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Published:

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(54) **Title**: CANISTER

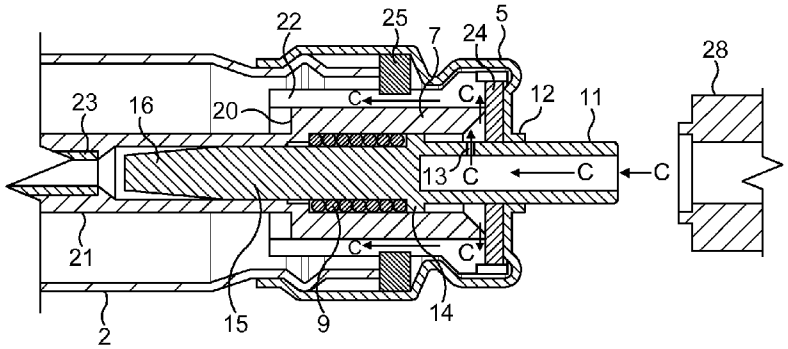

FIG. 5c

(57) **Abstract**: A canister (1) has a housing (2) closed by a crimped cap (5) and includes a metered valve (6) for dispensing a metered dose of aerosol. A seal (24) is provided between the canister and the body (7) of the metered valve (6) to prevent leakage of the pressurised fluid from within a canister around the valve. The seal is also configured to deform resiliently and admit pressurised fluid continuously into the canister when pressurised fluid is applied to the valve exteriorly of the canister. A liner (25) is disposed around the valve to seal the crimped joint between the housing and the cap, and the fluid that enters the canister can pass unobstructed along passageways (22) past the liner (25) into the housing to fill the canister with pressurised fluid, without substantially deforming the liner, so that the liner maintains a seal between the housing and the cap.

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Canister

Field of the invention

This invention relates to a canister for dispensing a metered dose of pressurised fluid, for example for producing an aerosol spray.

Background

It is known to provide a canister filled with fluid including a pressurised propellent that can provide an aerosol through a push-operated outlet valve. The canister may be filled with propellent by back-filling through the push-operated valve, for example as described in US 3827608.

It has been proposed to provide aerosol canisters with a metered valve that upon actuation, releases only a metered dose with aerosol, after which the valve needs to be released and operated a multiple times in order to release multiple metered doses.

It would be desirable to be able to re-fill a canister having a metered dose valve by back-feeding pressurised fluid through the valve in order to replenish the canister. However, the metering action of the valve prevents the canister being readily re-filled in this way on a continuous basis in a reverse direction through the valve. Hitherto, it has been proposed to provide a small canister for use in handheld aerosol delivery devices, which comprises a housing closed by a cap, with an interior metered valve for delivering aerosol from pressurised liquid within the housing. An interior liner is provided around the body of the valve to seal the join between the cap and the housing. It has been proposed to back-fill such a canister with pressurised fluid by forcing the fluid into the valve such that it passes around the exterior of the body of the valve within the canister in order to enter the housing. However, such back-filling can dislodge the liner and degrade the functionality of the canister.

Summary

An embodiment of the invention provides a canister for dispensing a metered dose of pressurised fluid which comprises a housing for containing fluid and a metered

valve within the container operable to release a metered dose of the fluid. A seal is provided between the canister and the metered valve to prevent leakage of the pressurised fluid from within a canister around the valve. The seal is also configured to deform resiliently and admit pressurised fluid continuously into the canister when pressurised fluid is applied to the valve exteriorly of the canister. In this way, the canister can be pressurised with a continuous flow of pressurised fluid from its exterior notwithstanding the metering action of the valve.

The metered valve may include a valve body including a plenum, a valve body inlet to admit pressurised fluid from the housing into the plenum, a moveable valve member in the body and a valve member outlet in the valve member for discharging the fluid from the plenum, for example to form an aerosol spray. The valve member may be moveable back and forth between a datum position in which the valve body inlet is open to the interior of the housing so that the dose of pressurised fluid is admitted into the plenum without discharge through the valve member outlet, and a discharge position in which the dose of fluid in the plenum is discharged through the valve member outlet, at which time the valve body inlet is closed by the valve member so that the metered dose can be discharged through the valve member outlet.

A canister may comprise a main body and a cap overlying an opening in the main body, with the seal being in the form of gasket disposed between the valve body and the cap to prevent leakage of the pressurised fluid from within the housing. A liner may be disposed around the valve and configured to block leakage of the pressurised fluid from within the housing between the housing and the cap.

At least one unobstructed passageway may extend past the liner so that on filling, the pressurised fluid that deforms the seal passes into the housing through the passageway past the liner. This can avoid deformation of the liner thereby avoiding any compromise of the pressure tight seal between the cap and the housng.

In order that the invention may be more fully understood an embodiment thereof will now be described by way of illustrative example with reference to the accompanying drawings.

Brief description of the drawings

Figure 1a is view of a canister from one side having a metered valve in a datum position in which the valve is unopened;

Figure 1b is a view of the canister shown in Figure 1 when the valve is in an operative position to release a metered dose of aerosol;

Figure 2 is a longitudinal sectional view of the canister shown in Figure 1a;

Figure 3 is an exploded, perspective view of the canister shown in Figures 1 and 2;

Figure 4 is an enlarged, perspective view of the body of the metered valve shown in Figures 2 and 3;

Figure 5a is an enlarged, sectional view of the metered valve in the canister in the datum position;

Figure 5b is an enlarged, sectional view of the metered valve in the canister in the operative position to release a metered dose of aerosol;

Figure 5c is a sectional view of the metered valve corresponding to Figure 5b when the canister is being filled with pressurised fluid through the stem of the metered valve;

Figure 6 is a partially broken away view in perspective of the passge of fluid through passageways on the exterior of the valve body during filling of the canister; and

Figure 7 is partial sectional view in perspective of the metered valve in the cansiter during the filling process.

Detailed description

As illustrated in Figures 1, 2 and 3, a canister 1 has a housing that includes a generally cylindrical main body 2 e.g. made of metal such as aluminium, having a closed, distal end 3 and a circular opening 4 closed by a cap 5. In use, the main body 2 contains pressurised fluid that is dispensed as an aerosol in metered doses by means of a metered valve 6. The valve 6 comprises a generally cylindrical valve body 7 that includes an interior plenum 8 that receives compression spring 9 that surrounds a longitudinally slidable valve member 10. The valve member 10 has a

tubular valve member outlet comprising valve stem 11 which protrudes through cap opening 12 disposed on the longitudinal axis of the cylindrical main body 2. A transverse outlet passageway 13 extends through the tubular body of the valve stem 11 adjacent a peripheral, circular flange 14 on the valve member to provide a path for pressurised fluid in the plenum 8 to discharge through the valve stem 11 when the valve is operated. Central region 15 of the valve member comprises an axial, solid rod of circular cross section that terminates in a tapered end region 16 formed with a longitudinally extending inlet groove 17.

The valve body 7 is generally cylindrical and includes a cylindrical main wall 18 that has a rebated front end 19 and a rear end wall 20 that couples to an inlet tube 21 which opens into the plenum 8. The compression spring 9 is received on the central region 15 of the valve member so as to be received between the flange 14 and the rear end wall 20 of the valve member within the plenum 8.

Passageways in the form of axially extending grooves 22 are formed in the outer surface of the valve body 7, extending from the front end 19 to the rear end wall 20 of the valve body 7 to facilitate continuous back filling of the container with propellant, as will be explained in more detail hereinafter.

A dip tube 23 is coupled to the inlet tube 21 of the valve body 7, the tube 23 extending towards the end 3 of the main body 2 in order to supply pressurised fluid into the plenum 8 through inlet tube 21 under the control of the moveable valve member 10.

An annular gasket seal 24 is arranged between the inner end surface of the cap 5 and the rebated front end 19 of the valve body 7. The seal 24 may be formed of rubber or similar resiliently deformable material so as to prevent pressurised fluid leaking from within the container around the valve body 7 and out of the canister through the cap opening 12.

To assemble the canister, the cap 5 is crimped onto the valve body 7 and also onto the opening 4 of the main body 2. A resiliently deformable, annular liner 25, for

example of rubber or like material is disposed around the valve body 7 between the opening 4 and the cap 5 so as to provide a seal and prevent leaks between the cap 5 and the main body 2.

In normal operation, when the canister is charged with a liquid to be aerosolised and pressurised propellent, the valve can be moved from a closed, datum position shown in Figure 5a, to an operative position shown in Figure 5b in which a metered dose of aerosol is discharged. In the datum position shown in Figure 5a, pressurised fluid from within the main body 2 passes through the dip tube 23 into the inlet tube 21 of valve body 7, so as to flow in the direction of arrows A into the plenum 8, in region 26 that also contains the spring 9. Pressurised fluid enters through the inlet groove 17 in the tapered region 16 of the valve member 10.

In the datum position, the compression spring 9 presses against the end wall 20 of the valve body 7 and the flange 14 of the valve member 10 so as to drive the flange 14 against the gasket seal 24, so that in combintion with the pressure exerted by the lquid in the canister, the valve body is pushed against the seal 24 so as to prevent pressurised liquid from leaking out of the canister. The region 26 thus fills with pressurised liquid in preparation for the dispensation of a metered dose.

When the valve stem 11 is pushed inwardly as shown in Figure 5b, the rod shaped central region of valve member 10 slides rearwardly within the inlet tube 21 so as to seal off the passage of liquid into the plenum 8 from the dip tube 23. Concurrently, the transverse opening 13 in the valve stem 11 moves inwardly of the plenum 8 so as to provide a discharge path for the pressurised fluid within the plenum into the valve stem 11, so as to be discharged as an aerosol. The discharge of the liquid to form the aerosol spray is shown by arrows B in Figure 5b, creating spray 27.

Once the metered dose has been discharged, the user releases pressure on the valve stem 11 to allow spring 9 to return the valve member 10 to the position shown in Figure 5a. In this way, the plenum 8 is replenished with fluid ready for the next metered dose discharge.

The process can continue until the pressure within the main body 2 is insufficient to form further metered dose aerosol discharges.

The canister 1 can be filled with pressurised fluid by backfilling through the valve stem 11. This is illustrated in Figure 5c in which an external source of pressurised fluid, for example from a larger reservoir, is fed into the valve stem 11 in the direction of arrows C. As shown schematically in Figure 5c, the source of pressurised fluid has a coupling 28 which in use is pressed against the valve stem 11 so as to move the valve member 10 to the operative position previously described with reference to Figure 5b. The pressurised fluid from the reservoir passes axially down the valve stem 11 and through the transverse passageway 13 into the plenum 8. Since the valve 6 is in the operative position, the central region 15 of the valve member 10 is inserted into the inlet tube 21 so as to provide a seal as previously described in relation to the metering action of the valve. Thus, the pressurised fluid from refill device 28 cannot pass into the dip tube 23 in order to refill the canister. However, the configuration of the gasket seal 24 and the rebated front end 19 of the valve body allows the pressurised fluid travelling through the passageway 13 into the plenum to deform the gasket 24 so that fluid passes in the direction of arrow C towards the outer cylindrical surface of the valve body 7 into the longitudinal passageways 22. This permits the fluid to pass along the passageways 22 into the main body 2 so as to fill the canister 1. The configuration of the passageways 22 allows the fluid to pass unobstructed past the liner 25 without causing substantial deformation of the liner. Thus, the seal provided by the liner 25 between the main housing 2 and the cap 5 is not compromised during the filling process by deformation of the liner 25.

It will be appreciated that the back-filling process described with reference to Figure 5c may be used to pressurise the canister 1 prior to its initial use or for refilling it after its initial contents have been used up.

The canister 1 may be relatively small, for example of dimensions similar to those of conventional cigarette. For example, the canister may be used to dispense a nicotine – containing aerosol spray as described in USSN 12/787,271; 12/787,257;

12/787,258 and 12/787,259 all assigned to the assignee of the present application, the contents whereof are incorporated herein by reference.

Many modifications and variations falling within the scope of the invention as claimed hereinafter will be evident to those skilled in the art in the light of the foregoing description.

Claims

1. A canister for dispensing a metered dose of pressurised fluid, comprising:

a housing for containing the pressurised fluid, comprising a main body having an opening therein;

a cap overlying the opening in the main body;

a metered valve within the container for dispensing metered doses of fluid from the housing;

a resiliently deformable seal disposed between the valve and the cap to prevent leakage of the pressurised fluid from the housing; and

a resiliently deformable liner disposed around the valve and configured to block leakage of the pressurised fluid from within the housing between the housing and the cap;

the canister being configured for filling by the introduction of pressurised fluid into the valve outlet so as to resiliently deform the seal and allow the fluid to pass between the valve body and the cap; and

at least one unobstructed passageway that extends past the liner so that on filling, the pressurised fluid that deforms the seal passes into the housing through the passageway past the liner.

2. The canister of claim 1 wherein the metered valve includes:

a valve body including a plenum,

a valve body inlet to admit pressurised fluid from the housing into the plenum,

a movable valve member in the valve body, and

a valve member outlet in the valve member for discharging the fluid from the plenum exteriorly of the housing,

the valve member being movable back and forth between a datum position in which the valve body inlet is open to the interior of the housing and a dose of pressurised fluid is admitted into the plenum without discharge through the valve member outlet, and a discharge position in which the dose of fluid in the plenum is discharged through the valve member outlet and the valve body inlet is closed by valve member, thereby to discharge a metered dose through the valve member

outlet.

3. The canister of claim 1 wherein the passageway comprises a groove in the valve body.

4. The canister of claim 2 wherein the plenum has an opening at one end adjacent the cap, and the seal is disposed between the valve body and the cap around the plenum opening to prevent leakage of the pressurised fluid from the housing.

5. The canister of claim 2 wherein the valve body includes an inlet valve seat against which the valve member sealing engages when in the discharge position to prevent pressurised fluid entering the valve body through the inlet during the discharge of the dose of fluid from the valve body through the valve outlet.

6. The canister of claim 1 including a nicotine containing fluid and a pressurised propellant.

7. The canister of claim 2 including an inlet tube connected to the valve body inlet to supply pressurized fluid from within the housing to the metered valve.

8. The canister of claim 1 wherein the cap is crimped onto the housing with the liner being retained between the cap and housing.

9. The canister of claim 1 wherein the housing has a generally cylindrical outer wall and is adapted to be received in a handheld aerosol delivery device.

10. A method of filling a canister for dispensing a metered dose of pressurised fluid, the canister comprising:

a housing for containing the pressurised fluid, comprising a main body having an opening therein;

a cap overlying the opening in the main body;

a metered valve within the container, including

a valve body,

a valve body inlet to admit pressurised fluid from the housing into the valve body,

a movable valve member in the valve body, and

a valve member outlet in the valve member for discharging the fluid from the valve,

the valve member being movable back and forth between a datum position in which a dose of pressurised fluid is admitted into the valve body inlet and a discharge position in which the dose of fluid in the body is discharged through the valve member outlet;

a first resiliently deformable seal disposed between the valve body and the cap to prevent leakage of the pressurised fluid from the housing; and

a second resiliently deformable seal disposed around the valve body and configured to block leakage of the pressurised fluid from within the housing; and

at least one unobstructed passageway that extends past the second seal,

the method including feeding pressurised fluid through the valve outlet so as to resiliently deform the first seal and allow the fluid to pass between the valve body and the cap, so as to pass into the housing through the passageway past the second seal.

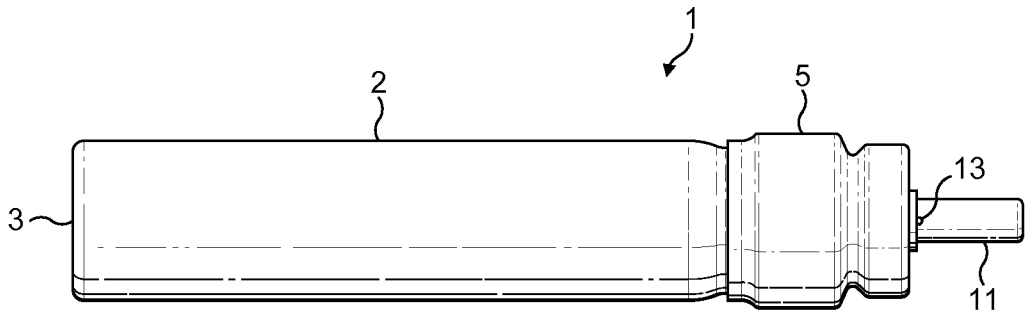


FIG. 1a

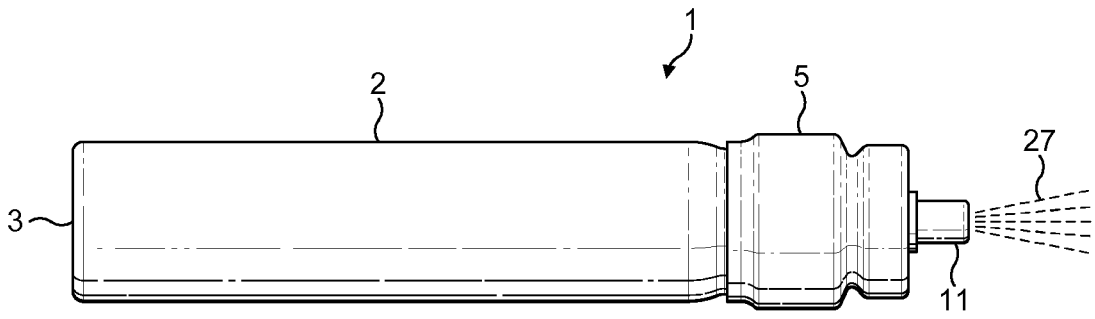


FIG. 1b

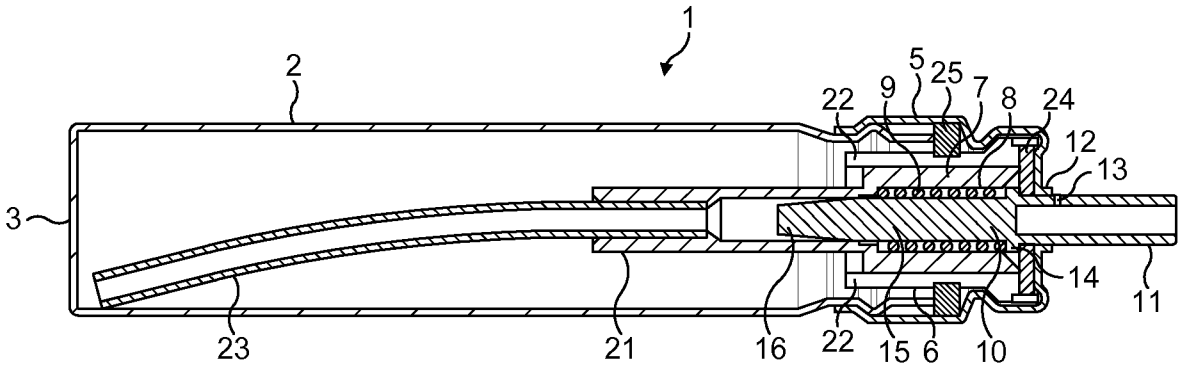


FIG. 2

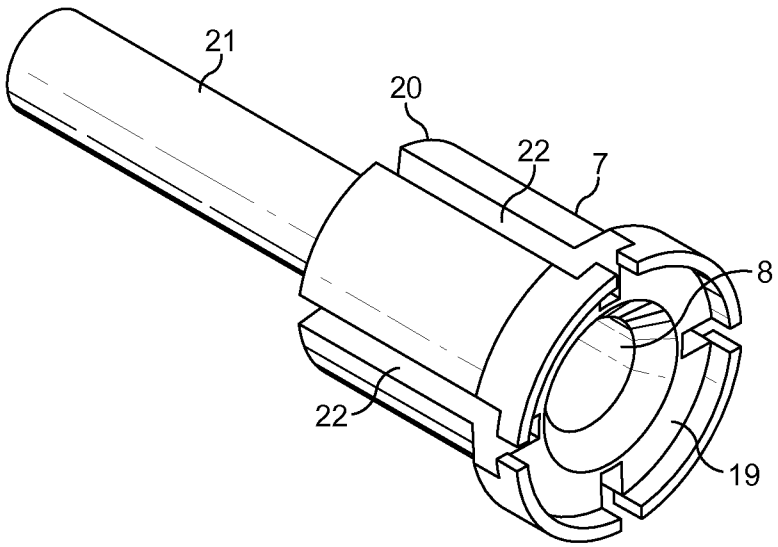
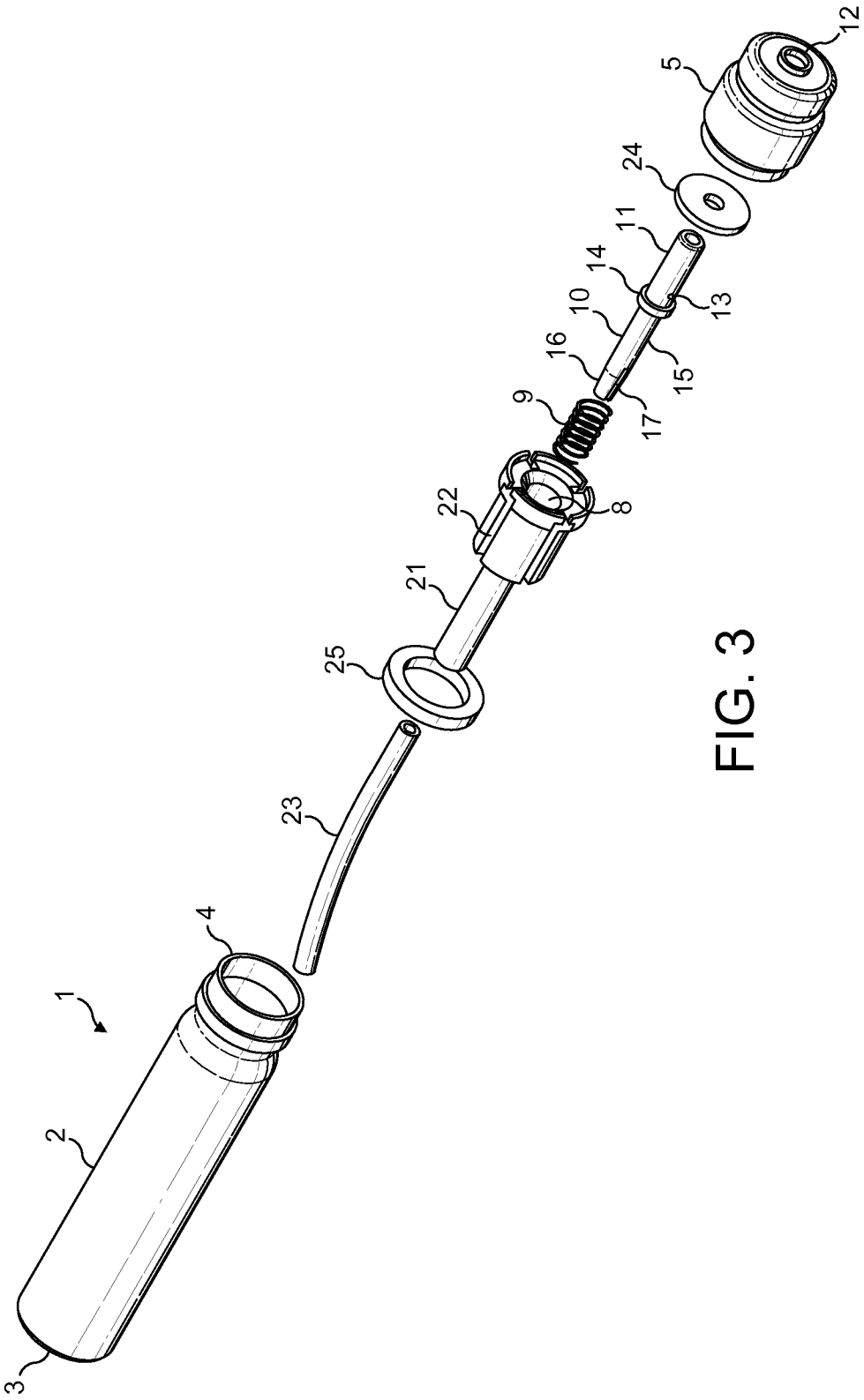


FIG. 4



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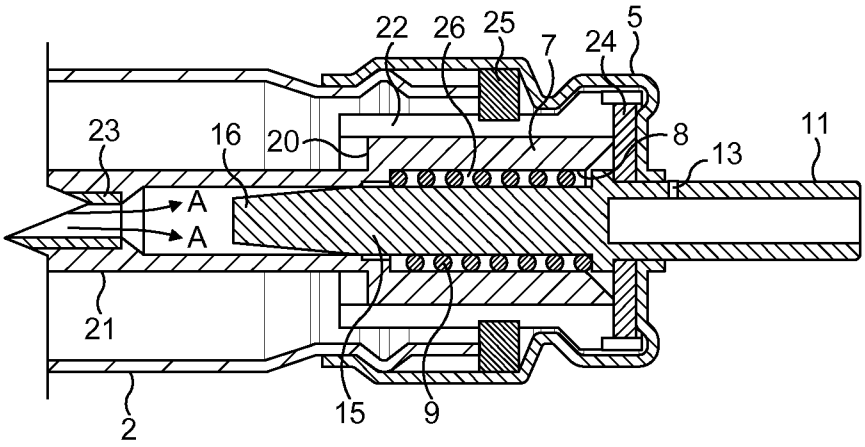
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FIG. 5a

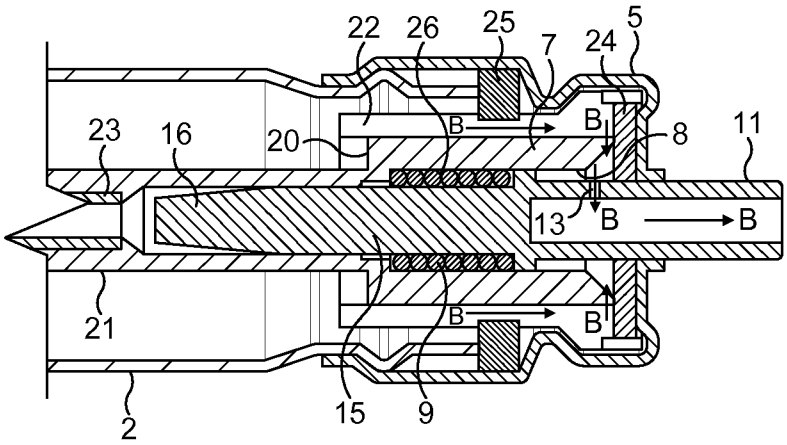
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FIG. 5b

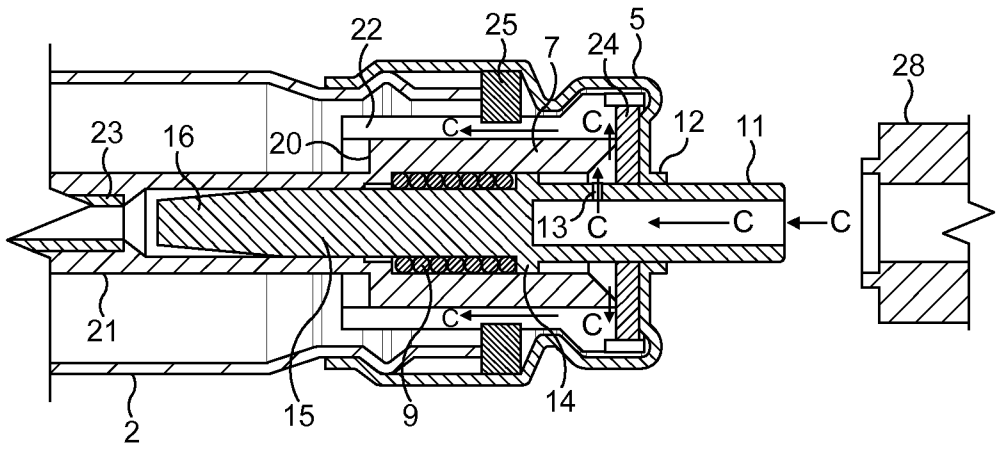
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FIG. 5c

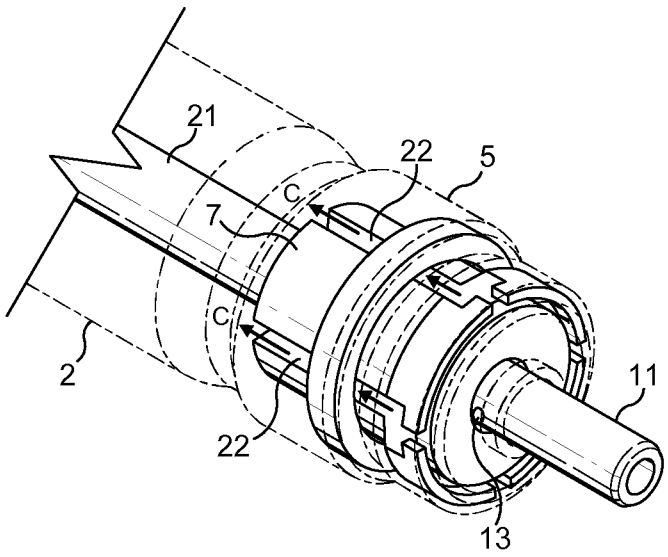
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FIG. 6

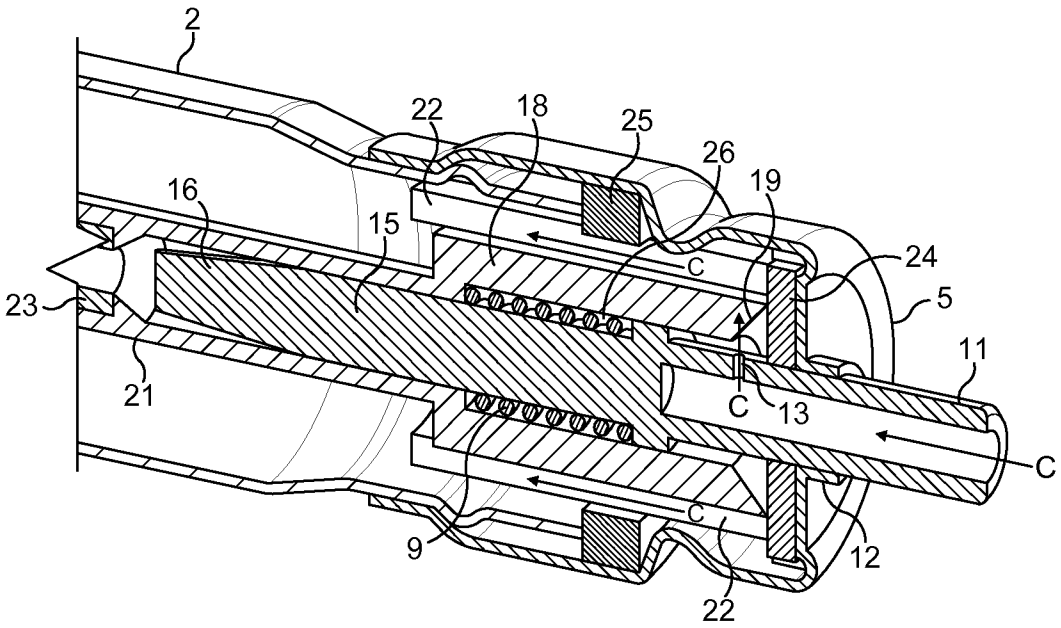

FIG. 7

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2012/060363

A. CLASSIFICATION OF SUBJECT MATTER
INV. A24F47/00 A61M15/00 B65D83/42 B65D83/54
ADD. B65B31/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A24F A61M B65D B65B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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X	GB 1 287 126 A (NEOTECHNIC ENG LTD) 31 August 1972 (1972-08-31) page 2, line 68 - line 89; figures 1,2	1-6,8-10
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A	US 4 842 168 A (BOUGAMONT JEAN-LOUIS [FR] ET AL) 27 June 1989 (1989-06-27) the whole document	1,10

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
24 August 2012	04/09/2012

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Gineste, Bertrand

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Form PCT/ISA/210 (second sheet) (April 2005)

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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