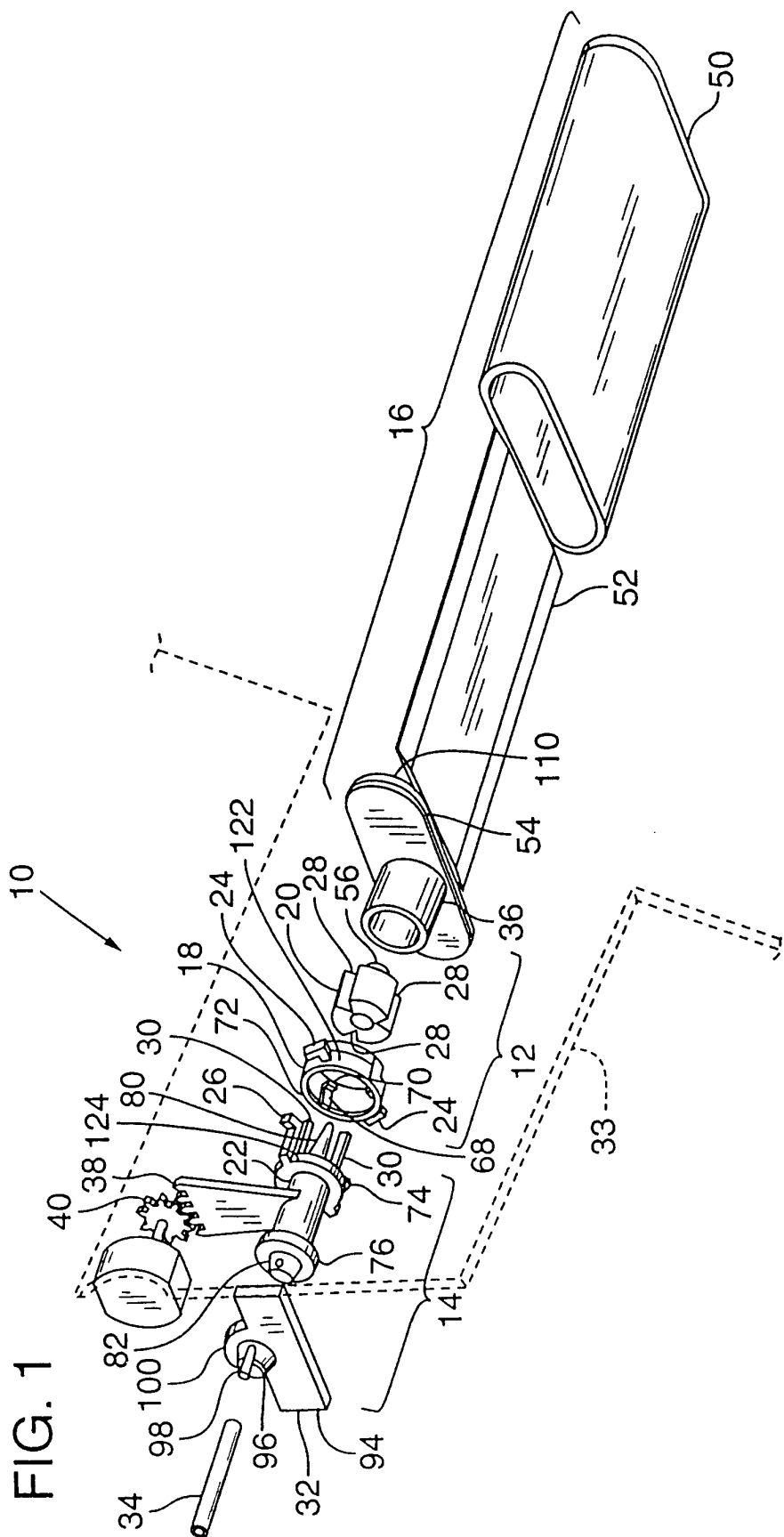
7. Ensemble connecteur à verrouillage pour connecter un logement d'alimentation d'encre à une imprimante à jet d'encre, l'ensemble connecteur comprenant :

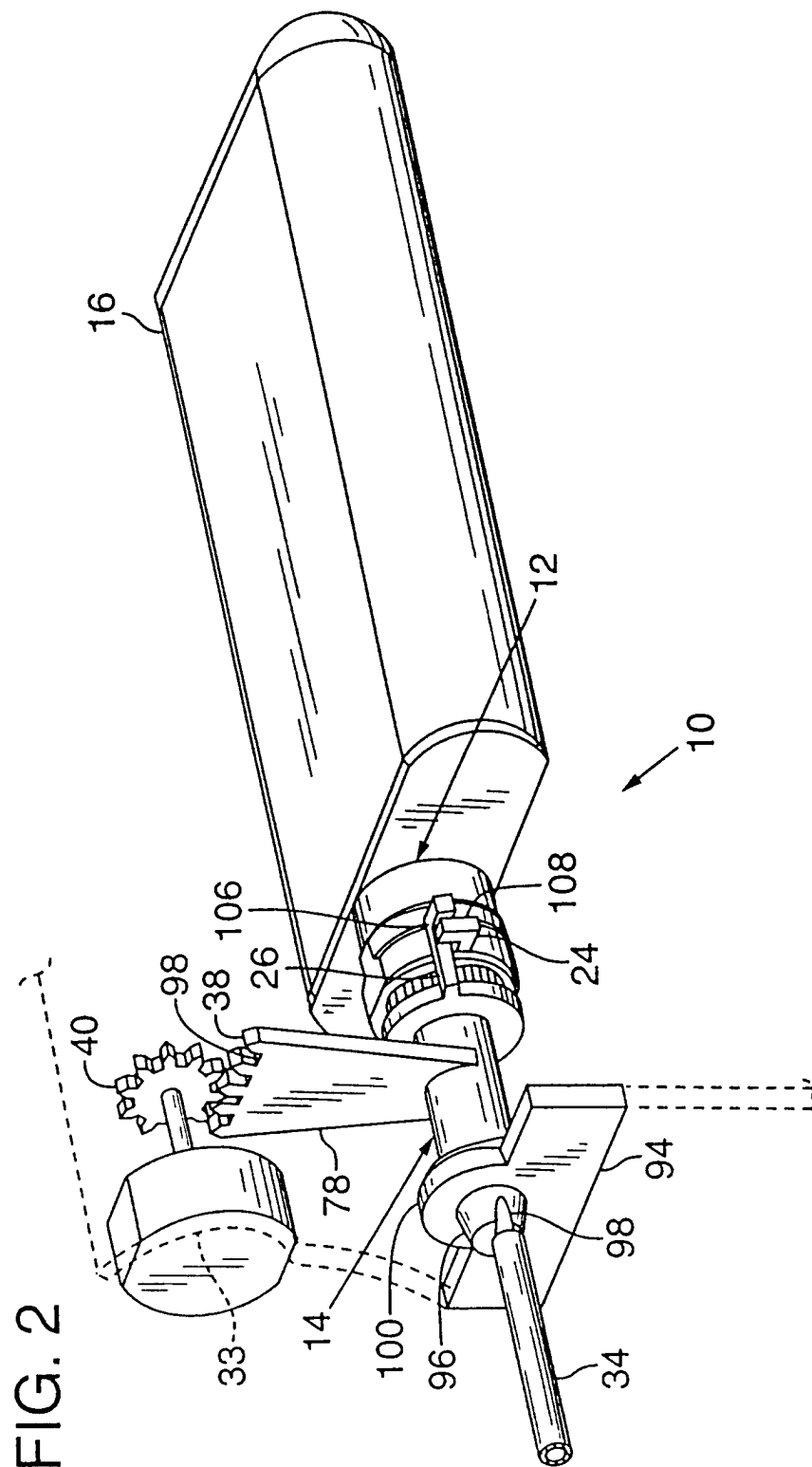
- une vanne de sortie (20) pouvant être montée sur le logement (16) d'alimentation d'encre, pouvant tourner en position ouverte, pour permettre l'écoulement depuis le logement et pouvant tourner en position fermée pour obturer l'écoulement depuis le logement, la vanne de sortie ayant une rainure de clavette (28) ;
- une vanne d'entrée (22) pouvant être montée sur l'imprimante et pouvant tourner en position ouverte, pour permettre l'écoulement d'encre dans l'imprimante à travers la vanne d'entrée, et pouvant tourner en position fermée pour obturer l'écoulement d'encre depuis l'imprimante, la vanne d'entrée pouvant s'accoupler avec la vanne de sortie, en ayant une clavette (30) pouvant être introduite dans la rainure de clavette placée sur la vanne de sortie, de façon telle que la rotation de la vanne d'entrée dans les positions ouvertes et fermées provoque la rotation de la vanne de sortie respectivement dans les positions ouvertes et fermées.

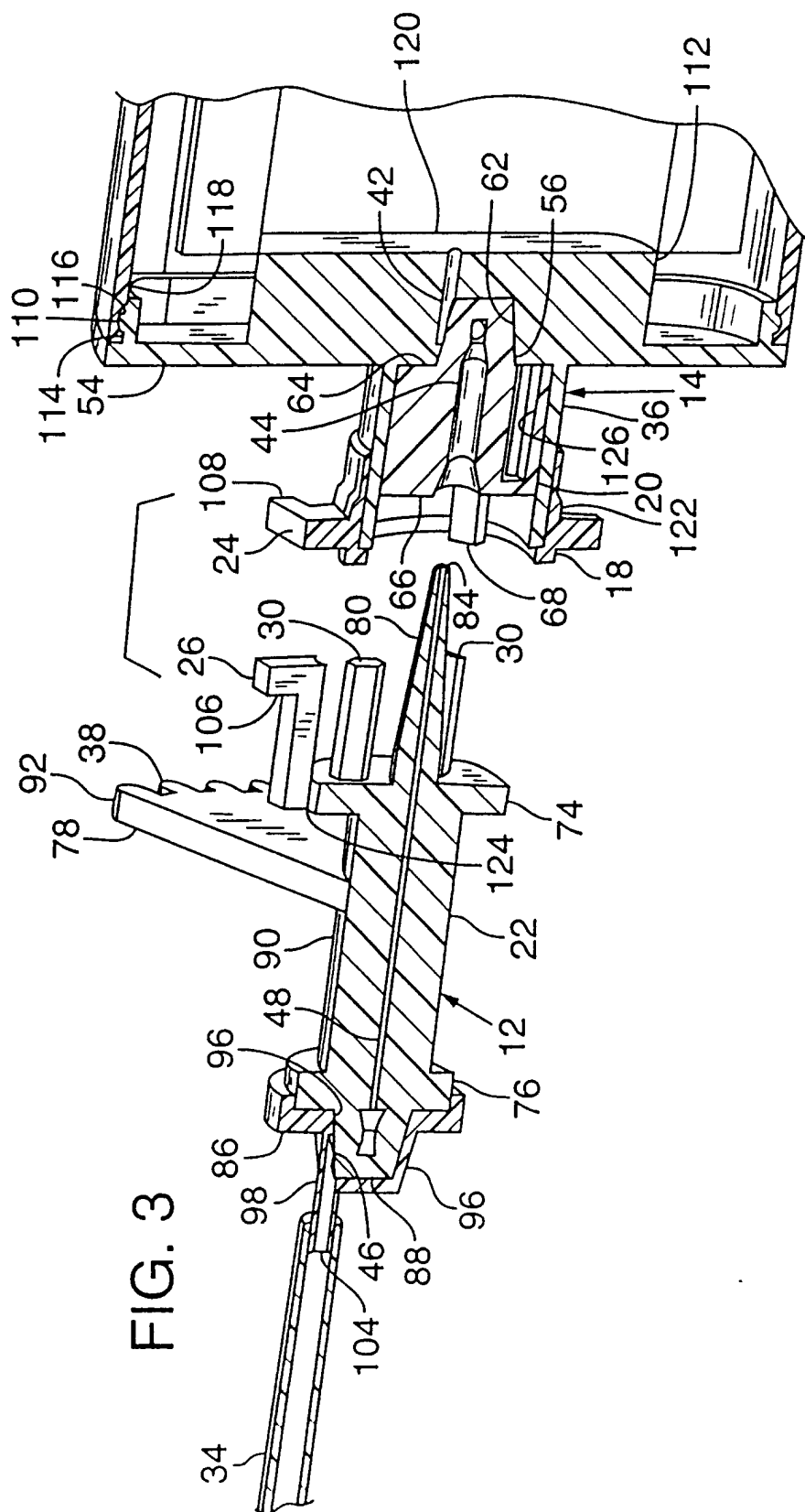
8. Ensemble connecteur selon la revendication 7, dans lequel la vanne d'entrée (22) comprend des dents (38) montées sur la vanne, ces dents pouvant être entraînées par un pignon (40) de l'imprimante, grâce à quoi la vanne d'entrée et, donc, la vanne de sortie (20) sont en rotation entre les positions ouvertes et fermées.

9. Ensemble connecteur selon la revendication 7, dans lequel le logement (16) d'alimentation d'encre comprend un perçage (42) à travers lequel de l'encre peut s'écouler hors du logement, ensemble connecteur dans lequel la vanne de sortie (20) comprend un passage (44), le perçage et le passage étant configurés de façon telle, que le passage est aligné avec le perçage en position ouverte, pour permettre l'écoulement d'encre depuis le logement et à travers la vanne de sortie et, de façon telle, que le passage est éloigné du perçage en position fermée, pour obturer l'écoulement d'encre provenant du logement.

10. Ensemble connecteur selon la revendication 7, dans lequel la station (33) de l'imprimante comprend une ouverture (46) à travers laquelle de l'encre peut s'écouler dans l'imprimante, ensemble connecteur dans lequel la vanne d'entrée (22) comprend un canal (48), l'ouverture et le canal étant configurés de façon telle, que le canal est aligné avec l'ouverture en position ouverte, pour permettre l'écoulement d'encre dans la station de l'imprimante à travers la vanne d'entrée et, de façon telle, que le canal est éloigné de l'ouverture en position fermée, empêchant ainsi l'écoulement d'encre à travers la vanne d'entrée.







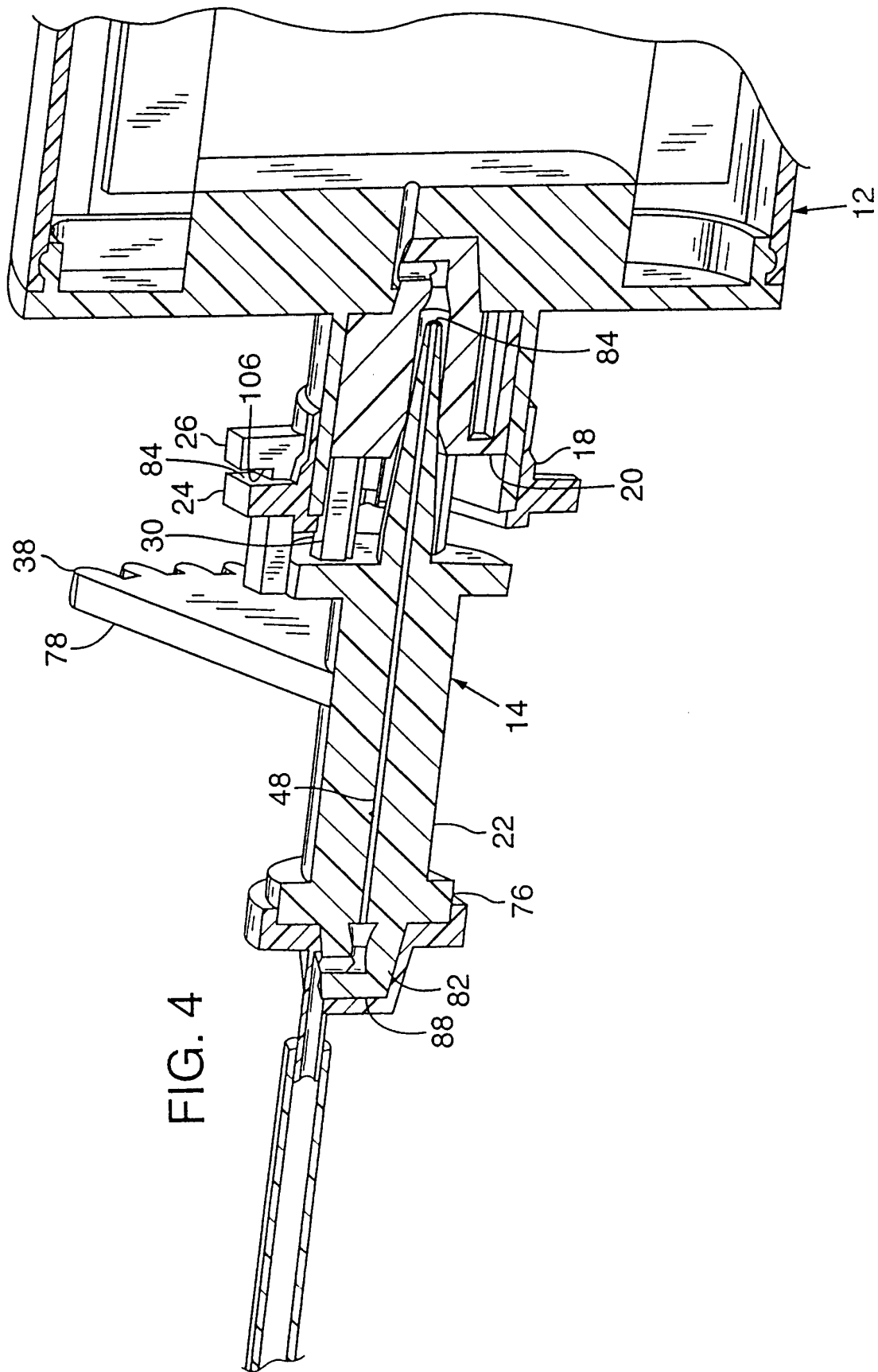


FIG. 4