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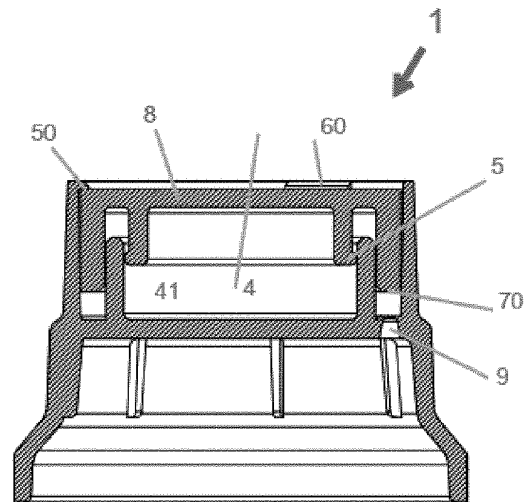
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(54) **PRESSURE CONTROL SYSTEM FOR MAINTAINING A PRE-DETERMINED CONSTANT WORKING PRESSURE IN AN SPRAY CAN**

(57) The invention provides a (spray can with) a pressure control device for maintaining a constant, predetermined working pressure in a fluid container with a dispensing head adapted, in use, for dispensing a fluid enclosed in the container at said working pressure, wherein the pressure control device comprises:  
a first cylinder having an open end and a closed end adapted to receive a stopper in a form-fitting manner, the stopper movably received in said cylinder thereby defining a reference pressure chamber,  
at least one fluid connection adapted for the passage of a propellant gas, preferably compressed air, in use,  
and a sealing element movable relative to the cylinder for releasing and sealing said fluid connection wherein, in use, the fluid connection is released when the pressure in the fluid container falls below the predetermined working pressure, propellant flows towards the dispensing head and the pressure in the fluid container rises to the operating pressure and then the fluid connection is closed by the sealing element as a result of the increased pressure in the fluid container, wherein said fluid connection is provided opposite to said closing element, so that the fluid connection can be opened and closed;  
**characterized in that** the stopper is inverted U-shaped, the stopper is inserted into the cylinder with the open end of the U-shape towards the fluid connection and the open end of the first cylinder, and wherein a stopper end of the inverted U-shaped stopper is positioned opposite the fluid connection to be able to act on the fluid connection for opening and closing.



B

Fig. 2

## Description

### TECHNICAL FIELD

**[0001]** The invention is situated in the field of rigid packaging, specifically in the field of dispensers and spray cans. The invention relates to a pressure control system for maintaining a predetermined constant working pressure in a spray can. The use of the system is advantageous.

### BACKGROUND

**[0002]** Spray cans made of metal or plastic are commonly known. They consist of a chamber for the storage of filling material. The propellant for the release of the filling material is in a separate compartment or is dispersed in the filling material. The propellant is often added to the chamber through an opening in the bottom of the spray can. A particular type of aerosols are these in which the pressure for release remains constant. To this end, the spray can includes a pressure control system for maintaining a predetermined constant pressure.

**[0003]** WO 99/62791 discloses a system based on a plunger incorporated in a chamber. The chamber wall has separation wall with a second chamber. Both chambers are connected by an opening that contains the plunger. Movement of the plunger through the orifice closes off or releases the second chamber. A supply of propellant is stored in the second chamber. Movement of the upright baffles along the inner wall of the first chamber ensures the closing off or release of a second opening through which fluid can flow for pressurizing/maintaining of filling material in the spray can in which the pressure control system is incorporated. The system has many parts and is prone to wear of the separate sealing rings.

**[0004]** WO 2005/082744 discloses an inner container for incorporation in a spray can, as a pressure control system for maintaining a predetermined constant pressure in a spray can. Pressure control includes a system with a stem movably accommodated in a second container. The movement of the stem goes from a position in which the container is opened to a position in which the container is closed.

**[0005]** EP 3186166 discloses a pressure control system with a greatly reduced number of parts. The system mainly comprises a pressure container with cylinder for receiving a stopper. Projecting edges of the stopper are provided to act on a fluid opening in a wall under which compressed air is stored. Movement of the stopper within the cylinder releases or seals the fluid opening. The compressed air is stored in a separate container within an aerosol dispenser.

**[0006]** In an alternative embodiment, a separate compartment for storage of compressed air in an aerosol dispenser is provided by a disk shape with pressure control, as described in EP 3619141. The fluid opening is outside the cylinder receiving the stopper.

**[0007]** Prior art pressure control systems for aerosols that maintain a constant predetermined operating pressure are based on a plunger-ring combination or a stopper in the form of a hat with a protruding rim. A ring-based system is prone to damage. If the ring is curled, the system will work inaccurately. A system based on a hat-shaped stopper requires a pressure chamber with (recessed) collecting basin.

**[0008]** There is a need for improvement, or at least alternatives.

**[0009]** The present invention aims to solve at least one of the problems with prior art embodiments.

### BRIEF DESCRIPTION OF THE FIGURES

#### [0010]

Figure 1 is a schematic representation of a pressure control system with a collecting basin and a stopper in which the stopper is in a hat shape and in which the fluid connection is located above the chamber for maintaining a propellant at a predetermined operating pressure.

Figure 2 is a schematic representation of a pressure control system with a collecting basin and a stopper in which the stopper is inverted U-shaped and in which the fluid connection is located below the chamber for maintaining a propellant at a predetermined operating pressure.

Figure 3 is a schematic representation of an alternative pressure control system with a collecting basin and a stopper in which the stopper is inverted U-shaped and in which the fluid connection is located below the chamber for maintaining a propellant at a predetermined operating pressure.

**[0011]** Figure 4 is a schematic representation of an additional alternative pressure control system with a collecting basin and a stopper in which the stopper is inverted U-shaped and in which the fluid connection is located under below the chamber for maintaining a propellant at a predetermined operating pressure.

**[0012]** A: loose parts; B: assembled parts, fluid connection open; C: assembled parts, fluid connection closed.

### SUMMARY OF THE INVENTION

**[0013]** The invention provides a pressure control system, synonymous with pressure control device, according to any of claims 1 to 4.

**[0014]** The invention also provides a spray can comprising a pressure control device according to an embodiment of the invention, according to claim 5.

## DETAILED DESCRIPTION OF THE INVENTION

**[0015]** Unless otherwise specified, all terms used in the description of the invention, including technical and scientific terms, shall have the meaning as they are generally understood by the worker in the technical field the present invention relates to. Furthermore, definitions of the terms have been included for a better understanding of the description of the present invention.

**[0016]** As used here, the following terms shall have the following meaning: "A", "an" and "the", as used here, refer to both the singular and the plural form unless clearly understood differently in the context. For example, "a compartment" refers to one or more than one compartment.

**[0017]** "Approximately" as used here, that refers to a measurable value such as a parameter, a quantity, a period or moment, etc., is meant to include variations of +/-20% or less, preferably +/-10% or less, more preferably +/-5% or less, still more preferably +/-1% or less, and even still more preferably +/-0.1% or less of the cited value, as far as such variations are appropriate for realizing the invention that is described. It will however be clear that the value to which the term "approximately" relates, will also be described specifically. The terms "include", "including" and "included", as used here, are synonym with "comprise", "comprising" and "comprises" and are inclusive of open terms that indicate the presence of what follows e.g. a component, and that do not exclude the presence of additional, non-said components, characteristics, elements, members, steps, that are well-known from or described in the state of the art.

**[0018]** The citation of numeric intervals by means of end points includes all integers and fractions included within that interval, including these end points.

**[0019]** The term "fluid", as used here, means a substance, such as a liquid or a gas, which can flow, does not have a solid shape and offers little resistance to an external tension. Preferably, compressed air is used.

**[0020]** The terms pressure control device and pressure control system are used as synonyms in the present description.

**[0021]** In a first aspect, the invention provides a pressure control system for an aerosol. The proposed system does not use a plunger-ring principle. The proposed system provides a solution to the problem of the possible tipping of a stopper in the shape of a hat. The proposed system is compact and reliable.

**[0022]** The invention relates to a pressure control device for maintaining a constant, predetermined working pressure in a fluid container with a dispensing head adapted, in use, for dispensing a fluid enclosed in the container at said working pressure.

**[0023]** The pressure control device comprises: a first cylinder having an open end and a closed end adapted to receive a stopper in a form-fitting manner.

**[0024]** The stopper is movably received in said cylinder defining a reference pressure chamber.

**[0025]** At least one fluid connection adapted for the passage of a propellant gas, preferably compressed air, is provided in use.

**[0026]** The pressure control device further comprises a sealing element movable relative to the cylinder for releasing and sealing said fluid connection wherein, in use, the fluid connection is released when the pressure in the fluid container falls below the predetermined working pressure, propellant flows towards the dispensing head and the pressure in the fluid container rises to the operating pressure and then the fluid connection is closed by the sealing element as a result of the increased pressure in the fluid container

**[0027]** Said fluid connection is provided opposite to said closing element, so that the fluid connection can be opened and closed.

**[0028]** The closing element is preferably provided with a protrusion to act on said fluid connection, more in particular opening and closing the fluid connection. Said protrusion preferably has a height H2 of 0.1-2.0 mm, more preferably a height H2 of 0.2-1.8 mm, more preferably 0.3-1.6 mm, most preferably 0.4-1.4 mm.

**[0029]** A pressure control device according to the invention is characterized in that the stopper is inverted U-shaped, the stopper is inserted into the cylinder with the open end of the U-shape towards the fluid connection and the open end of the first cylinder, and in which a stopper end of the inverted U-shaped stopper is positioned opposite the fluid connection to be able to act on the fluid connection for opening and closing.

**[0030]** Preferably, a clearance is sufficient between the stopper and a cylinder wall to allow propellant gas to flow from the open fluid connection towards the dispensing head.

**[0031]** In a preferred embodiment, the stopper is produced using a two-component injection moulding process, where a small amount of sealing polymer such as silicone or NBR is injected very locally and where sealing is required.

**[0032]** In a preferred embodiment, the sealing element for the fluid connection lies below the reference pressure chamber.

**[0033]** More preferably, the sealing element for the fluid connection is located below the reference pressure chamber.

**[0034]** The pressure control device can be designed as a disk without a pressure container, or with a pressure container.

**[0035]** The disk may be made by injection moulding. The fluid connection can be made afterwards, for example by drilling one or more holes through the disk wall. If desired, the mould can be provided for injection moulding to directly produce a disk with one or more holes. Preferably, the injection mould is made from a plastic composition based on polyethylene terephthalate (PET). Reinforcement agents such as glass fibres or impact modifiers, are added to the composition as needed.

**[0036]** The pressure control system according to an

embodiment of the invention preferably comprises a second cylinder, concentric to the first cylinder, and wherein the stopper end is positioned between walls of the first and second cylinders.

**[0037]** The length of the stopper end is adjusted to reach up to and close the fluid connection, in use.

**[0038]** The second cylinder (41) preferably has an open and closed end.

**[0039]** In the pressure control system according to an embodiment of the invention, the stopper is preferably provided with a first cylinder having open and closed ends, wherein the open end of the first stopper cylinder is directed toward the open end of the first cylinder and the walls of the first stopper cylinder are form-fittingly and movably incorporated between the first cylinder and the second cylinder.

**[0040]** Preferably, the stopper is provided with a second cylinder, preferably having an open and closed end, concentric to the first cylinder of the stopper, wherein the open end of the second cylinder of the stopper is directed toward the open end of the first cylinder and the walls of the second cylinder of the stopper are form-fittingly and movably incorporated into the second cylinder.

**[0041]** In a second aspect, the invention provides an aerosol can comprising a pressure control device according to an embodiment of the invention. The aerosol is designed for dispensing a filling material under constant, predetermined working pressure. The aerosol comprises a container for receiving filling material, a dispensing head and a pressure control device accommodated in the container.

**[0042]** In the aerosol, the pressure control device provides a separation between a compartment for filling material and a compartment for propellant, preferably compressed air. The pressure control device is a pressure control device according to an embodiment of the invention.

**[0043]** Preferably, said aerosol container is a metal container or a plastic container, more preferably a PET container, most preferably a PET container obtained with injection-stretch-blowing (ISBM).

**[0044]** Alternatively, the aerosol container may be made of other biaxially stretchable plastics, such as polyethylene naphthalate (PEN), polyethylene coisobutylene terephthalate (PEIT), polytrimethylene furanedicarboxylate (PTF), high-density polyethylene (HDPE), polypropylene (PP), polyamides, polystyrene, polyvinyl chloride (PVC), cyclic olefin polymer (COC), or a combination thereof.

**[0045]** In another embodiment, the container could be made by an extrusion process. In this case, a pipe section is extruded and cut/sealed to the desired length. This has the advantage that no residual material is cut off, unlike cutting the bottom of containers produced by an ISBM process. This cutting-off of the bottom is waste that is expensive. If the container tube is produced by extrusion, a separate additional part must be added for sealing.

**[0046]** Aerosols with a pressure control device accord-

ing to an embodiment of the invention can be used for storage and distribution of consumer goods such as shaving cream, sun cream; or foodstuff such as oil or sauces such as ketchup.

**[0047]** A method for manufacturing an aerosol can comprising a pressure control device according to an embodiment of the invention comprises the steps:

10 providing a pressure control device according to an embodiment of the invention,  
attaching the pressure control device to the wall of a fluid container.

**[0048]** Preferably, the method for manufacturing an aerosol can designed for dispensing a filling material under a constant predetermined working pressure according to an embodiment of the invention comprises the steps:

20 - providing a pressure control device according to an embodiment of the invention, incorporating the pressure control device in a fluid container, and attaching the pressure control device to an inner wall of the fluid container.

**[0049]** Preferably, the pressure control device is attached by welding, more preferably by laser welding. For this purpose, carbon black, also referred to as carbon black, can be provided. The positioning of the disk pressure control device prior to fastening defines the volume desired for propellant storage.

**[0050]** The pressure control device is preferably positioned as low as possible in an aerosol can. This is advantageous against the aerosol tipping over because the centre of gravity is lower. In a preferred embodiment, the volume of the propellant supply chamber is less than required to empty the aerosol can without replenishing propellant. It is advantageous to design the aerosol can as refillable with propellant.

**[0051]** In a preferred embodiment, the aerosol can is filled with filling material, and transported to the end user without any propellant. Then, the end user fills the aerosol can with propellant gas. This can be performed with a mobile filling device. For filling, the aerosol can can be provided at the bottom with a plug compatible with the mobile filling device.

**[0052]** The invention is further illustrated by means of examples. The examples are nonlimiting.

## 50 EXAMPLES

**[0053]** Legend for the figures:

1 pressure control device  
55 4 reference pressure chamber  
5 thickening, closing element  
8 stopper  
9 fluid connection

20	first cylinder hat
30	second cylinder hat
40	cylinder
41	second cylinder
45	a cylinder wall
50	clearance
60	undercut
70	stopper end, leg
80	stopper in hat shape
90	fluid connection
100	reference pressure chamber
110	recessed cylinder
160	undercut
170	closing element reference chamber
180	element for sealing fluid connection
400	cylinder
445	wall
1000	pressure control system

**[0054] Example 1**, with reference to **Figure 1**, relates to a pressure control system 1000 in which the stopper is in hat shape 80 and the fluid connection 90 is located above the chamber for maintaining a propellant under a predetermined working pressure 100, after receiving the system in a fluid container. Fig. 1 A: loose parts; Fig. 1 B: assembled parts, fluid connection open; Fig. 1 C: assembled parts, fluid connection closed.

**[0055]** The part with fluid connection 90 has a recessed cylinder 110 for receiving the hat shaped stopper 80. The rim of the hat shape 180 is used to act on the fluid connection 90. A rim 170 is provided at the bottom of the stopper 170 to seal the reference pressure chamber 100. The movement of the stopper 80 is restricted by an undercut 160 in the open end of a wall located at the top of the cylinder 100. The wall controls the hat rim. Tilting of the stopper 80 is prevented.

**[0056] Example 2**, with reference to **Figure 2**, relates to a schematic representation of a pressure control system in which the stopper is inverted U-shaped and in which the fluid connection is located below the chamber for maintaining a propellant under a predetermined working pressure. In Fig. 2 A, the individual parts are shown. In Fig. 2 B, the assembled pressure control device with an open fluid connection is provided. In Fig. 2 C, the assembled pressure control device is depicted with the fluid connection closed.

**[0057]** The pressure control system 1 uses an inverted U-shaped stopper 8 and a cylinder part 40 for receiving the stopper 8. An undercut 60 is provided in the opening at the top of the cylinder 40. After taking up the stopper 8, the undercut 60 ensures that the stopper will not shear out of the part when it is under pressure in use and compressed air pushes the stopper up. The part also has a second cylinder 41 which, together with the first cylinder 40, provides guidance for the legs of the inverted U-shaped stopper 8. This ensures good positioning and guidance of the stopper 8. The proposed system is compact and reliable.

**[0058]** The inverted U-shaped stopper 8 has its opening directed towards the open end of cylinders 40 and 41 and is placed in the slots formed between the two concentric cylinders. An end 70 of one of the legs of the U-shape, viewed in cross-section, is used as a sealant to act on the fluid compound 9. In the open position, the stopper 8 sits below the edges of the undercut 60. In the closed position, the stopper sits against the fluid connection 9 and the connection is closed. In operative condition, no gas can flow through the fluid connection towards the dispensing head of the aerosol dispenser.

**[0059]** The heights of the walls in the smallest diameter cylinder 41 are matched to the height of the legs in the inverted U-shaped stopper 8 so that it can close the fluid connection.

**[0060]** In the illustrated embodiment, the U-shaped stopper includes a cylinder having a closed end in the bottom of the U-shape and an open end at the opposite end of the cylinder. At the open end there is a thickened rim 5. This rim is provided to seal the open end of the smallest diameter cylinder 41 in the disk with fluid connection 9 upon assembly. Hereby the reference pressure chamber 4 is formed. The volume of chamber 4 determines the working pressure with which the aerosol will operate in operative condition.

**[0061] Example 3**, with reference to **Figure 3**, relates to an alternative pressure control system in which the stopper is inverted U-shaped and in which the fluid connection is located below the chamber for maintaining a propellant under a predetermined working pressure. In Fig. 3 A, the individual parts are shown. In Fig. 3 B, the assembled pressure control device 1' with an open fluid connection 9' is provided. In Fig. 3 C, the assembled pressure control device 1' is depicted with the fluid connection 9' closed.

**[0062]** The pressure control device 1' comprises: a cylinder 40' having an open end and a closed end adapted to receive the stopper 8' in a form-fitting manner.

**[0063]** The stopper 8' is movably received in said cylinder 40' defining a reference pressure chamber 4'.

**[0064]** At least one fluid connection 9' adapted for the passage of a propellant gas, preferably compressed air, is provided in use.

**[0065]** The pressure control device 1' further comprises a sealing element 70' movable relative to the cylinder 41' for releasing and sealing said fluid connection 9' wherein, in use, the fluid connection 9' is released when the pressure in the fluid container (not shown) falls below the predetermined working pressure, propellant flows towards the dispensing head (not shown) and the pressure in the fluid container rises to the operating pressure and then the fluid connection 9' is closed by the sealing element 70' as a result of the increased pressure in the fluid container. 9'

**[0066]** Said fluid connection 9' is provided opposite to said closing element 70', so that the fluid connection can be opened and closed.

**[0067]** The stopper 8' is inverted U-shaped. When as-

sembled, the stopper 8' is inserted into cylinders 40' and 41' with the open end of the U-shape towards fluid connection 9'. The stopper end 70' of the U-shaped stopper is positioned opposite the fluid connection 9' to act on the fluid connection for opening or closing.

**[0068]** Preferably, between the stopper 8' and a cylinder wall 45' of the cylinder 40' a clearance 50' is sufficient to allow propellant gas to flow from the open fluid connection towards the dispensing head.

**[0069]** With the pressure control device 1', a constant predetermined working pressure can be maintained in an aerosol can containing the system.

**[0070]** **Example 4**, with reference to **Figure 4**, relates to an additional alternative pressure control system in which the stopper 8" is inverted U-shaped and in which the fluid connection 9" is located below the chamber for maintaining a propellant under a predetermined working pressure.

**[0071]** The pressure control device 1" comprises: a first cylinder 40" having an open end and a closed end adapted to receive a stopper 8" in a form-fitting manner. The pressure control device further comprises a second cylinder 41" with an open end and a closed end, concentric with the first cylinder 40".

**[0072]** The stopper 8" is movably receivable (Fig. 4. A)/received (Fig. 4 B and C) in said cylinders 40" and 41" thereby defining a reference pressure chamber 41". To seal the reference pressure chamber, a thickened edge 5" is provided at the open end of the stopper 8". The thickened rim is on the inside of the stopper 8" and slides over the rim of a cylinder 41" with a smaller diameter than cylinder 40". A stem is provided in the centre of the stopper 8". This is inserted into the cylinder with smallest diameter 41". When the stem is inserted into the cylinder 41" of smallest diameter, the reference pressure chamber 41" is formed. The dimensions of the stopper 8" and cylinder walls are matched to each other for proper operation of the pressure control device 1".

**[0073]** At least one fluid connection 9" adapted for the passage of a propellant gas, preferably compressed air, is provided in use. The fluid connection is in line with the wall at the bottom of reference pressure chamber 41".

**[0074]** The pressure control device 1" further comprises a sealing element 70" movable relative to the cylinder 41" for releasing and sealing said fluid connection 9" wherein, in use, the fluid connection 9" is released when the pressure in the fluid container (not shown) falls below the predetermined working pressure, propellant flows towards the dispensing head (not shown) and the pressure in the fluid container rises to the operating pressure and then the fluid connection 9" is closed by the sealing element 70" as a result of the increased pressure in the fluid container

**[0075]** Said fluid connection 9" is provided opposite to said closing element 70", so that the fluid connection can be opened and closed.

**[0076]** The stopper 8" is inverted U-shaped. When assembled, the stopper 8" is inserted into cylinder 40" with

the open end of the U-shape towards fluid connection 9" (Fig. 4 A). The stopper end 70" of the U-shaped stopper is positioned opposite the fluid connection 9" to act on the fluid connection for opening (Fig. 4 B) or closing (Fig. 4C).

**[0077]** Preferably, between the stopper 8" and a cylinder wall 45" a clearance 50" is sufficient to allow propellant gas to flow from the open fluid connection 9" towards the dispensing head.

**[0078]** With the pressure control device 1", a constant predetermined working pressure can be maintained in an aerosol can.

#### Example 5

**[0079]** In the examples 1-4, the pressure control device is shown as a disk, without a container for storage of propellant. Alternatively, a pressurized container can be provided, beneath the fluid connection for propellant storage.

#### Claims

1. A pressure control device (1) for maintaining a constant, predetermined working pressure in a fluid container (not shown) with a dispensing head adapted for dispensing a fluid enclosed in the container at said working pressure in use, wherein the pressure control device (1) comprises:

a first cylinder having (40) an open end and a closed end adapted to receive a stopper (8) in a form-fitting manner,

the stopper (8) movably received in said cylinder (40) defining a reference pressure chamber (4), at least one fluid connection (9) adapted for the passage of a propellant gas, preferably compressed air in use,

and a sealing element (70) movable relative to the cylinder (40) for releasing and sealing said fluid connection (9) wherein, in use, the fluid connection (9) is released when the pressure in the fluid container falls below the predetermined working pressure, propellant flows towards the dispensing head and the pressure in the fluid container (not shown) rises to the operating pressure and

then the fluid connection (9) is closed by the sealing element (70) as a result of the increased pressure in the fluid container,

wherein said fluid connection (9) is provided opposite to said closing element (70), so that the fluid connection (9) can be opened and closed;

**characterized in that** the stopper (8) is inverted U-shaped, the stopper (8) is inserted into the cylinder (40) with the open end of the inverted U-shape towards the fluid connection (9) and

the open end of the first cylinder (40), and in which a stopper end (70) of the inverted U-shaped stopper (8) is positioned opposite the fluid connection (9) to be able to act on the fluid connection (9) for opening and closing.

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ner wall of the fluid container.

2. The pressure control system (1) according to claim 1, wherein the pressure control system comprises a second cylinder (41), concentric to the first cylinder (40), and wherein the stopper end (70) is positioned between walls of the first (40) and second (41) cylinders. 10
3. The pressure control system (1) according to claim 2, wherein the second cylinder (41) has an open and a closed end. 15
4. The pressure control system (1) according to claim 2 or 3, wherein the stopper (8) is provided with a first cylinder (20) with open and closed end, wherein the open end of the first stopper cylinder (20) is directed toward the open end of the first cylinder (40) and the walls of the first stopper cylinder (20) are form-fittingly and movably incorporated between the first cylinder (40) and the second cylinder (41). 20 25
5. The pressure control system (1) according to any of claims 2 to 4, wherein the stopper (8) is provided with a second cylinder (30), preferably having an open and closed end, concentric to the first cylinder (20) of the stopper (8), wherein the open end of the second cylinder (30) of the stopper (8) is directed toward the open end of the first cylinder (40) and the walls of the second cylinder (30) of the stopper (8) are form-fittingly and movably incorporated into the second cylinder (41). 30 35
6. Spray can designed for dispensing a filling material at a constant predetermined working pressure, comprising a container for receiving a filling material with a dispensing head and further comprising a pressure control system incorporated in the container, wherein the pressure control device in the aerosol dispenser provides a separation between a compartment for filling material and a compartment for propellant gas, preferably compressed air, comprising a pressure control system (1) according to any of claims 1 to 5. 40 45
7. A method for manufacturing a spray can designed for dispensing a filling material under constant predetermined working pressure according to claim 6, comprising the steps: 50
  - providing a pressure control device according to any of claims 1 to 5, 55
  - incorporating the pressure control device in a fluid container,
  - attaching the pressure control device to an in-

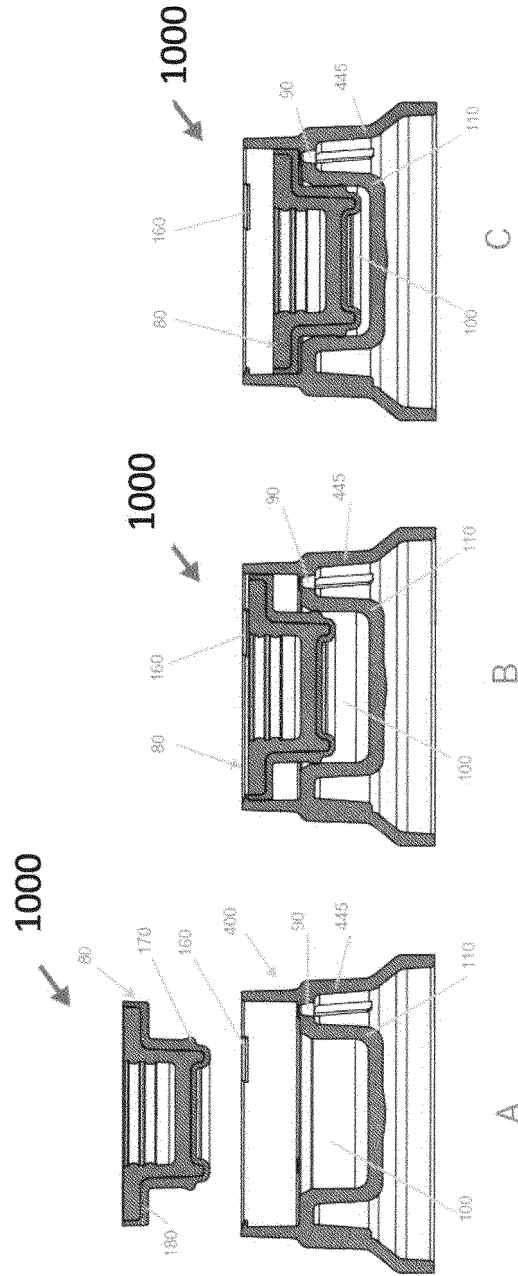


Fig. 1

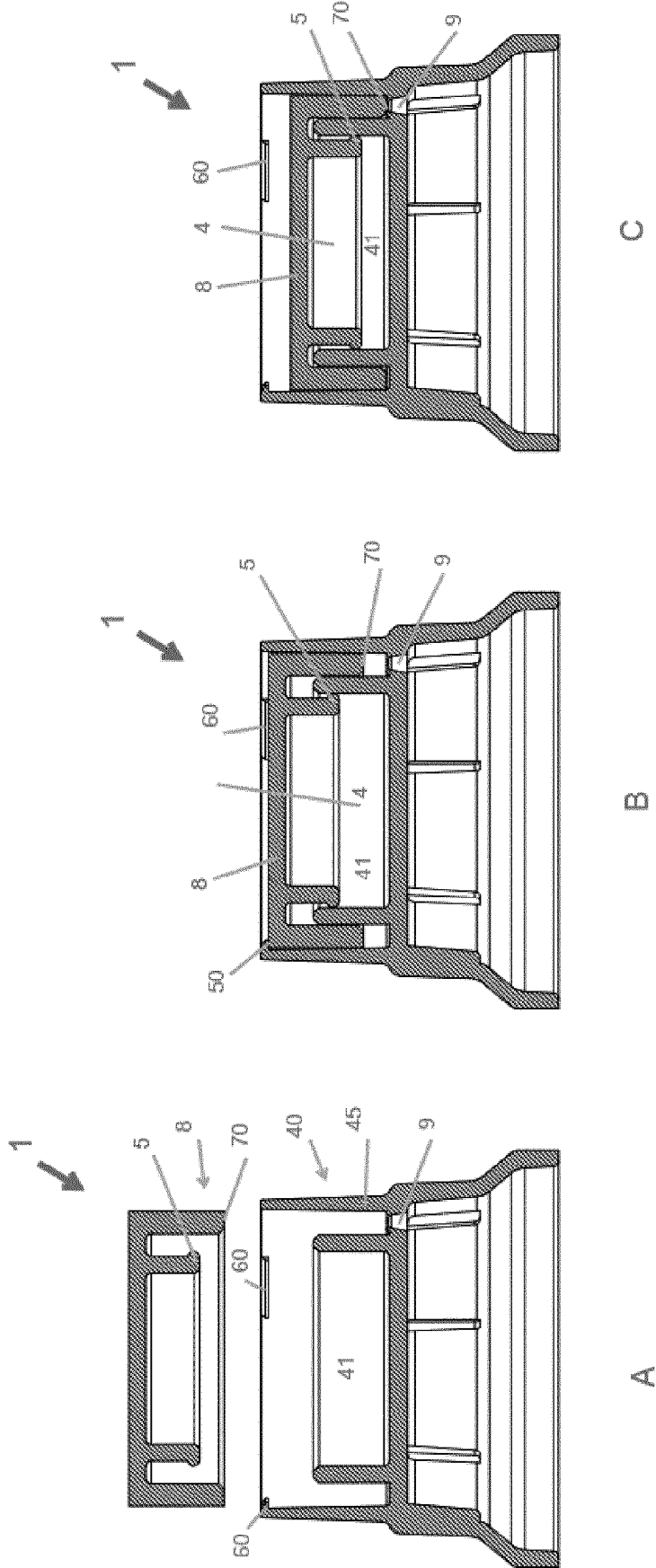


Fig. 2

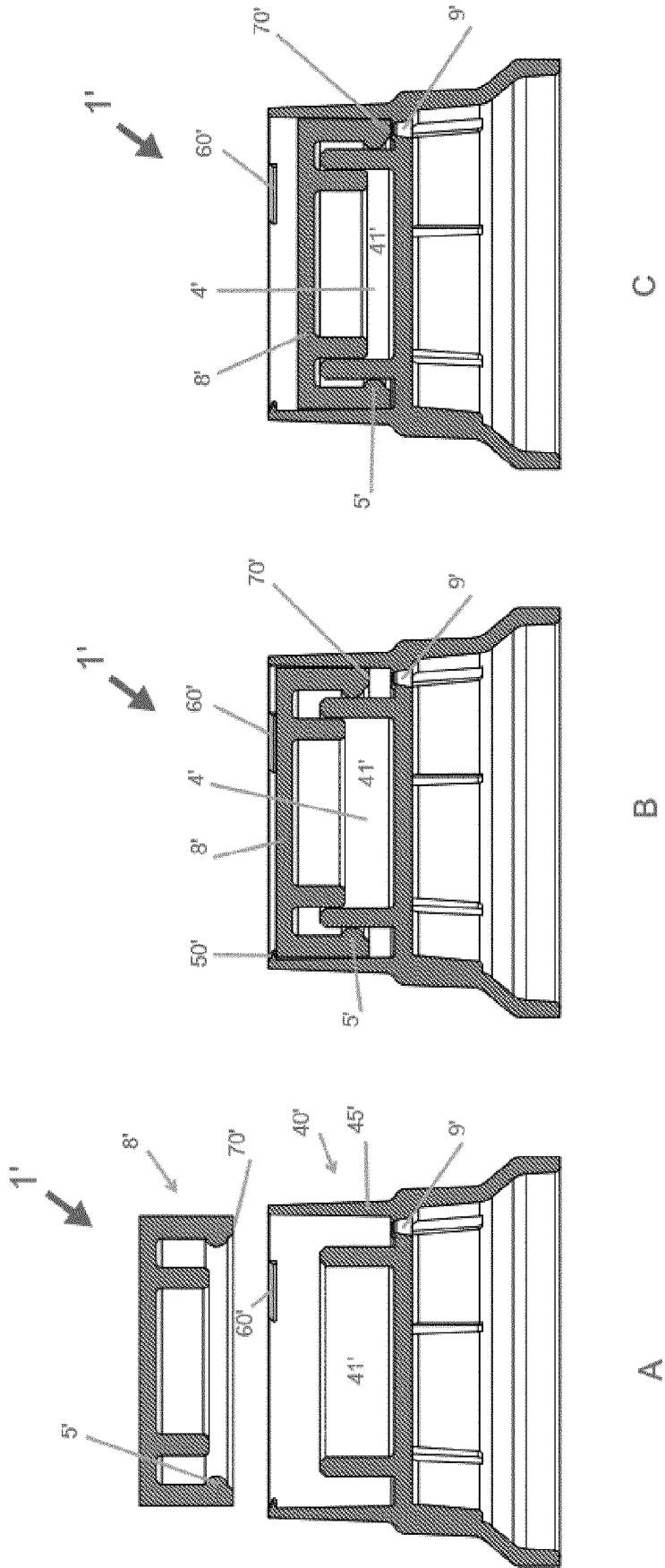


Fig. 3

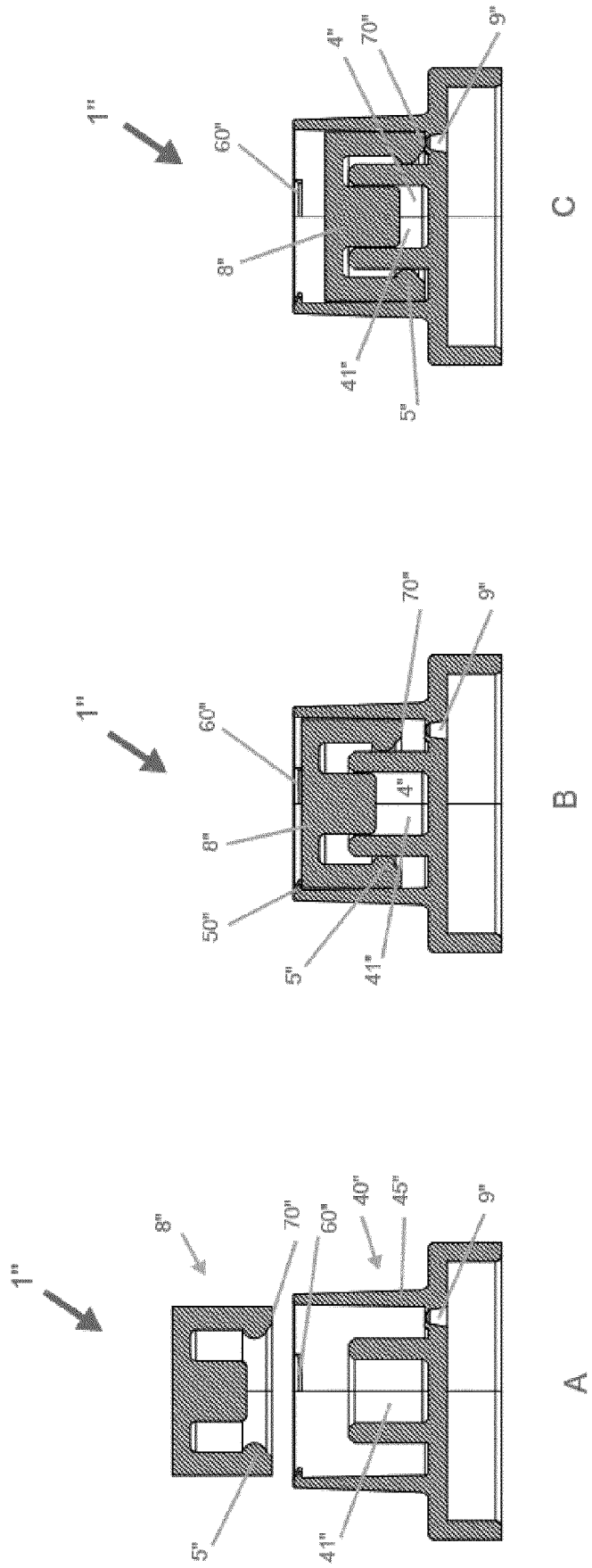


Fig. 4



EUROPEAN SEARCH REPORT

Application Number

EP 23 16 9299

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2018/185652 A1 (GOJARA BVBA [BE]) 11 October 2018 (2018-10-11)	1, 6, 7	INV. B65D83/66
A	* figures 6, 8 *	2-5	
A	----- US 2018/229920 A1 (VANDERSTRAETEN ERWIN [BE] ET AL) 16 August 2018 (2018-08-16) * the whole document * -----	1-7	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65D
The present search report has been drawn up for all claims			
Place of search <b>Munich</b>		Date of completion of the search <b>4 September 2023</b>	Examiner <b>Lindner, Volker</b>
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document	

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ANNEX TO THE EUROPEAN SEARCH REPORT  
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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
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