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(54) **ODORIZER DEVICE FOR GAS DISTRIBUTION NETWORKS**

VORRICHTUNG ZUR ODORIERUNG VON GASVERTEILERNETZWERKEN

DISPOSITIF POUR L'ODORISATION DU GAZ NATUREL

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Description

[0001] The present invention concerns an odorizer device suited to odorize the gas, for example natural gas or a similar gas, that flows along a gas distribution network.

[0002] It is known that, for safety reasons, natural gas is mixed with an odorizing substance before being distributed to the utilities.

[0003] Typically, the odorizing substance is a liquid and is let evaporate in the gas.

[0004] The presence of the above mentioned odorizing substance allows users and operators to perceive and become aware of any gas leakages from the gas distribution network.

[0005] According to a known technique, which can be defined as "capillarity-based", gas is odorized by means of a wick having one end arranged in the duct in which the gas flows and the other end immersed in a reservoir that contains the odorizing substance.

[0006] The odorizing substance is absorbed by the wick and owing to capillarity proceeds towards the end positioned in the duct, where it evaporates due to the effect of the gas flow that comes into contact with the wick, this is disclosed, for example, by GB861245, which discloses the preamble of claim 1.

[0007] The above mentioned known technique poses the drawback that it does not ensure a reliable dosing of the odorizing substance.

[0008] In fact, for a given wick and for a given gas, the dosing of the odorizing substance essentially depends on the area of the wick exposed to the gas flow, on the position of the wick in the duct and on the gas speed.

[0009] In practice, neither the length of the wick portion introduced in the duct nor the position assumed by the wick in the gas flow can be controlled with precision.

[0010] Consequently, the drawback arises that the percentage of odorizing substance mixed with the gas can oscillate considerably, even to the point of lying outside the range of values established by the applicable safety rules.

[0011] A further drawback posed by the above mentioned technique is represented by the fact that it does not allow the flow rate of the odorizing substance evaporating from the wick to be adjusted in an easy and reliable manner.

[0012] Said adjustment is necessary in particular in the case of variations in the flow rate of the gas flowing in the duct, due for example to the normal seasonal oscillations in gas consumption.

[0013] In fact, for a predefined area of the wick exposed to the gas flow, the flow rate of the odorizing substance evaporating from the wick is not proportional to the flow rate of the gas flowing in the duct.

[0014] In practice, the flow rate of the odorizing substance evaporating from the wick increases less than proportionally to the flow rate of the gas itself, leading to a corresponding reduction in the concentration of odorizing substance mixed with the gas.

[0015] In the attempt to solve the drawbacks described above, a known variant embodiment of the odorizer device described above has been developed, in which it is possible to adjust the length of the portion of the wick which is exposed inside the duct.

[0016] Even in this embodiment, however, the flow rate of the odorizing substance cannot be adjusted with precision, in fact it is only possible to control the length of the exposed wick portion, but not its position.

[0017] Therefore, the wick will tend to assume different positions inside the duct, depending on the length of said exposed portion and on the gas speed, so that the relation between the flow rate of the evaporated odorizing substance and the exposed area of the wick changes in a manner that cannot be foreseen.

[0018] The present invention intends to overcome all the drawbacks of the known art that have been described above.

[0019] In particular, it is one of the first objects of the present invention to provide an odorizer device of the capillarity-based type, which makes it possible to adjust the flow rate of the odorizing substance evaporating in the gas flow in a reliable manner.

[0020] It is also the object of the invention to provide an odorizer device in which said adjustment can be carried out in a simple and rapid manner, with no need to disassemble the device and release an undesirable gas odour in the environment.

[0021] It is another and not less important object of the invention to provide an odorizer device that is simple to construct.

[0022] The objects mentioned above are achieved by an odorizer device carried out according to the main claim.

[0023] Further characteristics and details of the odorizer device that is the subject of the invention are illustrated in the corresponding dependent claims.

[0024] Advantageously, the possibility to adjust the device in a simple and reliable manner makes it easier to maintain the concentration of odorizing substance in the gas within a limited range of values, even in case of variations in the gas flow rate.

[0025] Still advantageously, the simple and quick adjustment of the device makes it possible to reduce adjustment times and, therefore, labour costs.

[0026] Said objects and advantages, together with others that are described here below, are highlighted in the description of a preferred embodiment of the invention which is provided by way of non-limiting example with reference to the attached drawings, wherein:

- Figure 1 shows an axonometric view of the odorizer device that is the subject of the invention;
- Figure 2 shows a side sectional view of the odorizer device of Figure 1;
- Figure 3 shows an enlarged detail of Figure 2;
- Figure 4 shows the odorizer device of the invention

in an operating configuration.

[0027] The odorizer device of the invention, indicated as a whole by **1** in Figure 4, is particularly suited to be used to odorize natural gas or a similar gas flowing in a duct **29** of a distribution network.

[0028] As can be observed in Figures 1 and 2, the device **1** comprises a tubular jacket **10** developed according to a longitudinal axis **X.**

[0029] The device **1** furthermore comprises a containment element **2** sliding in the tubular jacket **10** according to the longitudinal axis **X** between a first position, in which an end portion **8** of the containment element **2** is arranged so that it is extracted from the tubular jacket **10,** and a second position, in which the end portion is arranged so that it is retracted into the tubular jacket **10.**

[0030] The tubular jacket **10** can be connected to the duct **29** in a stable manner through coupling means **13,** in such a way that the end portion **8** faces towards the inside of the duct **29,** as can be observed in Figure 4.

[0031] The containment element **2** defines a cavity **2a** that develops according to the direction of the longitudinal axis **X** between an inlet mouth **3,** opposing said end portion **8,** and a plurality of separate outlet mouths **7** defined on the external surface of the end portion **8** and arranged at the level of respective distinct positions according to the longitudinal axis **X.**

[0032] In particular, the outlet mouths **7** are arranged in such a way that they can all be placed inside the tubular jacket **10** following the complete retraction of the end portion **8,** so that they are all closed.

[0033] Preferably but not necessarily, each outlet mouth **7** is a hole with cylindrical cross section.

[0034] According to a variant embodiment of the invention, not illustrated in the drawings, one or more outlet mouths **7** are in the shape of corresponding slits mainly developed according to the direction of the longitudinal axis **X.**

[0035] In a further variant embodiment of the invention there is only one outlet mouth **7** in the shape of a slit.

[0036] According to further variant embodiments of the invention, not illustrated in the drawings, outlet mouths **7** can be provided which are carried out as a combination of the embodiments just described above.

[0037] In any case, the outlet mouths **7** overally extend over a section of the longitudinal axis **X** having a length exceeding the maximum width of the outlet mouths **7** in a direction that is orthogonal to the longitudinal axis **X.**

[0038] Furthermore, the outlet mouths **7** are configured in such a way that they are closed by the tubular jacket **10** when the containment element **2** is arranged in said second position.

[0039] Said configuration is such that the overall stroke of the containment element **2** that is required to uncover the outlet mouths **7** completely exceeds the width of the latter, so as to allow their progressive opening.

[0040] The device **1** comprises also a feeding element **9** suited to absorb an odorizing substance **28,** said feeding element being housed in the cavity **2a** with an end **9a** projecting from the inlet mouth **3** and the opposite end arranged inside the cavity **2a** itself.

[0041] Preferably but not necessarily, the feeding element **9** is a wick, even if in variant embodiments of the invention it can be constituted by any element suited to absorb the odorizing substance **28** and let it out through evaporation. Preferably, the feeding element **9** is blocked axially with respect to the containment element **2** through fixing means that are not illustrated in the drawings but are known per se.

[0042] Gas tight means **11** suited to prevent the gas that flows in the duct **29** from leaking outside through the device **1** are interposed between the tubular jacket **10** and the containment element **2.**

[0043] Said gas-tight means **11** preferably comprise two sealing rings arranged in corresponding housings obtained in the side of the tubular jacket **10** facing the containment element **2.**

[0044] Clearly, according to variant embodiments of the invention, said gas- tight means **11** can be present in a different number and/or can have a different shape than described above, provided that they are suited to prevent any gas leakage between the tubular jacket **10** and the containment element **2.**

[0045] The device **1** comprises also adjusting means **12** that maintain the containment element **2** in axial position with respect to the tubular jacket **10** but that can be operated in such a way as to cause the containment element **2** to slide in the tubular jacket **10** so as to modify said axial position.

[0046] In particular, said sliding movement is such as to allow the end portion **8** to be retracted in the tubular jacket **10** and to be extracted from the same.

[0047] In the configuration shown in the figures, the end portion **8** is completely extracted and, therefore, the outlet mouths **7** are all exposed to the gas flowing in the duct **29.**

[0048] In this way, the odorizing substance **28** can evaporate from the cavity **2a** through the entire cross section of the outlet mouths **7,** so as to odorize the gas.

[0049] Starting from the configuration mentioned above and acting on the adjusting means **12,** it is possible to retract the end portion **8** of the containment element **2** into the tubular jacket **10,** in such a way as to obtain the more or less partial obstruction of the outlet mouths **7** and, consequently, to adjust the passage area for the odorizing substance **28.**

[0050] Obviously, said adjustment takes place in an analogous way in all the variant embodiments of the device **1** described above.

[0051] It can be understood that, for a given configuration of the outlet mouths **7,** said passage area is independent of the gas speed and depends only on the position of the containment element **2** with respect to the tubular jacket **10.**

[0052] In particular, as the feeding element **9** does not project through the outlet mouths **7,** it maintains its posi-

tion independently of the gas speed.

[0053] Consequently it is possible, for example through laboratory tests, to establish a relation between the speed of the gas that comes into contact with the end portion **8** and the area of the outlet mouths **7** which has to remain exposed as a whole in order to maintain the concentration of the odorizing substance **28** in the gas within the pre-established limits.

[0054] Therefore, the invention achieves the object to make the adjustment of the flow rate of the odorizing substance **28** simpler and more reliable.

[0055] In the variant in which the outlet mouths **7** are a plurality of distinct openings, the adjustment takes place through discrete variations that depend on the number of openings exposed to the flow.

[0056] Therefore, said variant offers the additional advantage that it does not require high precision in the positioning of the containment element **2** with respect to the tubular jacket **10,** thus further increasing the ease of adjustment of the device **1.**

[0057] Preferably, the feeding element **9** is arranged in the cavity **2a** in such a way that it faces all the outlet mouths **7** over their entire length.

[0058] Advantageously, said layout ensures the efficient evaporation of the odorizing substance **28** through all of the outlet mouths **7** and, therefore, increases the reliability of the adjustment operation.

[0059] Preferably, the outlet mouths **7** constitute the only ways of communication towards the outside of the cavity **2a** through the end portion **8.**

[0060] Advantageously, said configuration ensures that the evaporation of the odorizing substance **28** in the duct **29** takes place exclusively through the outlet mouths **7,** in such a way as to make it possible to interrupt the distribution of the odorizing substance **28.**

[0061] Preferably, the condition described above is obtained by means of a sealing ring **18** belonging to the end portion **8** and configured in such a way that it can be arranged against a reference surface **19** defined on the tubular jacket **10** so as to prevent the outflow of the odorizing substance **28** through the outlet mouths **7.**

[0062] Advantageously, said sealing ring **18** makes it possible to completely close the odorizer device **1** towards the duct **29,** which is useful, for example, during maintenance operations or when it is necessary to interrupt the distribution of gas.

[0063] The sealing ring **18** may belong to a plug **5** connected to the end portion **8,** for example through a screwing action.

[0064] As regards the shape of the outlet mouths **7,** preferably their width in the direction perpendicular to the longitudinal axis **X** generally decreases as their distance from the inlet mouth **3** increases.

[0065] The applicant of the present invention has observed that said variation in the cross section of the outlet mouths **7** makes it possible to establish a substantially proportional relation between the gas flow rate and the overall length of the outlet mouths **7** which are extracted, in order to obtain the predetermined concentration of odorizing substance **28.**

[0066] In the case where the outlet mouths **7** are constituted by a plurality of holes arranged in different positions along the longitudinal axis **X,** the condition described above is obtained by defining for said holes diameters that decrease as their distance from the inlet mouth **3** increases.

[0067] If, instead, there is just one outlet mouth **7** in the shape of a slit, said requisite can be met by making the slit with decreasing cross section towards the end opposite the inlet mouth **3.**

[0068] If there are outlet mouths **7** in the shape of holes, these are preferably arranged at regular intervals along the longitudinal axis **X,** in such a way that the number of holes which are extracted is proportional to the length over which the containment element **2** slides in the tubular jacket **10.**

[0069] As regards the adjusting means **12,** they preferably comprise screw means that connect the containment element **2** to the tubular jacket **10,** are suited to maintain the mutual axial position of the two elements and at the same time can be rotated in such a way as to adjust said mutual axial position.

[0070] Preferably and as shown in Figure 3, said screw means comprise a first sleeve **14** provided with a first inner thread **15** that is coupled with a corresponding outer thread **16** belonging to the tubular jacket **10** and with a second inner thread **15a** that is coupled with a corresponding outer thread **17** belonging to the coupling element **2** and having opposite direction with respect to the outer thread **16.**

[0071] Obviously, by rotating the first sleeve **14** and maintaining the relative angular position between the containment element **2** and the tubular jacket **10** unchanged, it is possible to obtain opposing sliding movements of the two components with respect to the first sleeve **14** according to the longitudinal axis **X,** thus allowing an easy and quick adjustment of the device **1.**

[0072] In order to maintain a fixed relative angular position between the containment element **2** and the tubular jacket **10,** one or both of the components are preferably provided with corresponding notches, not illustrated in the drawings, which allow the operator to check the angular position of the two components.

[0073] According to a variant embodiment of the invention, not illustrated in the drawings, the first sleeve **14 is** axially constrained to the containment element **2** or to the tubular jacket **10** and is coupled only to the other one of said two components through screw means.

[0074] Preferably, the odorizer device **1** comprises reference notches, not illustrated in the drawings, on the first sleeve **14** and/or on the containment element **2** and/or on the tubular jacket **10,** said reference notches being suited to indicate to the operator the length of the portion of the outlet mouths **7** facing towards the outside of the tubular jacket **10** during the adjustment of the device **1.**

[0075] Said notches can be arranged in different positions according to the longitudinal axis **X** at the level of those surfaces of the containment element **2** and/or of the tubular jacket **10** that are progressively uncovered by the first sleeve **14** during the adjustment.

[0076] Preferably but not necessarily, the adjusting means **12** comprise also locking means, not illustrated herein but known per se, which can be activated at the end of the adjustment operation in order to prevent any further accidental rotation of the first sleeve **14** due, for example, to vibrations or other causes.

[0077] Said locking means may comprise, for example, a fixing dowel.

[0078] As regards the coupling means **13** suited to connect the odorizer device **1** to the duct **29,** these preferably comprise a second sleeve **20** provided with connection means for stable connection to the tubular jacket **10.**

[0079] Preferably, said stable connection means comprise a stop surface **21** suited to be arranged against a corresponding reference surface **22** belonging to the tubular jacket **10,** sealing means **23** being provided that prevent the passage of gas between the second sleeve **20** and the tubular jacket **10** and that preferably comprise an annular gasket.

[0080] Preferably, said stable connection is obtained by screwing the second sleeve **20,** provided with an inner thread **24,** to the tubular jacket **10,** provided with a corresponding outer thread **25,** until the stop surface **21** comes to be positioned against the reference surface **22.**

[0081] Said second sleeve **20** is associated with the duct **29** through a welding operation or using any other equivalent connections means of the known type. Preferably and as shown in Figure 4, the odorizing substance **28** is contained in a reservoir **26** provided with a mouth **27.**

[0082] The odorizer device **1** comprises joining means **6** for the tight coupling of the containment element **2** with said mouth **27,** in such a way that the inlet mouth **3** of the cavity **2a** is in communication with the inside of the reservoir **26.**

[0083] Preferably, said joining means **6** comprise an outer thread **6a** belonging to the containment element **2** and screwed to a corresponding inner thread belonging to said mouth **27** of the reservoir **26.**

[0084] Preferably, the feeding element **9** has its end **9a** that projects beyond the inlet mouth **3,** so that the latter can be arranged inside the reservoir **26** in such a way as to effectively absorb the odorizing substance **28** independently of the position of the reservoir **26** with respect to the odorizer device **1.**

[0085] Operatively, the odorizer device **1** described above can be used after fixing the second sleeve **20** to the duct **29** in which the gas flows, for example through a welding operation, as shown in Figure 3.

[0086] Thus, the reservoir **26** is screwed to the odorizer device **1** by proceeding as described above, after which the tubular jacket **10** is screwed to the second sleeve **20,** in such a way as to arrange the containment element **2** with its end portion **8** facing the inside of the duct **29.**

[0087] At this point, it is possible to adjust the odorizer device **1** by acting on the first sleeve **14,** as described above.

[0088] Advantageously, the odorizer device **1** described above can be easily removed for maintenance purposes or when it is necessary to fill the reservoir **26** with odorizing substance **28.**

[0089] According to the above description, it can be understood that the odorizer device that is the subject of the invention achieves all of the set objects.

[0090] In particular, the position of the feeding element inside the containment element and the configuration of the outlet mouths facilitate the adjustment of the odorizer device, making it a quick and reliable operation.

Claims

1. Odorizer device (1) for gas distribution networks, comprising:

- a tubular jacket (10) developing according to a longitudinal axis (X);
- a feeding element (9) suited to absorb an odorizing substance (28) and to transfer it through evaporation, arranged in said tubular jacket (10);
- coupling means (13) for the stable connection of said tubular jacket (10) to a duct (29);

characterized in that it comprises:

- a containment element (2) slidingly arranged in said tubular jacket (10) according to said longitudinal axis (X);
- adjusting means (12) suited to maintain the mutual axial position between said tubular jacket (10) and said containment element (2) and suited to be operated to cause said containment element (2) to slide with respect to said tubular jacket (10) between a first position, in which an end portion (8) of said containment element (2) is arranged outside of said tubular jacket (10), and a second position, in which said end portion (8) is arranged inside said tubular jacket (10);
- gas tight means (11) interposed between said tubular jacket (10) and said containment element (2);
- a cavity (2a) belonging to said containment element (2), developed according to the direction of said longitudinal axis (X) between an inlet mouth (3) opposing said end portion (8) and one or more outlet mouths (7) defined on the external surface of said end portion (8), the whole of said outlet mouths extending over a portion of said longitudinal axis (X) whose length exceeds the maximum width of said outlet mouths (7) according to a direction that is orthogonal to said lon-

gitudinal axis (X), said outlet mouths (7) being configured in such a way that they are closed by said tubular jacket (10) when said containment element (2) is arranged in said second position;

said feeding element (9) being arranged in said cavity (2a).

2. Odorizer device (1) according to claim 1, **characterized in that** said one or more outlet mouths (7) comprise a plurality of separate outlet mouths (7), arranged in corresponding distinct positions along the direction of said longitudinal axis (X).

3. Odorizer device (1) according to any of the preceding claims, **characterized in that** said one or more outlet mouths (7) comprise a slit.

4. Odorizer device (1) according to any of the preceding claims, **characterized in that** the width of said one or more outlet mouths (7), according to a direction that is orthogonal to said longitudinal axis (X), generally decreases as the distance from said inlet mouth (3) increases.

5. Odorizer device (1) according to any of the preceding claims, **characterized in that** said adjusting means (12) comprise screw means interposed between said containment element (2) and said tubular jacket (10).

6. Odorizer device (1) according to claim 5, **characterized in that** said screw means comprise a first sleeve (14) provided with a first inner thread (15) that is coupled with an outer thread (16) belonging to said tubular jacket (10), and with a second inner thread (15a) that is coupled with an outer thread (17) belonging to said containment element (2) and having opposite direction with respect to said outer thread (16) of said tubular jacket (10).

7. Odorizer device (1) according to claim 5 or 6, **characterized in that** it comprises reference notches on said first sleeve (14) and/or on said containment element (2) and/or on said tubular jacket (10), said notches being suited to indicate to an operator the length of the portion of said one or more outlet mouths (7) projecting from said tubular jacket (10).

8. Odorizer device (1) according to any of the preceding claims, **characterized in that** said cavity (2a) communicates with the outside through said end portion (8), exclusively through said one or more outlet mouths (7).

9. Odorizer device (1) according to claim 8, **characterized in that** said tubular jacket (10) defines a reference surface (19), said end portion (8) comprising a sealing ring (18) suited to be arranged against said reference surface (19) in such a way as to prevent said odorizing substance (28) from escaping through said outlet mouths (7).

10. Odorizer device (1) according to any of the preceding claims, **characterized in that** it comprises a second sleeve (20) suited to be stably connected to said tubular jacket (10) and provided with a stop surface (21) suited to be arranged against a corresponding reference surface (22) belonging to said tubular jacket (10), sealing means (23) being present that are suited to prevent the passage of gas between said second sleeve (20) and said tubular jacket (10).

11. Odorizer device (1) according to claim 10, **characterized in that** said second sleeve (20) comprises an inner thread (24) suited to be screwed to an outer thread (25) belonging to said tubular jacket (10).

12. Odorizer device (1) according to any of the preceding claims, **characterized in that** it comprises fixing means suited to lock the axial movement of said feeding element (9) with respect to said containment element (2).

13. Odorizer device (1) according to any of the preceding claims, **characterized in that** it comprises joining means (6) suited to sealingly connect said inlet mouth (3) to a reservoir (26).

14. Odorizer device (1) according to claim 13, **characterized in that** it comprises a reservoir (26) containing said odorizing substance (28), provided with a mouth (27) that is coupled with said inlet mouth (3) through said joining means (6), said feeding element (9) being placed in contact with said odorizing substance (28).

15. Odorizer device (1) according to any of the preceding claims, **characterized in that** said feeding element (9) is a wick.

16. Odorizer device (1) according to any of the preceding claims, **characterized in that** it is suited to be used in distribution networks for natural gas or similar gases.

Patentansprüche

1. Odorierungsvorrichtung (1) für Gasverteilungsnetze, Folgendes umfassend:

- eine röhrenförmige Umhüllung (10), die sich einer Längsachse (X) entsprechend entwickelt;
- ein Zuführelement (9), dazu geeignet, einen

Odorierstoff (28) zu absorbieren und durch Verdampfung zu übertragen, in der besagten röhrenförmigen Umhüllung (10) angeordnetes;
- Kupplungsmittel (13) zur stabilen Verbindung der besagten röhrenförmigen Umhüllung (10) mit einer Leitung (29);

dadurch gekennzeichnet, dass sie Folgendes umfasst:

- ein Rückhalteelement (2), das entlang der besagten Längsachse (X) gleitend in der besagten röhrenförmigen Umhüllung (10) angeordnet ist;
- Einstellmitttel (12), dazu geeignet, die wechselseitig axiale Position zwischen der besagten röhrenförmigen Umhüllung (10) und dem besagten Rückhalteelement (2) zu erhalten, und dazu geeignet, betätigt zu werden, um das besagte Rückhalteelement (2) bezüglich der besagten röhrenförmigen Umhüllung (10) zwischen einer ersten Position, in der ein Endabschnitt (8) des besagten Rückhalteelements (2) außerhalb der besagten röhrenförmigen Umhüllung (10) angeordnet ist, und einer zweiten Position, in der der besagte Endabschnitt (8) innerhalb der besagten röhrenförmigen Umhüllung (10) angeordnet ist, gleiten zu lassen;
- gasdichte Mittel (11), die zwischen der besagten röhrenförmigen Umhüllung (10) und dem besagten Rückhalteelement (2) eingefügt sind;
- einen zu dem besagten Rückhalteelement (2) gehörenden Hohlraum (2a), der sich entsprechend der Richtung der besagten Längsachse (X) zwischen einer dem besagten Endabschnitt (8) entgegengesetzten Einlassöffnung (3) und einer oder mehreren, an der Außenfläche des besagten Endabschnitts (8) definierten Auslassöffnungen (7) entwickelt, wobei die Gesamtheit der besagten Auslassöffnungen sich über einen Abschnitt der besagten Längsachse (X) erstreckt, dessen Länge die maximale Breite der besagten Auslassöffnungen (7) einer Richtung entsprechend, die zu der besagten Längsachse (X) orthogonal verläuft, übersteigt, wobei die besagten Auslassöffnungen (7) so konfiguriert sind, dass sie durch die besagte röhrenförmige Umhüllung (10) geschlossen werden, wenn das besagte Rückhalteelement (2) in der besagten zweiten Position angeordnet ist;

wobei das besagte Zuführelement (9) in dem besagten Hohlraum (2a) angeordnet ist.

2. Odorierungsvorrichtung (1) nach Patentanspruch 1, **dadurch gekennzeichnet, dass** die besagte(n) eine oder mehreren Auslassöffnung(en) (7) eine Vielzahl von separaten Auslassöffnungen (7) umfasst/umfassen, die in entsprechenden, separaten Positionen der Richtung der besagten Längsachse (X) entlang angeordnet sind.

3. Odorierungsvorrichtung (1) nach einem jeden der vorstehenden Patentansprüche, **dadurch gekennzeichnet, dass** die besagte(n) eine oder mehreren Auslassöffnung(en) (7) einen Schlitz umfasst/umfassen.

4. Odorierungsvorrichtung (1) nach einem jeden der vorstehenden Patentansprüche, **dadurch gekennzeichnet, dass** die Breite der besagten einen oder mehreren Auslassöffnungen (7) einer Richtung entsprechend, die orthogonal zu der besagten Längsachse (X) ist, generell mit zunehmendem Abstand von der besagten Einlassöffnung (3) abnimmt.

5. Odorierungsvorrichtung (1) nach einem jeden der vorstehenden Patentansprüche, **dadurch gekennzeichnet, dass** die besagten Einstellmitttel (12) Schraubmittel umfassen, die zwischen dem besagten Rückhalteelement (2) und der besagten röhrenförmigen Umhüllung (10) eingefügt sind.

6. Odorierungsvorrichtung (1) nach Patentanspruch 5, **dadurch gekennzeichnet, dass** die besagten Schraubmittel eine erste Muffe (14) umfassen, die ein erstes Innengewinde (15) aufweist, welches mit einem zu der besagten röhrenförmigen Umhüllung (10) gehörenden Außengewinde (16) gekuppelt ist, sowie ein zweites Innengewinde (15a), welches mit einem Außengewinde (17) gekuppelt ist, das zu dem besagten Rückhalteelement (2) gehört und eine bezüglich des besagten Außengewindes (16) der besagten röhrenförmigen Umhüllung (10) entgegengesetzte Richtung aufweist.

7. Odorierungsvorrichtung (1) nach Patentanspruch 5 oder 6, **dadurch gekennzeichnet, dass** sie Bezugskerben an der besagten ersten Muffe (14) und/oder an dem besagten Rückhalteelement (2) und/oder an der besagten röhrenförmigen Umhüllung (10) umfasst, wobei die besagten Kerben dazu geeignet sind, einem Bediener die Länge des Abschnittes der besagten einen oder mehreren Auslassöffnungen (7) anzugeben, der aus der besagten röhrenförmigen Umhüllung (10) herausragt.

8. Odorierungsvorrichtung (1) nach einem jeden der vorstehenden Patentansprüche, **dadurch gekennzeichnet, dass** der besagte Hohlraum (2a) durch den besagten Endabschnitt (8) ausschließlich durch die besagte(n) eine oder mehreren Auslassöffnung(en) (7) mit dem Äußeren kommuniziert.

9. Odorierungsvorrichtung (1) nach Patentanspruch 8, **dadurch gekennzeichnet, dass** die besagte röhrenförmigen Umhüllung (10) eine Bezugsfläche (19)

definiert, wobei der besagte Endabschnitt (8) einen Dichtring (18) umfasst, der dazu geeignet ist, derart gegen die besagte Bezugsfläche (19) angeordnet zu werden, dass der Austritt des besagten Odorierstoffs (28) durch die besagten Auslassöffnungen (7) vermieden wird.

10. Odorierungsvorrichtung (1) nach einem jeden der vorstehenden Patentansprüche, **dadurch gekennzeichnet, dass** er eine zweite Muffe (20) umfasst, die dazu geeignet ist, stabil mit der besagten röhrenförmigen Umhüllung (10) verbunden zu werden und mit einer Anschlagfläche (21) versehen ist, welche dazu geeignet ist, gegen eine entsprechende, zu der besagten röhrenförmigen Umhüllung (10) gehörende Bezugsfläche (22) angeordnet zu werden, wobei Versiegelungsmittel (23) vorhanden sind, die dazu geeignet sind, den Durchgang von Gas zwischen der besagten zweiten Muffe (20) und der besagten röhrenförmigen Umhüllung (10) zu verhindern.

11. Odorierungsvorrichtung (1) nach Patentanspruch 10, **dadurch gekennzeichnet, dass** die besagte zweite Muffe (20) ein Innengewinde (24) umfasst, das dazu geeignet ist, auf ein zu der besagten röhrenförmigen Umhüllung (10) gehörendes Außengewinde (25) aufgeschraubt zu werden.

12. Odorierungsvorrichtung (1) nach einem jeden der vorstehenden Patentansprüche, **dadurch gekennzeichnet, dass** sie Befestigungsmittel umfasst, die geeignet sind, die axiale Bewegung des besagten Zuführelements (9) bezüglich des besagten Rückhalteelements (2) zu blockieren.

13. Odorierungsvorrichtung (1) nach einem jeden der vorstehenden Patentansprüche, **dadurch gekennzeichnet, dass** sie Verbindungsmittel (6) umfasst, die geeignet sind, die besagte Einlassöffnung (3) dicht mit einem Reservoir (26) zu verbinden.

14. Odorierungsvorrichtung (1) nach Patentanspruch 13, **dadurch gekennzeichnet, dass** sie ein Reservoir (26) umfasst, das den besagten Odorierstoff (28) enthält und mit einer Öffnung (27) versehen ist, die durch die besagten Verbindungsmittel (6) mit der besagten Einlassöffnung (3) gekuppelt ist, wobei das besagte Zuführelement (9) in Kontakt mit dem besagten Odorierstoff (28) plaziert ist.

15. Odorierungsvorrichtung (1) nach einem jeden der vorstehenden Patentansprüche, **dadurch gekennzeichnet, dass** das besagte Zuführelement (9) ein Docht ist.

16. Odorierungsvorrichtung (1) nach einem jeden der vorstehenden Patentansprüche, **dadurch gekennzeichnet, dass** sie dazu geeignet ist, in Verteilungsnetzen für Erdgas oder ähnliche Gase eingesetzt zu werden.

Revendications

1. Dispositif d'odorisation (1) pour les réseaux de distribution du gaz, comprenant:

- une chemise tubulaire (10) se développant selon un axe longitudinal (X);
- un élément d'alimentation (9) apte à absorber une substance odorante (28) et à la transférer par évaporation, disposé dans ladite chemise tubulaire (10);
- des moyens d'accouplement (13) pour la connexion stable de ladite chemise tubulaire (10) à un conduit (29);

caractérisé en ce qu'il comprend:

- un élément de confinement (2) disposé de manière coulissante dans ladite chemise tubulaire (10) selon ledit axe longitudinal (X);
- des moyens de réglage (12) aptes à maintenir la position axiale réciproque entre ladite chemise tubulaire (10) et ledit élément de confinement (2) et aptes à être actionnés pour provoquer le coulissement dudit élément de confinement (2) par rapport à ladite chemise tubulaire (10) entre une première position, dans laquelle une portion d'extrémité (8) dudit élément de confinement (2) est disposée à l'extérieur de ladite chemise tubulaire (10), et une deuxième position, dans laquelle ladite porion d'extrémité (8) est disposée à l'intérieur de ladite chemise tubulaire (10);
- des moyens étanches au gaz (11) interposés entre ladite chemise tubulaire (10) et ledit élément de confinement (2);
- une cavité (2a) appartenant audit élément de confinement (2), développée selon la direction dudit axe longitudinal (X) entre une bouche d'entrée (3) opposée à ladite portion d'extrémité (8) et une ou plusieurs bouches de sortie (7) définies sur la surface extérieure de ladite portion d'extrémité (8), l'ensemble desdites bouches de sortie s'étendant sur une portion dudit axe longitudinal (X) dont la longueur est supérieure à la largeur maximale desdites bouches de sortie (7) selon une direction qui est orthogonale audit axe longitudinal (X), lesdites bouches de sortie (7) étant configurées de manière à ce qu'elles soient fermées par ladite chemise tubulaire (10) quand ledit élément de confinement (2) est disposé dans ladite deuxième position;

ledit élément d'alimentation (9) étant disposé dans

ladite cavité (2a).

2. Dispositif d'odorisation (1) selon la revendication 1, **caractérisé en ce que** lesdites une ou plusieurs bouches de sortie (7) comprennent une pluralité de bouches de sortie séparées (7), disposées dans des positions distinctes correspondantes le long de la direction dudit axe longitudinal (X).

3. Dispositif d'odorisation (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce que** lesdites une ou plusieurs bouches de sortie (7) comprennent une fente.

4. Dispositif d'odorisation (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce que** lesdites une ou plusieurs bouches de sortie (7) présentent, selon une direction qui est orthogonale audit axe longitudinal (X), une larguer généralement décroissante au fur et à mesure que la distance de ladite bouche d'entrée (3) augmente.

5. Dispositif d'odorisation (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce que** lesdits moyens de réglage (12) comprennent des moyens à vis interposés entre ledit élément de confinement (2) et ladite chemise tubulaire (10).

6. Dispositif d'odorisation (1) selon la revendication 5, **caractérisé en ce que** lesdits moyens à vis comprennent un premier manchon (14) pourvu d'un premier filetage intérieur (15) qui est accouplé à un filetage extérieur (16) appartenant à ladite chemise tubulaire (10), et d'un deuxième filetage intérieur (15a) qui est accouplé à un filetage extérieur (17) appartenant audit élément de confinement (2) et ayant une direction opposée par rapport audit filetage extérieur (16) de ladite chemise tubulaire (10).

7. Dispositif d'odorisation (1) selon la revendication 5 ou 6, **caractérisé en ce qu'**il comprend des encoches de référence sur ledit premier manchon (14) et/ou sur ledit élément de confinement (2) et/ou sur ladite chemise tubulaire (10), lesdites encoches étant aptes à indiquer à un opérateur la longueur de la portion desdites une ou plusieurs bouches de sortie (7) saillant de ladite chemise tubulaire (10).

8. Dispositif d'odorisation (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce que** ladite cavité (2a) communique avec l'extérieur à travers ladite portion d'extrémité (8), exclusivement à travers lesdites une ou plusieurs bouches de sortie (7).

9. Disposif d'odorisation (1) selon la revendication 8, **caractérisé en ce que** ladite chemise tubulaire (10) définit une surface de butée (19), ladite portion d'extrémité (8) comprenant un anneau d'étanchéité (18) apte à être disposé contre ladite surface de butée (19) de manière à empêcher la sortie de ladite substance d'odorisation (28) à travers lesdites bouches de sortie (7).

10. Dispositif d'odorisation (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce qu'**il comprend un deuxième manchon (20) qui peut être relié stablement à ladite chemise tubulaire (10) et pourvu d'une surface d'arrêt (21) apte à être disposé contre une surface de butée correspondante (22) appartenant à ladite chemise tubulaire (10), des moyens d'étanchéité (23) étant présents et qui sont aptes à empêcher le passage de gaz entre ledit deuxième manchon (20) et ladite chemise tubulaire (10).

11. Dispositif d'odorisation (1) selon la revendication 10, **caractérisé en ce que** ledit deuxième manchon (20) comprend un filetage intérieur (24) indiqué pour être vissé sur un filetage extérieur (25) appartenant à ladite chemise tubulaire (10).

12. Dispositif d'odorisation (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce qu'**il comprend des moyens de fixation aptes à bloquer le mouvement axial dudit élément d'alimentation (9) par rapport audit élément de confinement (2).

13. Dispositif d'odorisation (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce qu'**il comprend des moyens d'union (6) apte à relier de manière étanche ladite bouche d'entrée (3) à un réservoir (26).

14. Dispositif d'odorisation (1) selon la revendications 13, **caractérisé en ce qu'**il comprend un réservoir (26) contenant ladite substance d'odorisation (28), pourvu d'une bouche (27) qui est accouplée à ladite bouche d'entrée (3) par lesdits moyens d'union (6), ledit élément d'alimentation (9) étant disposé en contact avec ladite substance d'odorisation (28).

15. Dispositif d'odorisation (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce que** ledit élément d'alimentation (9) est une mèche.

16. Dispositif d'odorisation (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce qu'**il est indiqué pour être utilisé dans des réseaux de distribution du gaz naturel ou gaz similaires.

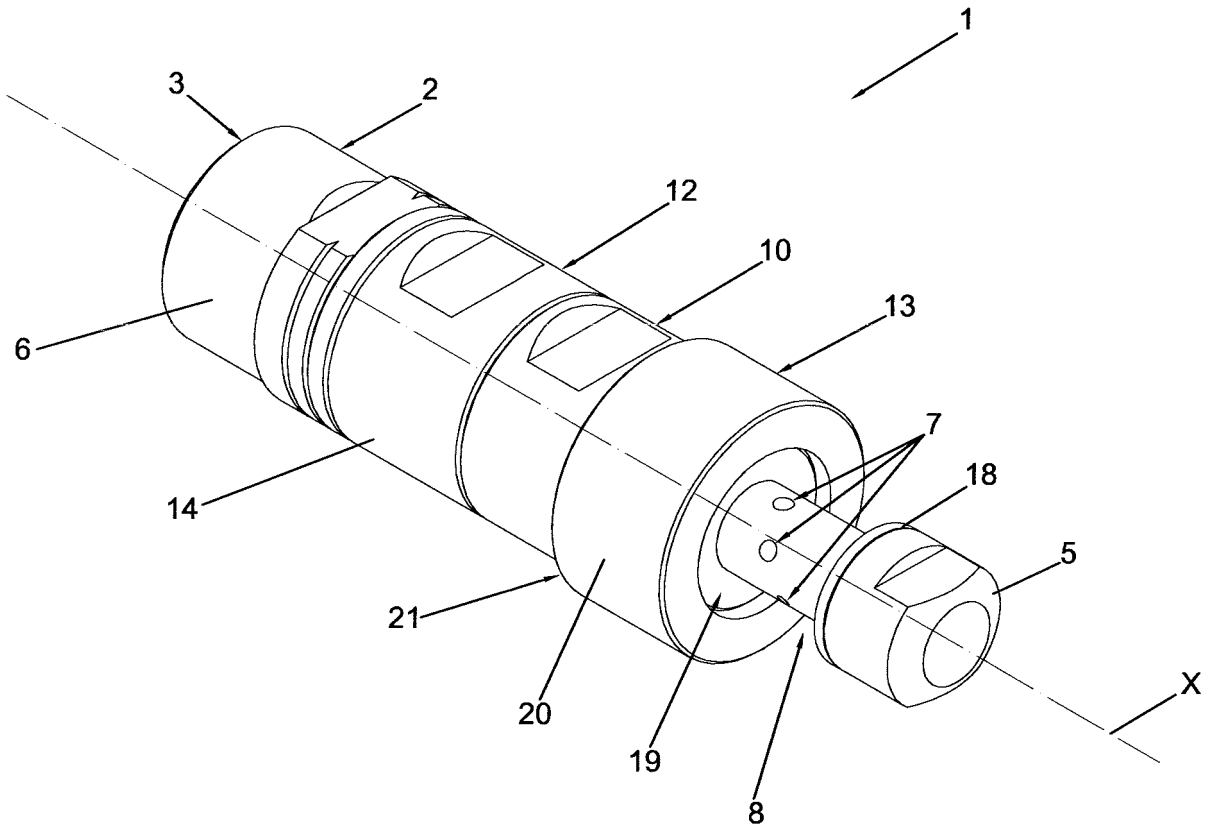


Fig. 1

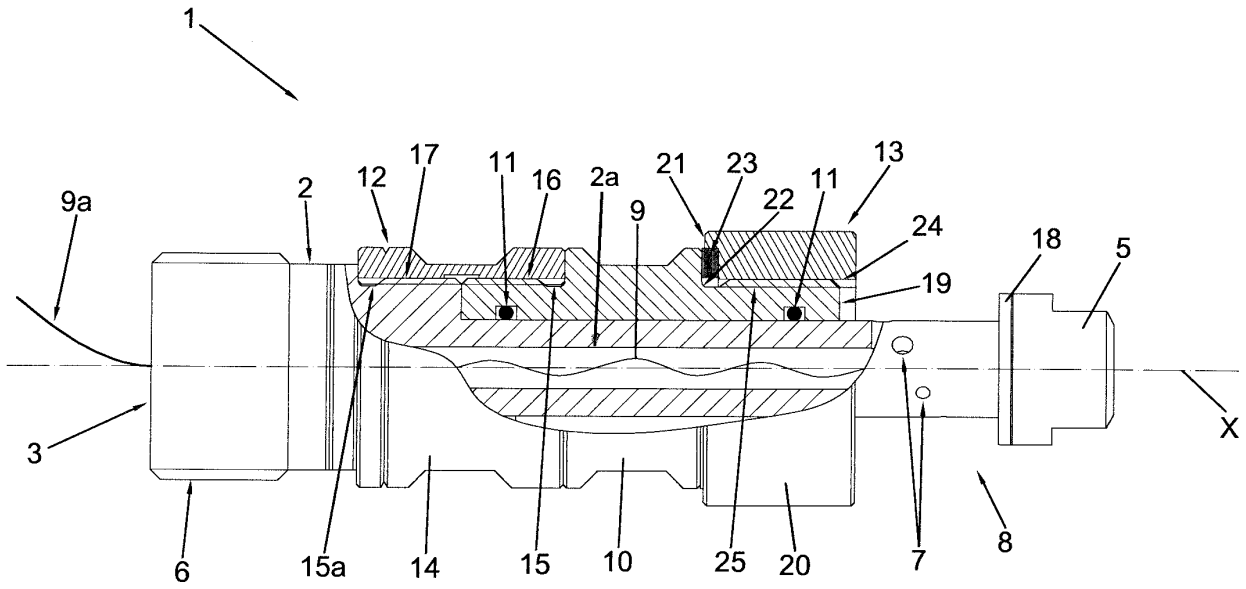

1
9a
2
12
17
11
16
2a
9
21
23
22
11
13
24
19
18
5
X
3
6
15a
14
15
10
25
20
7
8

Fig. 2

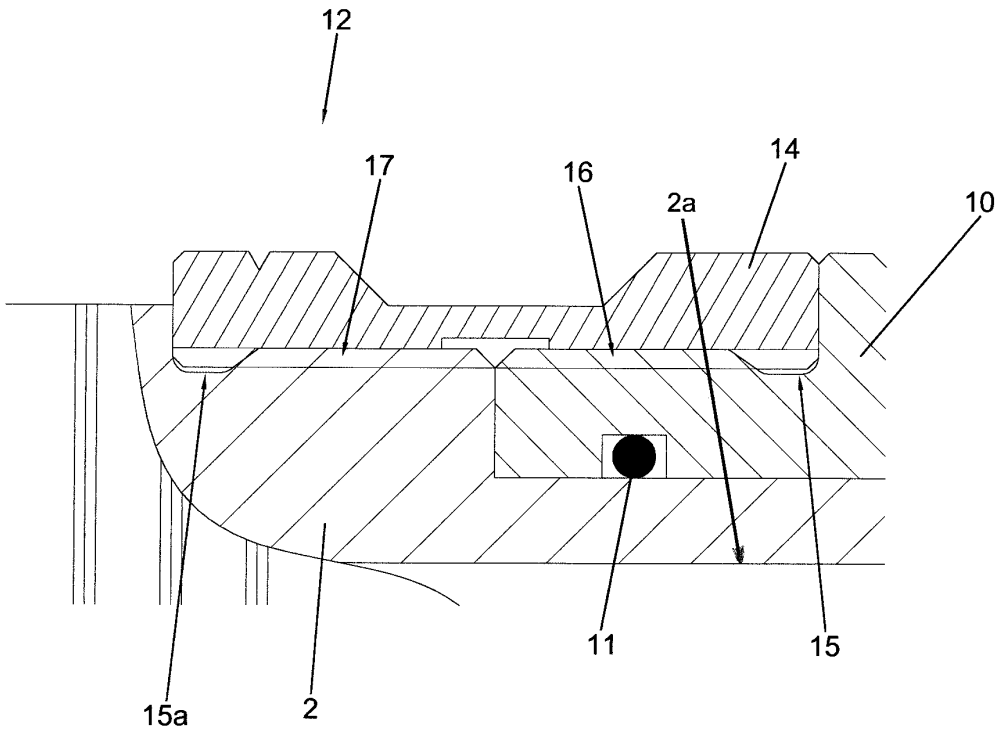

12
17
16
14
2a
10
11
15
15a
2

Fig.3

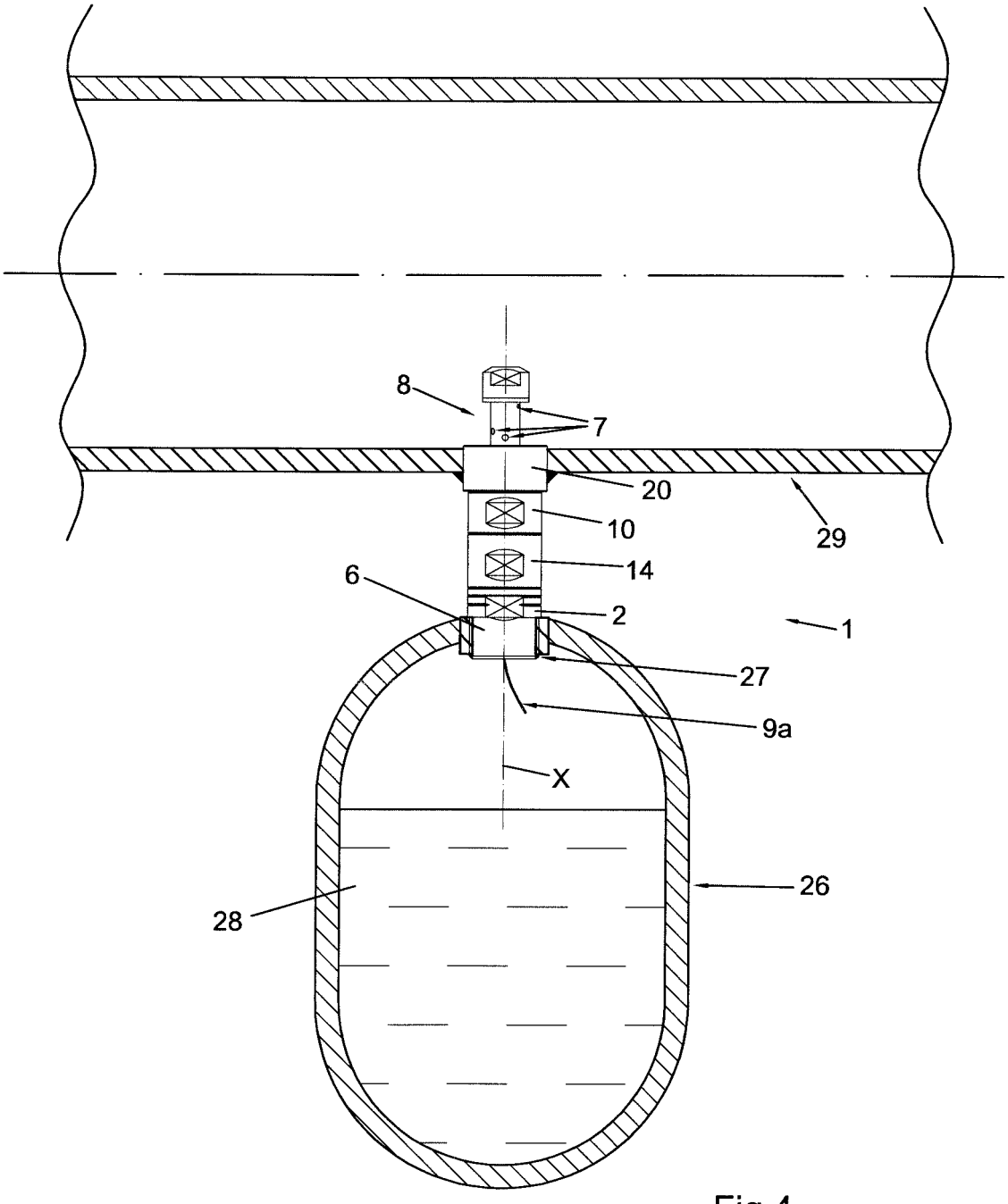


Fig.4

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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