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(54) FOUNTAIN PEN AND CLEAN INK REFILL SYSTEM

FÜLLFEDERHALTER UND SAUBERES TINTENNACHFÜLLSYSTEM

STYLO ET SYSTÈME DE RECHARGE D'ENCRE PROPRE

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(56) References cited:
WO-A2-2011/121589 DE-A1- 4 409 756
DE-A1- 19 703 853 GB-A- 596 262
GB-A- 2 170 999

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Description

BACKGROUND

Field of the Invention

[0001] The invention generally relates to fountain pens, and more specifically to a fountain pen having a clean ink refill system.

Related Technology

[0002] Conventional fountain pens include a free ink reservoir that is fluidly connected to a writing nib. Ink flows from the reservoir to the writing nib via capillary action. As ink leaves the reservoir, air replaces the vacated volume through an air hole located near the writing nib. When the ink reservoir is depleted, it can be refilled by dipping the air hole into an ink container. Ink from the container is then sucked up into the reservoir by an internal piston.

[0003] Conventional fountain pens suffer, in particular, from two problems. A first problem is ink leaking out of the pen during changes in external pressure. For example, when a user carries a fountain pen in an airplane and the airplane depressurizes slightly as it ascends, the pressure within the ink reservoir will eventually force ink out of the nib to equalize internal reservoir pressure with external air pressure. This can cause the ink to leak and stain, for example, a shirt pocket. Leaks of this sort can also occur with rapid changes in atmospheric pressure, such as the passage of a storm front. Similar leaks can also occur during changes in atmospheric temperature, which result relative pressure differentials between the pressure within the reservoir and outside of the reservoir.

[0004] A second problem is that refilling the fountain pen ink is a messy procedure. To refill the fountain pen, the writing nib and part of the ferrule up to the air hole must be immersed in a pool of ink, usually within an ink jar of some sort. Because the writing nib and ferrule are immersed in the pool of ink, the writing nib and ferrule become coated with an ink film that must be removed by cleaning the fountain pen after the ink refilling procedure is completed.

[0005] DE19703853A1 describes an ink refill system fountain for a fountain pen.

[0006] The invention relates to an ink refill system for a fountain pen and an ink bottle for holding liquid ink set forth in the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] Further features and advantages of the invention can be gathered from the claims, the following description, and the attached diagrammatic drawings, wherein:

Fig. 1 is a cross-sectional view of an uncapped fountain

pen with an internal valve in an open position; Fig. 2 is cross-sectional view of the fountain pen of Fig. 1 with a cap disposed over the writing nib and the internal valve in a closed position;

Fig. 3 is an exploded cross-sectional view of the fountain pen of Fig. 1 ;

Fig. 4 is a close-up cross-sectional view of the internal valve of the fountain pen of Fig. 1 ;

Fig. 5 is a close-up cross-sectional view of the internal valve of the fountain pen of Fig. 2 ;

Fig. 6 is a close-up cross-sectional view of the internal valve of the fountain pen of Fig. 3 ;

Fig. 7 is a cross-sectional view of the fountain pen of Fig. 1 , with a ferrule assembly removed and the fountain pen connected to an ink refill bottle; and

Fig. 8 is close-up cross-sectional view of the fountain pen and ink refill bottle of Fig. 7.

DETAILED DESCRIPTION

[0008] A fountain pen 10 is exemplified in the drawings, however, other writing instruments that include free ink refillable reservoirs, including, but not limited to, markers, high-lighters, felt tip pens, and other fluid application devices including, but not limited to, correction fluid applicators and paint applicators could also be made in accordance with the teachings of the disclosure by selection of appropriate components.

[0009] Turning now to Figs. 1-3, the fountain pen 10 comprises an outer hollow barrel 11 having a barrel body 12 and an orifice at a first end 15 thereof through which ink is delivered from a reservoir 14 to a writing nib 16. As illustrated, the orifice is formed in an elastomer joint 13 that is disposed at the first end 15 of the barrel body 12. The elastomer joint 13 forms a valve seat, which will be discussed further below, that cooperates with a valve to selectively open and close the orifice. The ink reservoir 14 is capable of containing a supply of ink. The writing nib 16 is operatively connected to the barrel 12 by a feed assembly 17 that includes a ferrule 18 that is removably secured to the barrel body 12. A locking mechanism 20, such as a bayonet or a threaded connection, secures the ferrule 18 to the first end 15 of the barrel body 12. A cap 22 may be attached to the first end 15 of the barrel body 12 to cover the writing nib 16, as illustrated in Fig. 2, or removed from the barrel to expose the nib 16, as illustrated in Fig. 1. The cap 22 may be attached, more specifically, to the feed assembly 17 by a threaded connection 19.

[0010] A refill piston 24 is located within the barrel body 12 at a second end 26. The refill piston 24 is operatively connected to the reservoir 14. The refill piston 24 is movable along a longitudinal axis A of the barrel body 12. As the refill piston 24 moves towards the second end 26, a volume of the reservoir 14 is increased, causing pressure within the reservoir to decrease. When refilling the reservoir 14 with ink, this decrease in reservoir pressure results in a pressure differential between the reservoir

and the external environment that forces fresh ink into the reservoir through the first end 15 of the barrel body 12. The refill piston 24 may be actuated by a refill cap 28 that is rotatably secured to the second end 26 of the barrel body 12. As the refill cap 28 is rotated, internal threads 30, which are coupled to the refill piston 24, cause the refill piston 24 to translate along the longitudinal axis A. In other embodiments, the refill piston 24 may be actuated by other elements, such as a refill lever (not shown). In yet other embodiments, the illustrated barrel body 12 may be formed as a replaceable cartridge that is covered by an outer shell.

[0011] A valve 32 is disposed within the barrel body 12 at the first end 15. The valve 32 selectively opens and closes the orifice to allow ink to pass through the orifice, either from the reservoir 14 to the writing nib 16, or from an ink supply to the reservoir 14 during a refilling operation.

[0012] Turning now to Figs. 4-6, the feed assembly 17 includes the ferrule 18, the locking mechanism 20, and a nib support 34 that secures the nib 16 to the ferrule 18. An ink feed channel 36 extends through the nib support 34, fluidly connecting the reservoir 14 to the writing nib 16 when the valve 32 is open. The nib support 34 is slidably attached to the ferrule 18 so that the nib support 34 and the nib 16 are movable along the longitudinal axis A.

[0013] The locking mechanism 20 is threadedly secured to the ferrule at a first end 40 and releasably secured to the barrel body 12 proximate a second end 42 by a bayonet connection 44. In other embodiments, a second threaded connection (not shown) may be substituted for the bayonet connection 44. The bayonet connection 44 comprises a slot 46 disposed in the locking device, and a bayonet 48 disposed on a retainer 50. A retainer cover 52 secures the retainer 50 to the barrel body 12. The bayonet connection 44 allows a user to quickly and easily remove the feed assembly 17 from the barrel body 12 so that the reservoir 14 may be refilled when depleted of ink.

[0014] The valve 32 comprises a piston 60 that is longitudinally translatable within the barrel body along the longitudinal axis A, a seat 62 disposed within the orifice at the first end 15 of the barrel body 12, and a first biasing element 64 that biases the piston 60 towards the seat 62. The seat 62 is attached to the barrel body 12 by a seat cover 63. The piston 60 may be made of an elastomer, such as a thermoplastic elastomer. A piston guide 70 may optionally retain the piston 60 within the barrel body 12, and guide movement of the piston 60 along longitudinal axis A.

[0015] During use, the piston 60 may be opened by a valve opening mechanism 68 when the cap is removed from the feed assembly 17. More specifically, as discussed above, the writing nib 16 is slidably secured to the ferrule 18 by the nib support 34 so that the writing nib 16 and nib support 34 may slide along the longitudinal axis A. The nib support 34 may be guided in longitudinal

movement by an inner surface of the seat 62. A second biasing element 74 biases the nib support 34 and the nib 16 towards the valve 32. When the cap 22 is removed from the feed assembly 17, the nib support 34 is biased by the second biasing element 74 towards the piston 60, which pushes the piston 60 away from the seat 62 to open the valve 32. The valve opening mechanism 68, comprises an ink feed tube 76 that extends towards one end of the nib support 34. As the nib support 34 moves towards the valve 32, one end of the nib support 34a pushes against the piston 60, thereby causing the piston 60 to move away from the seat 62. Once the piston 60 is spaced apart from the seat 62, ink may flow through the seat 62, through the ink feed tube 76 and into the ink feed channel 36 to the writing nib 16.

[0016] When the cap 22 is attached to the feed assembly 17 by the threaded connection 19, the threaded connection 19 draws the nib support 34 and the writing nib 16 away from the valve 32. As the nib support 34 moves away from the valve 32, the nib support 34 allows the piston 60 to move towards the seat 62 under the biasing force produced by the first biasing element 64. Eventually, the piston 60 makes contact with the seat 62 (Fig. 5), which closes the orifice, thus preventing ink from flowing out of, or into, the reservoir 14 through the orifice. As a result, when the cap is attached to the feed assembly 17, the valve 32 prevents ink from leaking out of the reservoir 14.

[0017] Similarly, when the feed assembly 17 is removed from the barrel body 12, the piston 60 remains pressed against the seat 62 by the biasing force from the first biasing element 64, as illustrated in Fig. 6. Once the feed assembly 17 is removed from the barrel body 12, the reservoir 14 may be replenished with ink, as discussed below.

[0018] Once the feed assembly 17 is removed from the barrel body 12, the barrel body 12 may be releasably connected to an ink supply, such as an ink bottle 100, as illustrated in Fig. 7. The ink bottle 100 may include a bottle body 102 having an opening 104 at a first end 106. The bottle body 102 may comprise an ink refill reservoir 108. The ink refill reservoir 108 may contain a supply of ink 110. A cap 112 may cover the opening 104 to prevent ink from spilling out of the opening 104. The cap 112 may include an air hole 113 to relieve negative pressure within the ink refill reservoir during ink refill operations for the barrel 11. A gas permeable barrier 121 may be disposed between liquid in the ink refill reservoir 108 and the air hole 113. The gas permeable barrier 121 allows gas to pass through the air hole 113 to equalize pressure while preventing liquid from passing through the air hole 113 to prevent liquid leaks. In other embodiments, the cap 112 may be integrally formed with the bottle body 102.

[0019] The barrel body 12 may be releasably coupled to the cap 112 by a refill adapter 114. The refill adapter 114 comprises a central orifice 115 (Fig. 8). A refill tube 116 may comprise a refill channel 118, through which ink may flow from the ink refill reservoir 108 to the reservoir

14. The refill tube 116 may extend partially into the central orifice 115. A refill tube extender 122 may be attached to one end of the refill tube 116, the refill tube extender 122 extending through the central orifice 115. In other embodiments, the refill tube extender 122 may be integrally formed with the refill tube 116.

[0020] The refill adapter 114 may comprise a locking device 120 having a bayonet slot 146, similar to the bayonet slot 46 in the locking mechanism 20 of Figs. 1-5. The locking device 120 releasably secures the barrel body 12 to the refill adapter 114. The bayonet slot 146 in the locking device 120 receives the bayonet 48 on the retainer 50 of the barrel 11. As the barrel body 12 is secured to the refill adapter 114, the piston 60 is pushed away from the seat 62 by the refill tube extender 122. Once the piston 60 is spaced apart from the seat 62, the reservoir 14 is fluidly connected with the ink refill reservoir 108 by the ink refill tube 116.

[0021] After the barrel body 12 is connected to the refill adapter 114, the refill piston 24 may be actuated. As the refill piston 24 moves away from the seat 62 volume of the reservoir 14 increases. This increase in volume decreases pressure within the reservoir 14 relative to the ink refill reservoir 108 and atmospheric pressure above the ink supply 110 pushes ink from the ink supply 110, through the refill tube 116, through the seat 62, and into the reservoir 14 to replenish the reservoir 14 with ink.

[0022] After the refill operation is complete, the barrel body 12 may be removed from the refill adapter 114 by releasing the bayonet 48 from the bayonet slot 146. As the barrel body 12 is moved away from the refill tube extender 122, force from the first biasing element 64 moves the piston 60 towards the seat 62 until the piston 60 contacts the seat 62 and closes the valve 32, thereby preventing any ink from spilling out of the reservoir 14. Additionally, because the feed assembly 17 is removed from the barrel body 12 during the refill operation, the writing nib 16 and ferrule 18 are kept out of the ink supply and thus remain clean and dry.

[0023] In other embodiments, the piston 60 may be replaced by a ball. In yet other embodiments, the valve may be actuated by mechanical movement of the barrel body, such as by twisting the barrel body, instead of being biased by a biasing element.

[0024] The disclosure is not limited to a fountain pen. The disclosure could be applied to virtually any writing instrument. The features of the invention disclosed in the description, drawings and claims can be individually or in various combinations for the implementation of the different embodiments of the invention. The features disclosed in the above description, the figures and the claims may be significant for the realisation of the invention in its different embodiments individually as in any combination.

List of Reference numerals

[0025]

10	fountain pen
11	outer hollow barrel
12	barrel body
13	elastomer joint
5 14	ink reservoir
15	first end
16	writing nib
17	feed assembly
18	ferrule
10 19	threaded connection
20	locking mechanism
22	cap
24	refill piston
26	second end
15 28	refill cap
30	internal threads
32	valve
34	nib support
34a	one end of the nib support
20 36	ink feed channel
40	first end
42	second end
44	bayonet connection
46	slot
25 48	bayonet
50	retainer
52	retainer cover
60	piston
62	seat
30 63	seat cover
64	first biasing element
68	valve opening mechanism
70	piston guide
74	second biasing element
35 76	ink feed tube
100	ink bottle
102	bottle body
104	opening
106	first end
40 108	refill reservoir
110	ink supply
112	cap
113	air hole
114	refill adapter
45 115	central orifice
116	refill tube
118	refill channel
120	locking device
121	gas permeable barrier
50 122	refill tube extender
146	bayonet slot

Claims

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1. An ink refill system for a fountain pen (10), the system comprising:

a fountain pen barrel (11) comprising:

a barrel body (12) including a first end (15),
an orifice being formed at the first end, and
a second end (26) that is closed;
an ink reservoir (14) disposed in the barrel
body (12), the ink reservoir (14) being ca-
pable of containing ink, and the ink reservoir
(14) being fluidly connected with the orifice;
a valve (32) disposed within the barrel body
(12) between the ink reservoir (14) and the
orifice, the valve (32) including a piston (60)
and a seat (62);
a biasing element (64) that biases the valve
(32) towards a closed position in which the
piston (60) contacts the seat (62) to prevent
from flowing out of the reservoir through the
orifice; and

a bottle (100) comprising:

a bottle body (102) having an opening (104)
at one end;
an ink refill reservoir (108) disposed within
the bottle body (102); and
a refill tube (116) disposed within the bottle
body (102), the refill tube (116) extending
at least partially through the bottle opening
(104),
wherein the valve (32) is opened and closed
by interaction with the refill tube (116).

2. The ink refill system of claim 1, further comprising a refill adapter (114) for releasably securing the fountain pen (10) to the bottle (100), the refill adapter (114) being disposed within the opening (104), the refill tube (116) extending through the refill adapter (114), wherein particularly the ink refill adapter (114) is attached to a bottle cap (112) that is releasably secured to the bottle (100) to cover the opening (104).
3. The ink refill system of claim 1 or 2, further comprising a retainer (50) disposed on the fountain pen barrel (11), the retainer (50) being adapted to cooperate with the ink refill adapter (114) to releasably secure the fountain pen barrel (11) to the bottle body (102), wherein particularly the retainer (50) includes at least one bayonet post (48) and/or the retainer (50) includes internal threads (30).
4. The ink refill system of claim 2 or 3, wherein the refill adapter (114) includes a bayonet slot (46) for receiving a bayonet (48) on the fountain pen barrel (11), wherein particularly the refill adapter (114) includes external threads that cooperate with the internal threads (30) of the retainer (50) to releasably secure the fountain pen barrel (11) to the bottle body (102).

5. The ink refill system of one of the claims 2 to 4, wherein the bottle cap (112) includes an air hole (113) for relieving pressure within the bottle body (102) during ink refill of the fountain pen barrel (11).

6. The ink refill system of one of the preceding claims, further comprising a refill tube extender (122) disposed on one end of the refill tube (116), wherein particularly the refill tube extender (122) extends through the seat (62) to move the piston (60) to an open position, away from the seat (62), when the fountain pen barrel (11) is attached to the bottle body (102).

7. An ink bottle (100) for holding liquid ink, the ink bottle (100) comprising:

a bottle body (102) having an opening (104) at one end;

a bottle cap (112) covering the opening (104) and including an air hole (113) for relieving pressure within the bottle body (102) during ink refill of the fountain pen barrel (11);

an ink refill reservoir (108) for containing ink, the ink refill reservoir (108) being formed by the bottle body (102); and

a refill tube (116) disposed within the bottle body (102), the refill tube (116) extending at least partially through the bottle opening (104)

characterized by:

a gas permeable barrier (121) disposed between the ink in the ink refill reservoir (108) and the air hole (113), wherein the gas permeable barrier 121 allows gas to pass through the air hole (113) while preventing ink from passing through the air hole (113).

8. The ink bottle (100) of claim 7, further comprising a refill adapter (114) for releasably securing a writing instrument to the bottle body (102), the refill adapter (114) being disposed within the opening (104), and the refill tube (116) extending at least partially through the refill adapter (114).

9. The ink bottle of claim 8, wherein the ink refill adapter (114) is attached to a bottle cap (112) that is releasably secured to the bottle (100) to cover the opening (104).

10. The ink bottle of claim 8 or 9, wherein the refill adapter (114) includes a bayonet slot (46).

11. The ink bottle of one of the claims 8 to 10, wherein the refill adapter (114) includes external threads.

12. The ink bottle of one of the claims 7 to 11, further comprising a refill tube extender (122) disposed on one end of the refill tube (116).

13. The ink bottle of claim 12, wherein the refill tube extender (122) extends through the refill adapter (114).

Patentansprüche

1. Tintennachfüllsystem für einen Füllfederhalter (10), wobei das System aufweist:

einen Füllfederhalterzylinder (11), aufweisend:

einen Zylinderkörper (12) mit einem ersten Ende (15), wobei am ersten Ende eine Öffnung gebildet ist, und einem zweiten Ende (26), das geschlossen ist;

einen im Zylinderkörper (12) angeordneten Tintenspeicher (14), wobei der Tintenspeicher (14) Tinte beinhalten kann und der Tintenspeicher (14) mit der Öffnung flüssigkeitsverbunden ist;

ein Ventil (32), das im Zylinderkörper (12) zwischen dem Tintenspeicher (14) und der Öffnung angeordnet ist, wobei das Ventil (32) einen Kolben (60) und einen Sitz (62) enthält;

ein Vorspannelement (64), welches das Ventil (32) zu einer geschlossenen Stellung vorspannt, in der der Kolben (60) den Sitz (62) kontaktiert, um ein Fließen aus dem Speicher durch die Öffnung zu verhindern; und

eine Flasche (100), aufweisend:

einen Flaschenkörper (102) mit einer Öffnung (104) an einem Ende;

einen im Flaschenkörper (102) angeordneten Tintennachfüllspeicher (108); und

ein im Flaschenkörper (102) angeordnetes Nachfüllrohr (116), wobei sich das Nachfüllrohr (116) zumindest teilweise durch die Flaschenöffnung (104) erstreckt,

wobei das Ventil (32) durch eine Wechselwirkung mit dem Nachfüllrohr (116) geöffnet und geschlossen wird.

2. Tintennachfüllsystem nach Anspruch 1, ferner aufweisend ein Nachfüllanschlussstück (114) zum lösbaren Befestigen des Füllfederhalters (10) an der Flasche (100), wobei das Nachfüllanschlussstück (114) in der Öffnung (104) angeordnet ist, wobei sich das Nachfüllrohr (116) durch das Nachfüllanschlussstück (114) erstreckt, wobei insbesondere das Tintennachfüllanschlussstück (114) an einem Flaschendeckel (112) angebracht ist, der lösbar an der Flasche (100) befestigt ist, um die Öffnung (104) abzudecken.

3. Tintennachfüllsystem nach Anspruch 1 oder 2, ferner aufweisend einen am Füllfederhalterzylinder (11) angeordneten Halter (50), wobei der Halter (50) angepasst ist, um mit dem Tintennachfüllanschlussstück (114) zusammenzuwirken, um den Füllfederhalterzylinder (11) lösbar am Flaschenkörper (102) zu befestigen, wobei vorzugsweise der Halter (50) wenigstens einen Bajonettpfosten (48) enthält und/oder der Halter (50) Innengewinde (30) enthält.

4. Tintennachfüllsystem nach Anspruch 2 oder 3, bei welchem das Nachfüllanschlussstück (114) einen Bajonettschlitz (46) zum Aufnehmen eines Bajonetts (48) am Füllfederhalterzylinder (11) aufweist, wobei vorzugsweise das Nachfüllanschlussstück (114) Außengewinde enthält, die mit den Innengewinden (30) des Halters (50) zusammenwirken, um den Füllfederhalterzylinder (11) lösbar am Flaschenkörper (102) zu befestigen.

5. Tintennachfüllsystem nach einem der Ansprüche 2 bis 4, bei welchem der Flaschendeckel (112) ein Luftloch (113) zur Druckentlastung im Flaschenkörper (102) während des Tintennachfüllens des Füllfederhalterzylinders (11) enthält.

6. Tintennachfüllsystem nach einem der vorhergehenden Ansprüche, ferner aufweisend einen an einem Ende des Nachfüllrohrs (116) angeordneten Nachfüllrohrverlängerer (122), wobei vorzugsweise der Nachfüllrohrverlängerer (122) sich durch den Sitz (62) erstreckt, um den Kolben (60) zu einer offenen Stellung weg vom Sitz (62) zu bewegen, wenn der Füllfederhalterzylinder (11) am Flaschenkörper (102) angebracht wird.

7. Tintenflasche (100) zum Halten von flüssiger Tinte, wobei die Tintenflasche (100) aufweist:

einen Flaschenkörper (102) mit einer Öffnung (104) an einem Ende;

einen Flaschendeckel (112), der die Öffnung (104) abdeckt und ein Luftloch (113) zur Druckentlastung im Flaschenkörper (102) während eines Tintennachfüllens eines Füllfederhalterzylinders enthält;

einen Tintennachfüllspeicher (108) zum Beinhalten von Tinte, wobei der Tintennachfüllspeicher (108) durch den Flaschenkörper (102) gebildet ist; und

ein im Flaschenkörper (102) angeordnetes Nachfüllrohr (116), wobei sich das Nachfüllrohr (116) wenigstens teilweise durch die Flaschenöffnung (104) erstreckt, **gekennzeichnet durch** eine zwischen der Tinte im Tintennachfüllspeicher (108) und dem Luftloch (113) angeordnete gasdurchlässige Barriere (121), wobei die gasdurchlässige Barriere (121) Gas durch das Luft-

loch (113) strömen lässt, während sie ein Durchströmen von Tinte durch das Luftloche (113) verhindert.

8. Tintenflasche (100) nach Anspruch 7, ferner aufweisend ein Nachfüllanschlussstück (114) zum lösba-
ren Befestigen eines Schreibinstruments am Fla-
schenkörper (102), wobei das Nachfüllanschluss-
stück (114) in der Öffnung (104) angeordnet ist und
sich das Nachfüllrohr (116) wenigstens teilweise
durch den Nachfüllanschlussstück (114) erstreckt. 5
9. Tintenflasche nach Anspruch 8, bei welcher das Tin-
tennachfüllanschlussstück (114) an einem Fla-
schendeckel (112) angebracht ist, der lösbar an der
Flasche (100) befestigt ist, um die Öffnung (104) ab-
zudecken. 10
10. Tintenflasche nach Anspruch 8 oder 9, bei welcher
das Nachfüllanschlussstück (114) einen Bajonett-
schlitz (46) enthält. 15
11. Tintenflasche nach einem der Ansprüche 8 bis 10,
bei welcher das Nachfüllanschlussstück (114) Au-
ßengewinde enthält. 20
12. Tintenflasche nach einem der Ansprüche 7 bis 11,
ferner aufweisend einen Nachfüllrohrverlängerer
(122), der an einem Ende des Nachfüllrohrs (116)
angeordnet ist. 25
13. Tintenflasche nach Anspruch 11, bei welcher sich
der Nachfüllrohrverlängerer (122) durch das Nach-
füllanschlussstück (114) erstreckt. 30

Revendications

1. Système de recharge en encre pour un stylo-plume
(10), le système comprenant : 35
- un baril de stylo-plume (11) comprenant : 40
- un corps de baril (12) incluant une première
extrémité (15), un orifice étant formé à la
première extrémité, et une deuxième extré-
mité (26) qui est fermée ; 45
- un réservoir d'encre (14) disposé dans le
corps de baril (12), le réservoir d'encre (14)
étant capable de contenir de l'encre, et le
réservoir d'encre (14) étant en communica-
tion fluïdique avec l'orifice ; 50
- une valve (32) disposée à l'intérieur du
corps de baril (12) entre le réservoir d'encre
(14) et l'orifice, la valve (32) incluant un pis-
ton (60) et un siège (62) ; 55
- un élément de sollicitation (64) qui sollicite
la valve (32) vers une position fermée dans

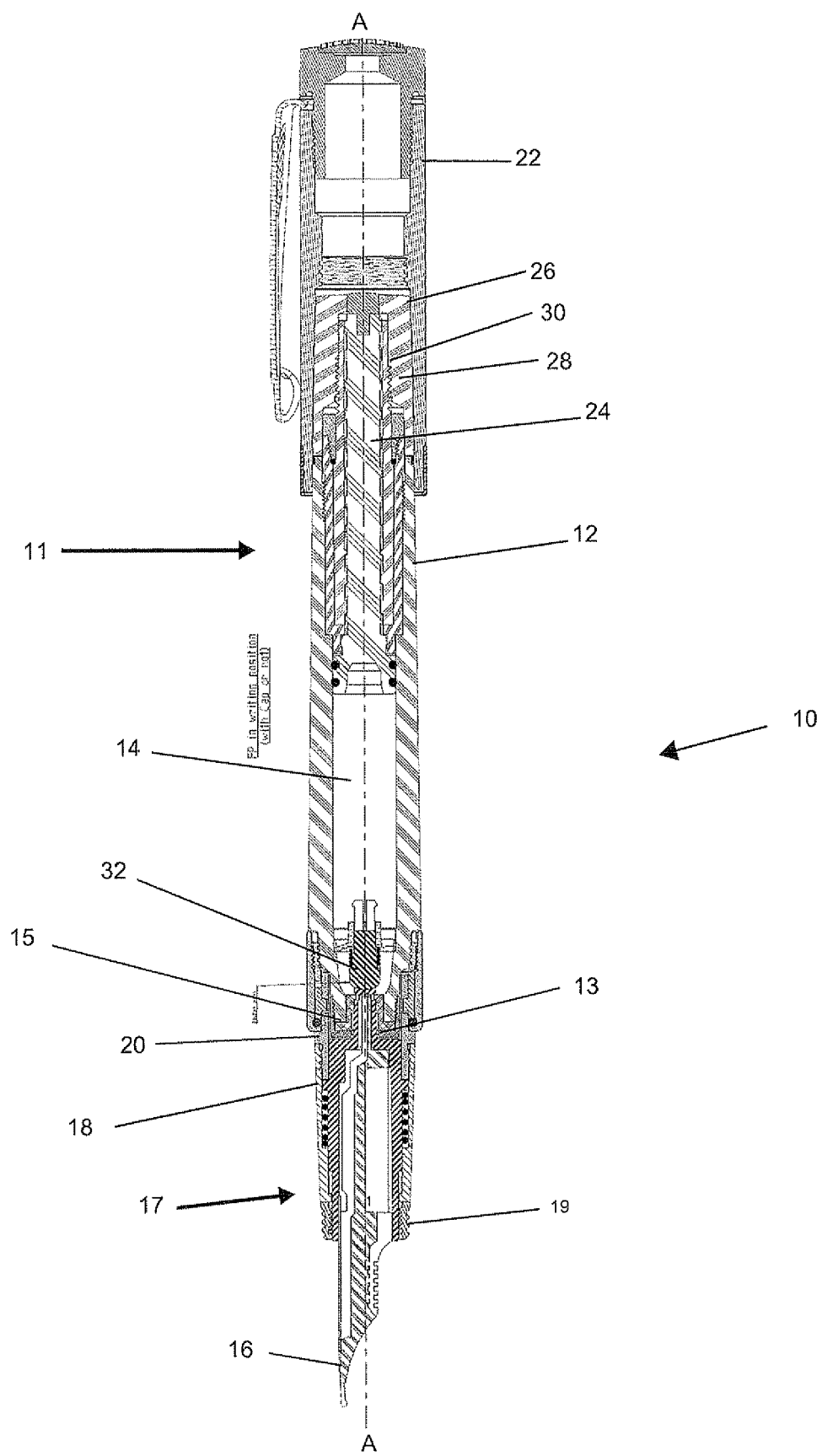
laquelle le piston (60) entre en contact avec
le siège (62) pour empêcher un écoulement
hors du réservoir à travers l'orifice ; et

une bouteille (100) comprenant :

un corps de bouteille (102) ayant une ouver-
ture (104) à une extrémité ;
un réservoir de recharge en encre (108) dis-
posé à l'intérieur du corps de bouteille
(102) ; et
un tube de recharge (116) disposé à l'inté-
rieur du corps de bouteille (102), le tube de
recharge (116) s'étendant au moins partiel-
lement à travers l'ouverture de bouteille
(104),
dans lequel la valve (32) est ouverte et fer-
mée par interaction avec le tube de rechar-
ge (116).

2. Système de recharge en encre selon la revendica-
tion 1, comprenant en outre un adaptateur de rechar-
ge (114) pour fixer de manière amovible le stylo-
plume (10) à la bouteille (100), l'adaptateur de re-
charge (114) étant disposé à l'intérieur de l'ouverture
(104), le tube de recharge (116) s'étendant à travers
l'adaptateur de recharge (114), dans lequel, en par-
ticulier, l'adaptateur de recharge en encre (114) est
fixé à un capuchon de bouteille (112) qui est fixé de
manière amovible à la bouteille (100) pour recouvrir
l'ouverture (104).
3. Système de recharge en encre selon la revendica-
tion 1 ou 2, comprenant en outre un élément de re-
tenue (50) disposé sur le baril de stylo-plume (11),
l'élément de retenue (50) étant adapté pour coopérer
avec l'adaptateur de recharge en encre (114) pour
fixer de manière amovible le baril de stylo-plume (11)
au corps de bouteille (102), dans lequel, en particu-
lier, le dispositif de retenue (50) inclut au moins une
tige de type baïonnette (48) et / ou le dispositif de
retenue (50) inclut des filetages internes (30).
4. Système de recharge en encre selon la revendica-
tion 2 ou 3, dans lequel l'adaptateur de recharge
(114) inclut une fente à baïonnette (46) pour recevoir
une baïonnette (48) sur le baril de stylo-plume (11),
dans lequel, en particulier, l'adaptateur de recharge
(114) inclut des filetages externes qui coopèrent
avec les filetages internes (30) du dispositif de rete-
nue (50) pour fixer de manière amovible le baril de
stylo-plume (11) au corps de bouteille (102).
5. Système de recharge en encre selon l'une des re-
vendications 2 à 4, dans lequel le capuchon de bou-
teille (112) inclut un trou d'air (113) pour soulager la
pression à l'intérieur du corps de bouteille (102) pen-
dant la recharge en encre du baril de stylo-plume

- (11).
6. Système de recharge en encre selon l'une des revendications précédentes, comprenant en outre un prolongateur de tube de recharge (122) disposé sur une extrémité du tube de recharge (116), dans lequel, en particulier, le prolongateur de tube de recharge (122) s'étend à travers le siège (62) pour déplacer le piston (60) vers une position ouverte, éloignée du siège (62), lorsque le baril de stylo-plume (11) est fixé au corps de bouteille (102).
7. Bouteille d'encre (100) pour contenir de l'encre liquide, la bouteille d'encre (100) comprenant :
- un corps de bouteille (102) ayant une ouverture (104) à une extrémité ;
 un capuchon de bouteille (112) recouvrant l'ouverture (104) et incluant un trou d'air (113) pour soulager la pression à l'intérieur du corps de bouteille (102) pendant la recharge en encre du baril de stylo-plume (11) ;
 un réservoir de recharge en encre (108) pour contenir de l'encre, le réservoir de recharge en encre (108) étant formé par le corps de bouteille (102) ; et
 un tube de recharge (116) disposé à l'intérieur du corps de bouteille (102), le tube de recharge (116) s'étendant au moins partiellement à travers l'ouverture de bouteille (104),
caractérisée par :
 une barrière perméable aux gaz (121) disposée entre l'encre dans le réservoir de recharge en encre (108) et le trou d'air (113), la barrière perméable aux gaz (121) permettant aux gaz de passer à travers le trou d'air (113) tout en empêchant que de l'encre passe à travers le trou d'air (113).
8. Bouteille d'encre (100) selon la revendication 7, comprenant en outre un adaptateur de recharge (114) pour fixer de manière amovible un instrument d'écriture au corps de bouteille (102), l'adaptateur de recharge (114) étant disposé à l'intérieur de l'ouverture (104), et le tube de recharge (116) s'étendant au moins partiellement à travers l'adaptateur de recharge (114).
9. Bouteille d'encre selon la revendication 8, dans laquelle l'adaptateur de recharge en encre (114) est fixé à un capuchon de bouteille (112) qui est fixé de manière amovible à la bouteille (100) pour recouvrir l'ouverture (104).
10. Bouteille d'encre selon la revendication 8 ou 9, dans laquelle l'adaptateur de recharge (114) inclut une fente à baïonnette (46).
11. Bouteille d'encre selon l'une des revendications 8 à 10, dans laquelle l'adaptateur de recharge (114) inclut des filetages externes.
12. Bouteille d'encre selon l'une des revendications 7 à 11, comprenant en outre un prolongateur de tube de recharge (122) disposé sur une extrémité du tube de recharge (116).
13. Bouteille d'encre selon la revendication 12, dans laquelle le prolongateur de tube de recharge (122) s'étend à travers l'adaptateur de recharge (114).



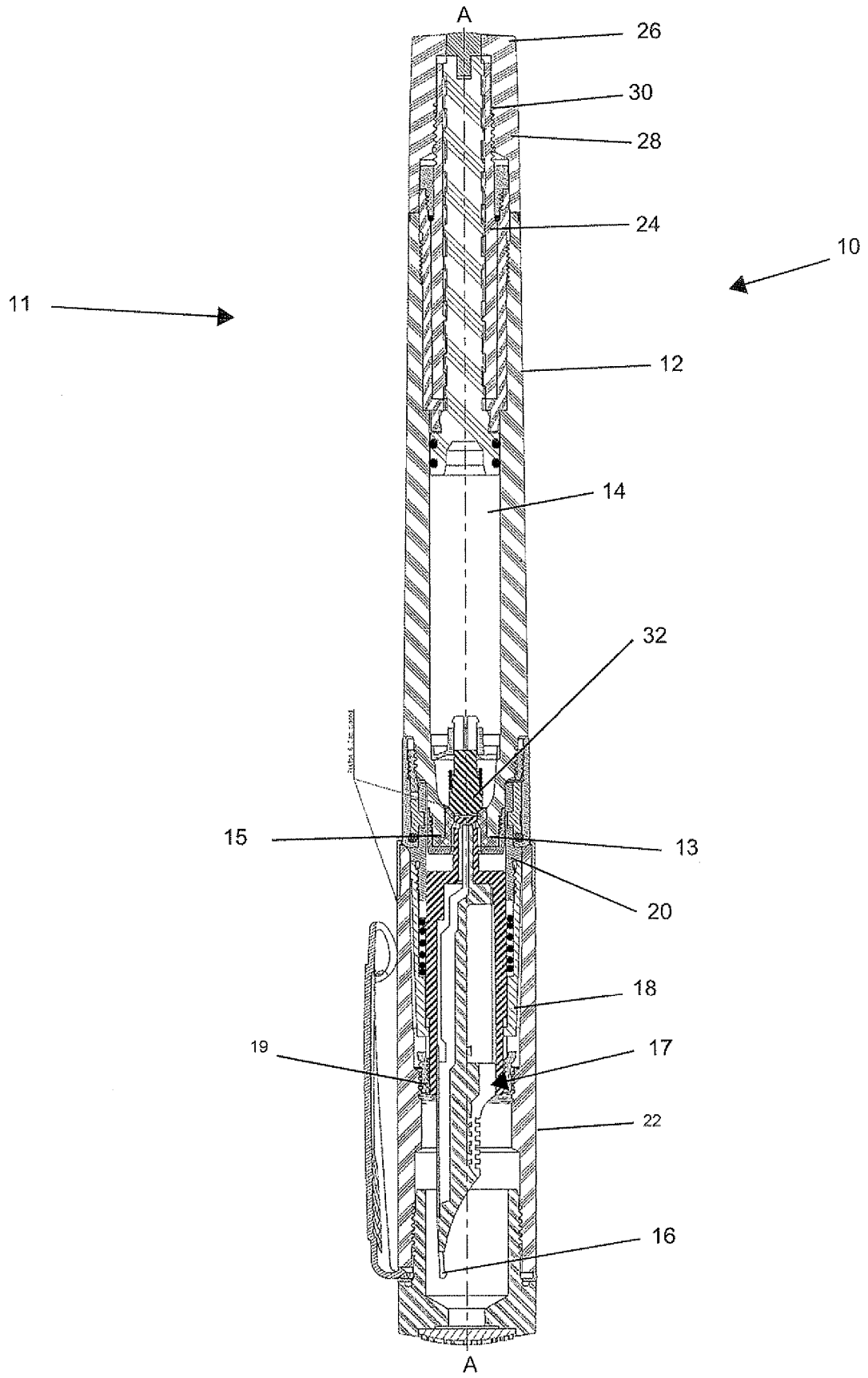


FIG. 2

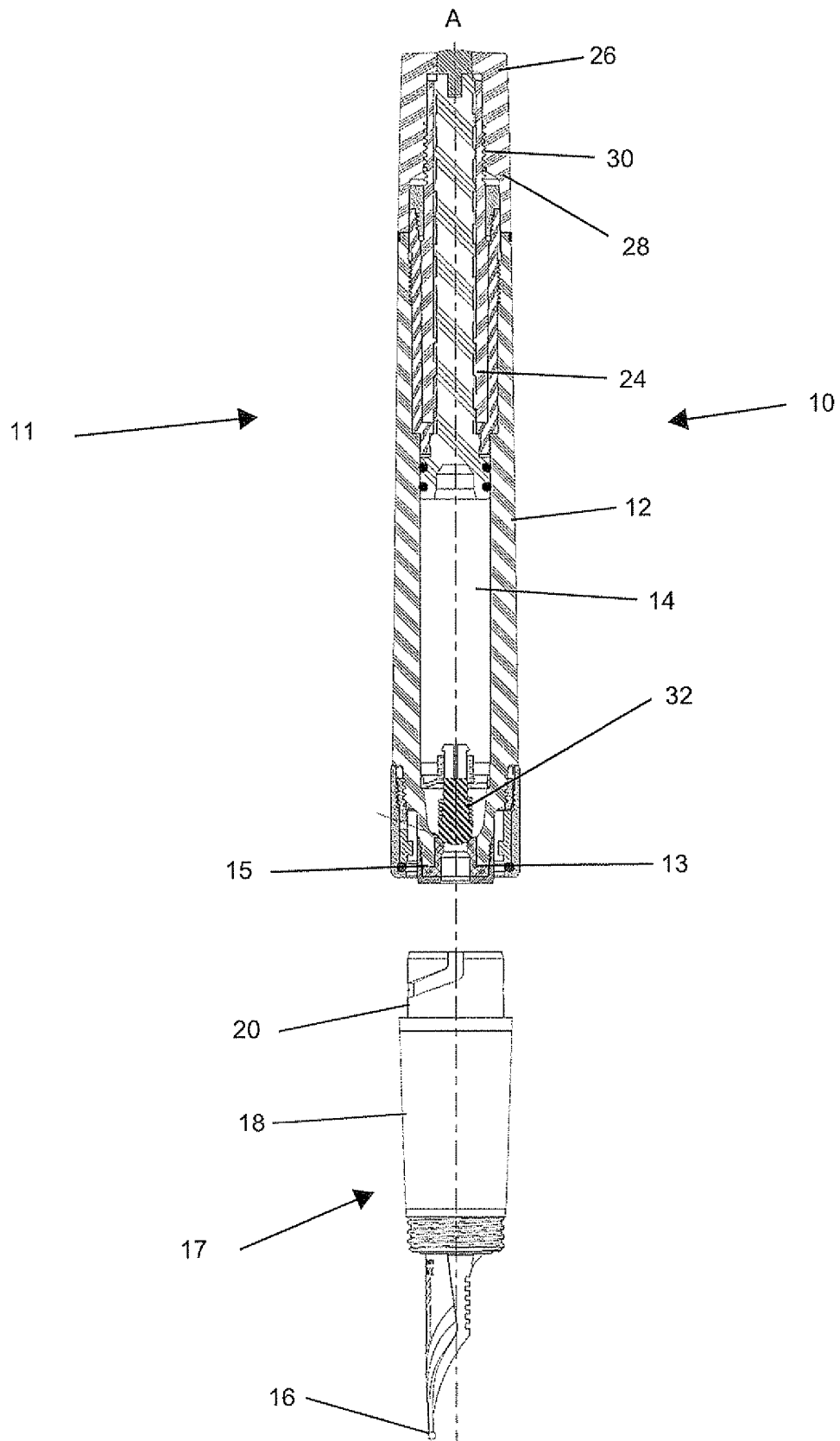


FIG. 3

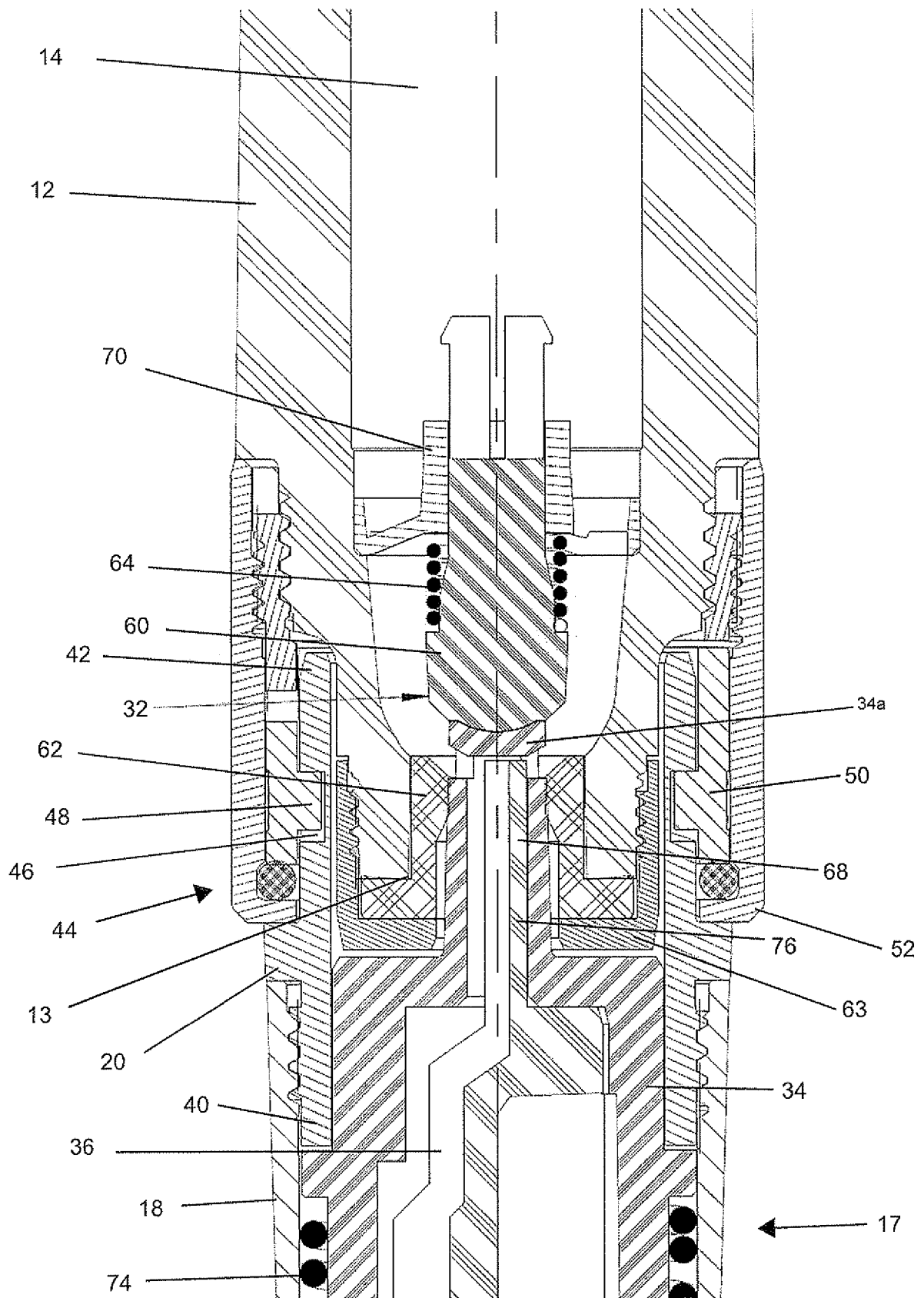


FIG. 4

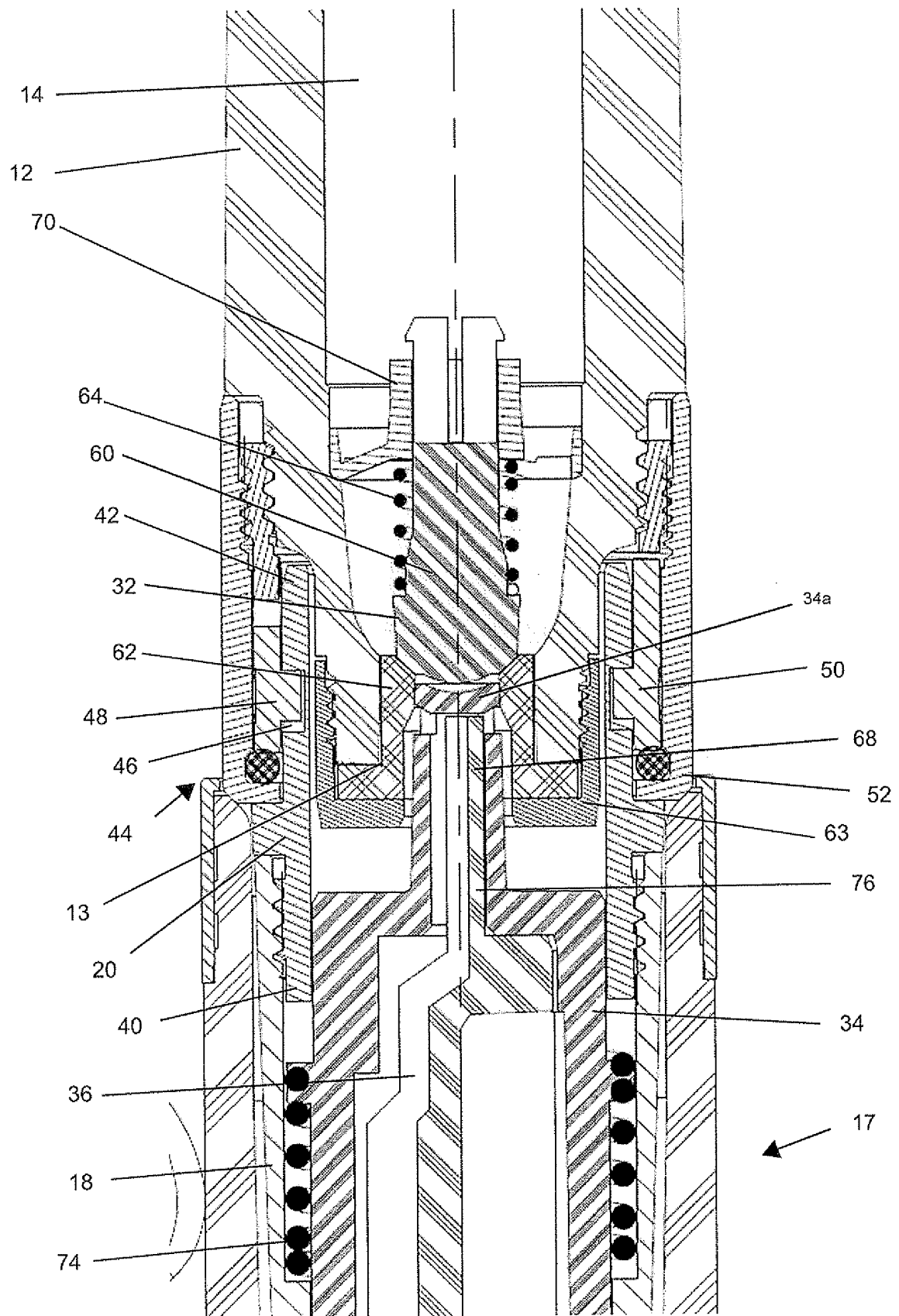


FIG. 5

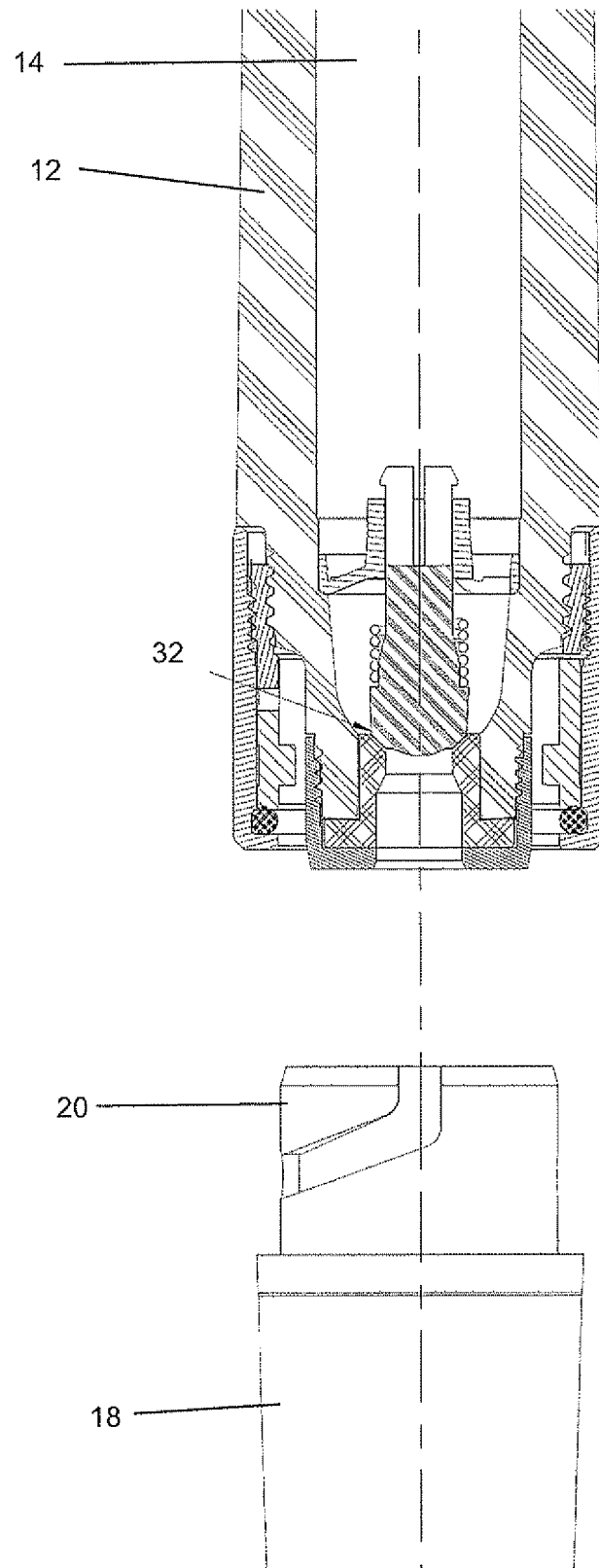


FIG. 6

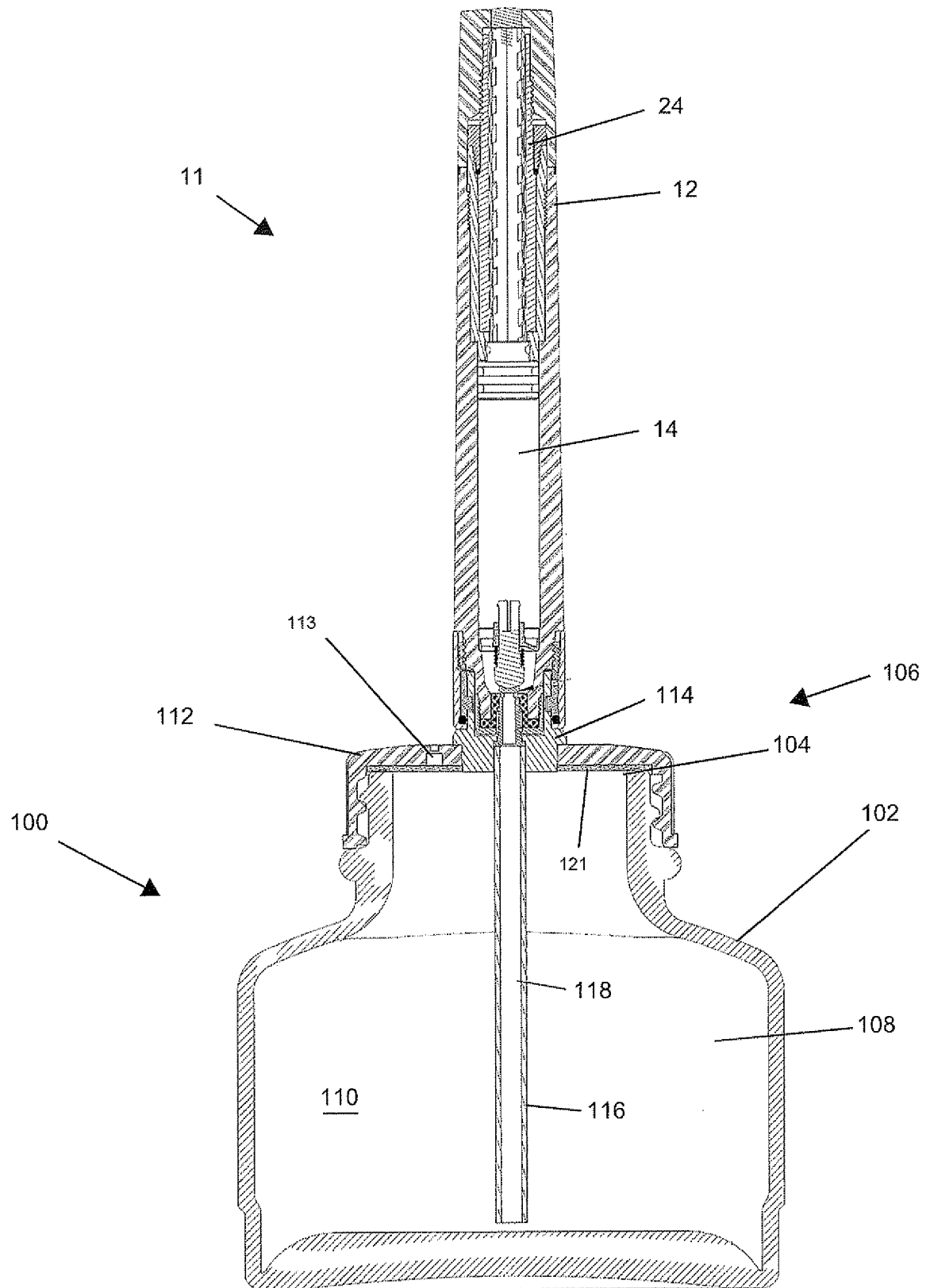


FIG. 7

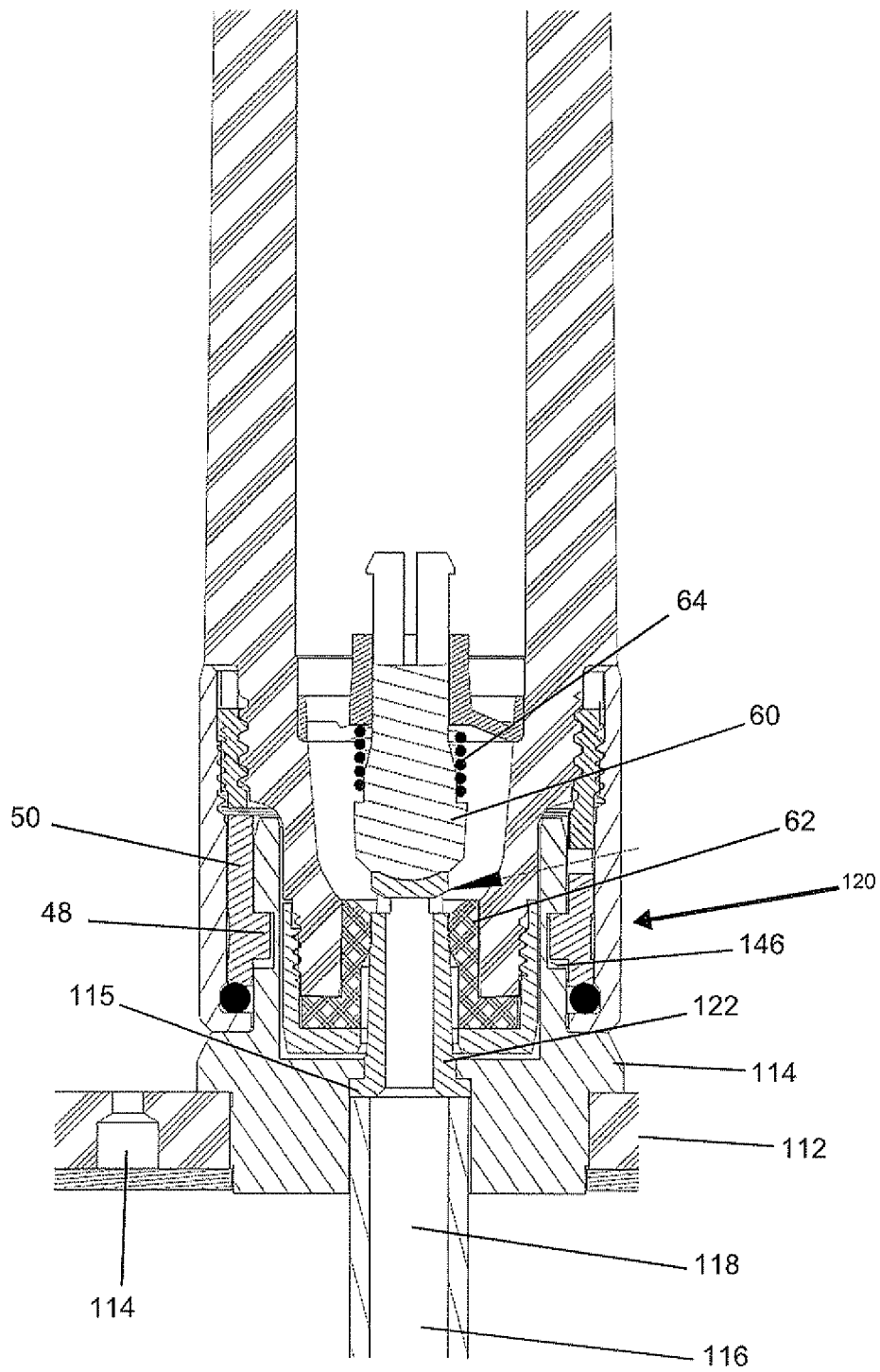


FIG. 8

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- DE 19703853 A1 **[0005]**