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(54) **CONTAINER FOR STORING AND TRANSPORTING AGGRESSIVE MEDIA, IN PARTICULAR BROMINE**

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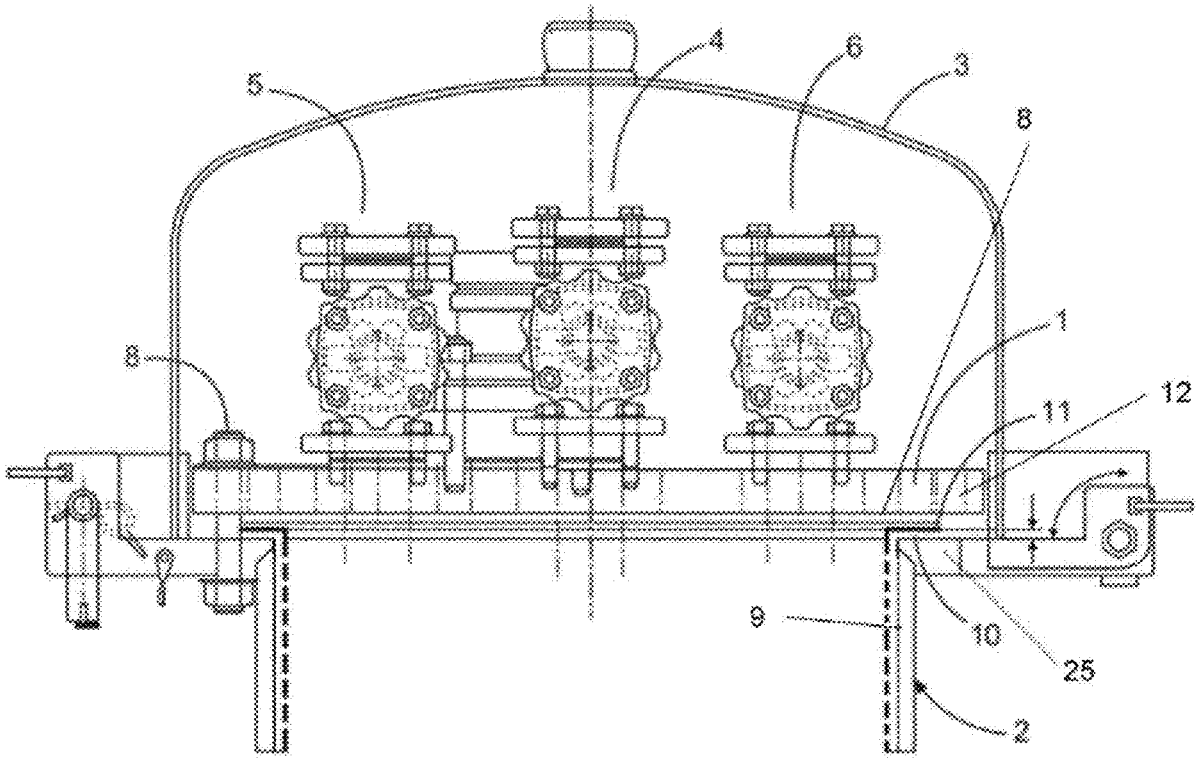
(57) **ABSTRACT**

The present invention relates to a tank container with a raised manhole connector (**2**) and a domed cover (**1**) for closing the raised manhole connector (**2**), these being lined with lead for transporting aggressive contents, such as for example bromine, wherein the domed cover (**1**) and the raised manhole connector (**2**) have nickel sealing surfaces (**22**, **23**, **24**), which are produced in particular by means of deposition welding, and also to conventional tank containers retrofitted according to the invention and to methods for this.



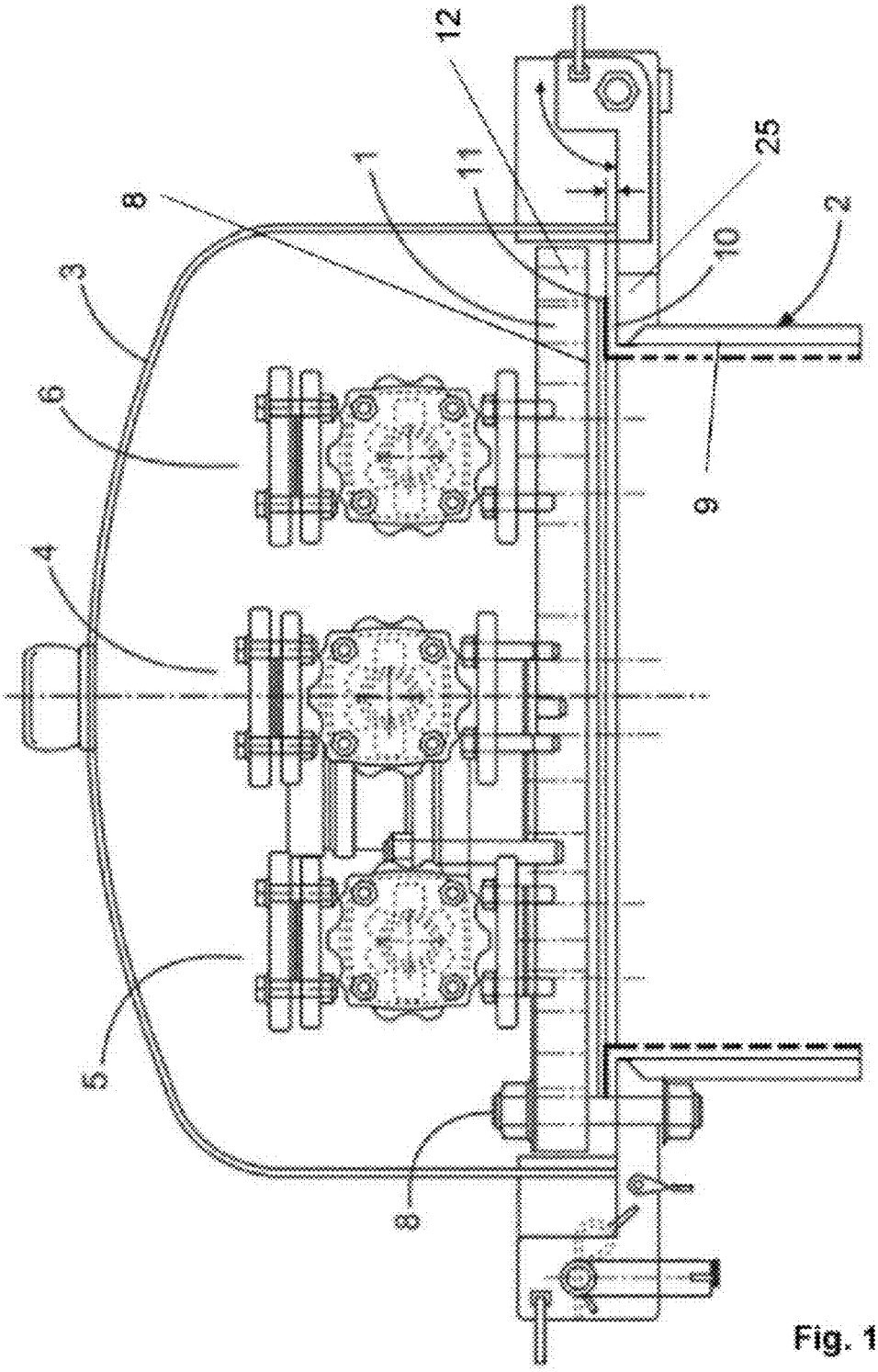


Fig. 1

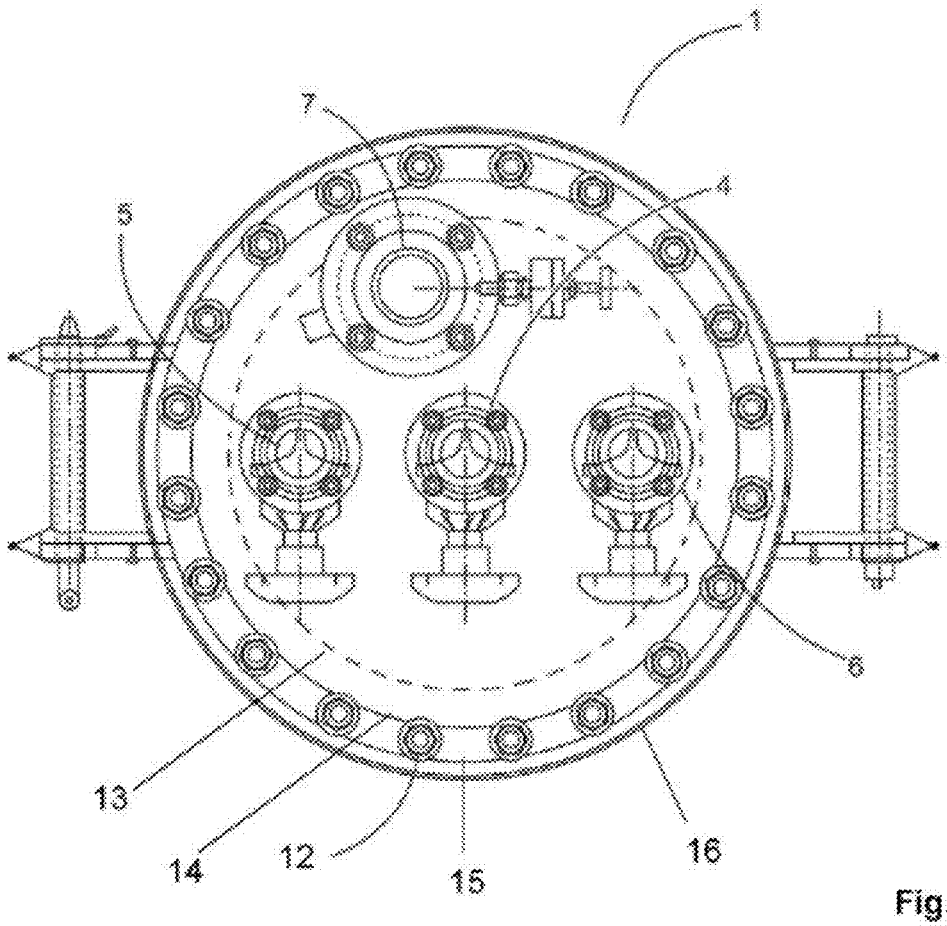


Fig. 2

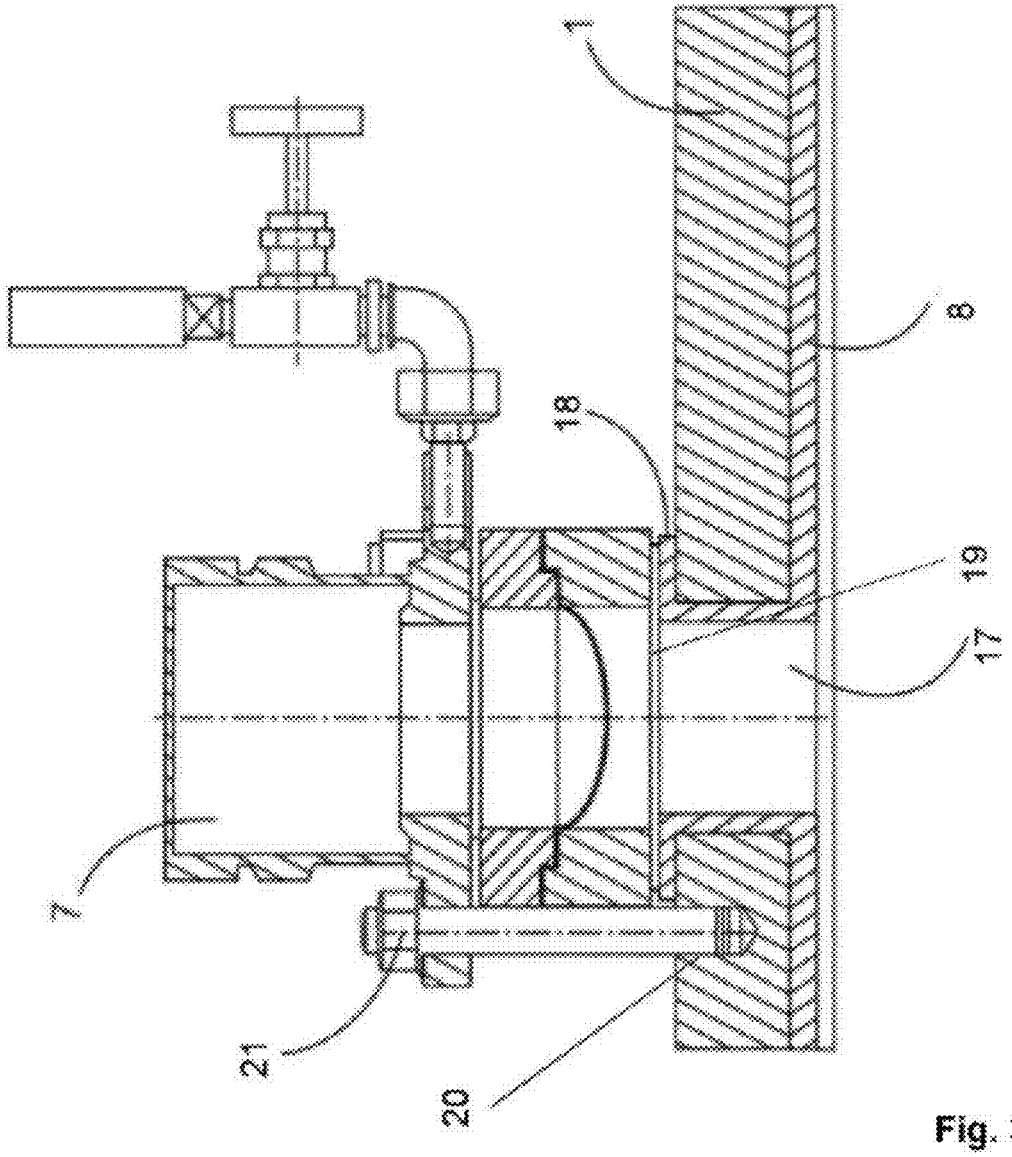


Fig. 3

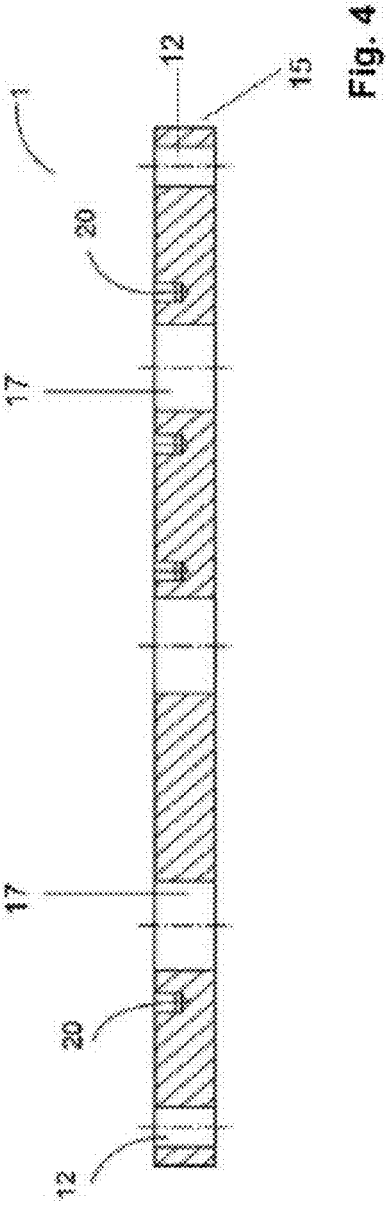


Fig. 4

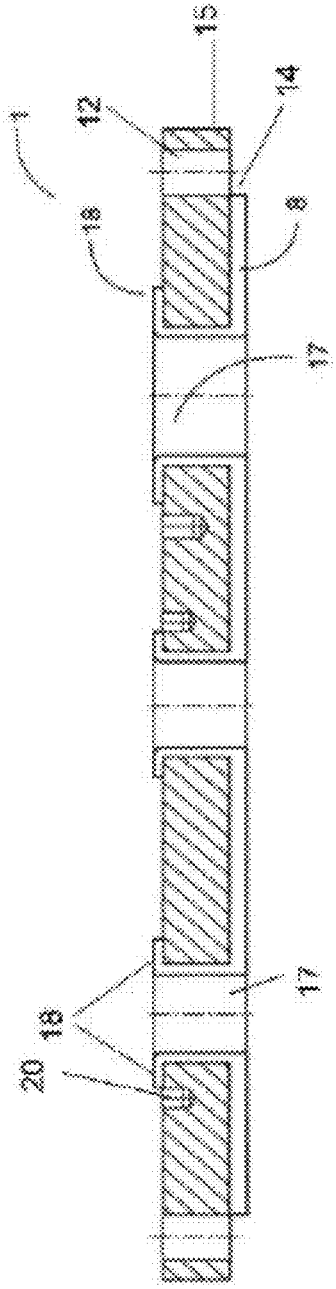


Fig. 5

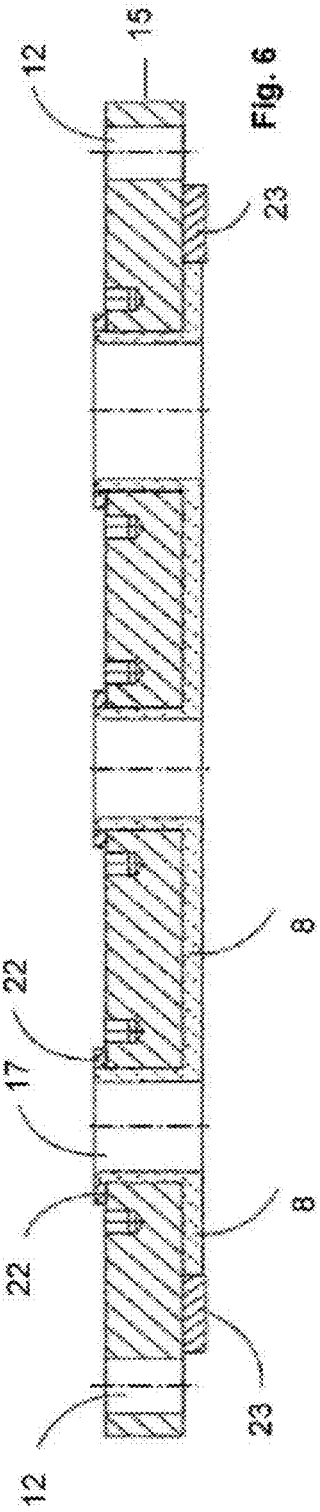


Fig. 6

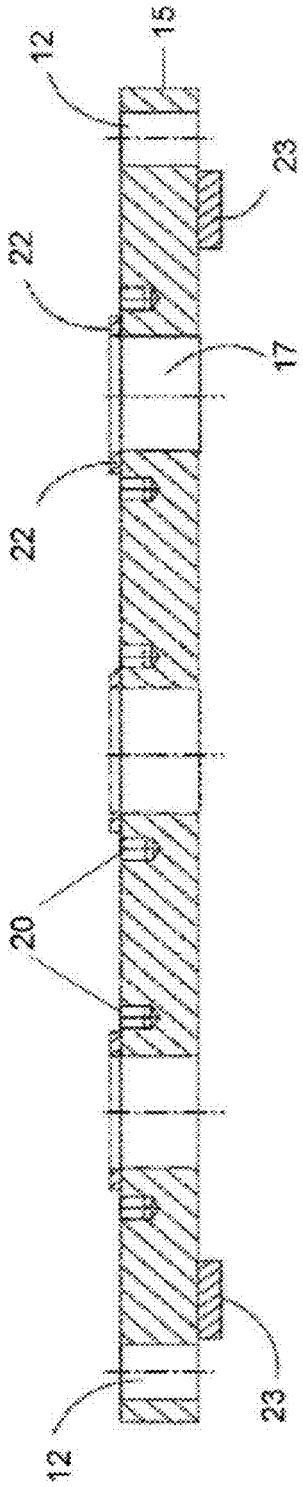


Fig. 7

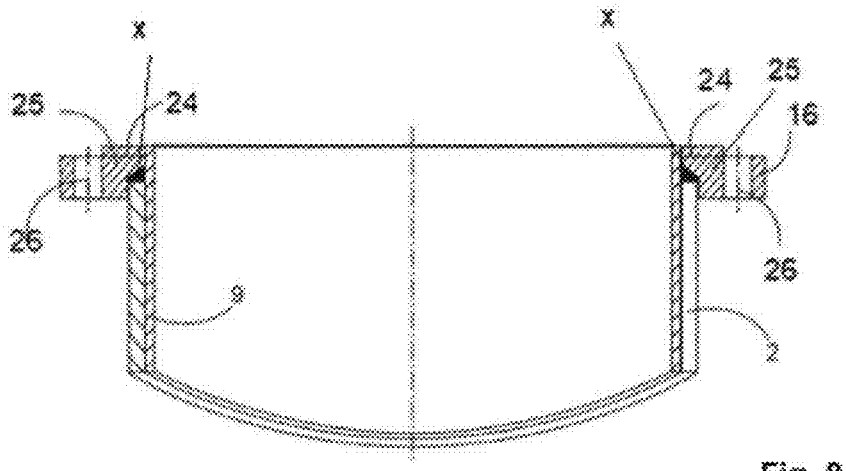


Fig. 8

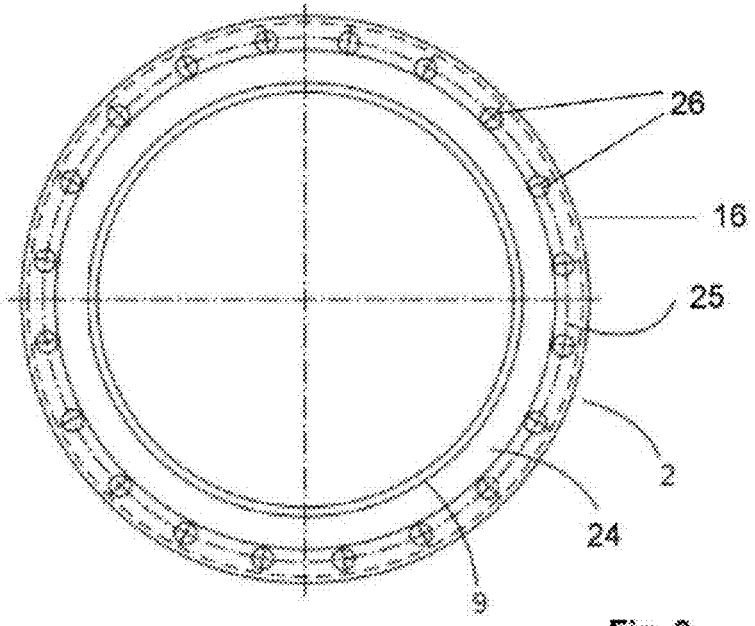


Fig. 9

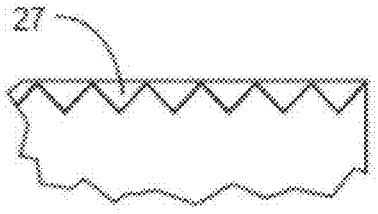


Fig. 10

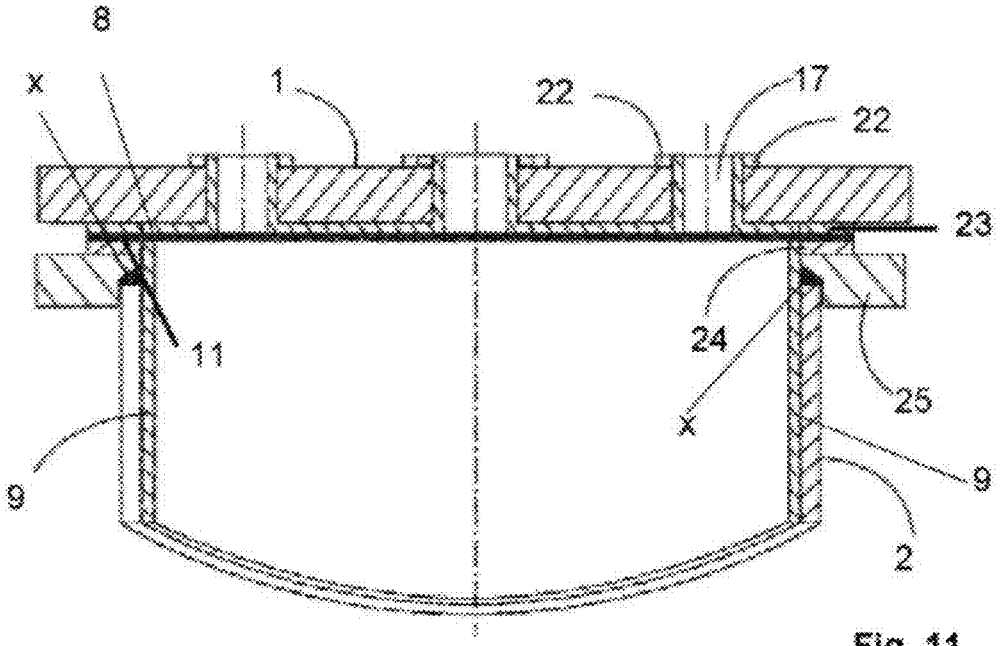


Fig. 11

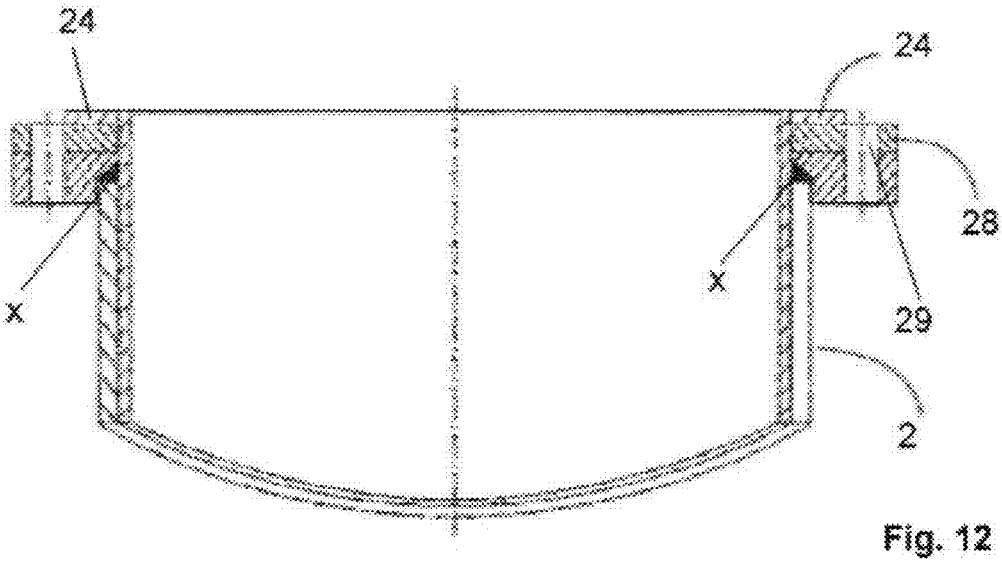


Fig. 12

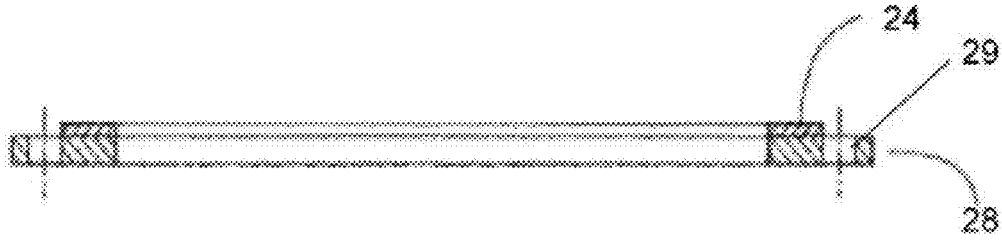


Fig. 13

CONTAINER FOR STORING AND TRANSPORTING AGGRESSIVE MEDIA, IN PARTICULAR BROMINE

[0001] The present invention relates to a container for the transport and storage of aggressive contents, in particular bromine, as well as a domed cover for closing the container.

[0002] Bromine is extremely toxic and highly corrosive, making it a dangerous substance that requires special precautions for transport and storage.

[0003] Since bromine has a strong corrosive effect against numerous materials and will corrode them, bromine can only be transported and stored in special containers.

[0004] For example, it is known that bromine is stored in glass bottles or glass containers. However, glass is fragile and is therefore only suitable for storage and transport in small quantities. In addition, glass bottles must be specially protected against breakage during transport, which makes transport cumbersome and expensive.

[0005] Presently, bromine is transported in steel containers, which can have different volumes depending on the requirement. The inner walls of these containers, including the cover, are lined with lead, as bromine would otherwise corrode the container shell. Lead is chemically very resistant due to passivation and is resistant to numerous corrosive substances, including bromine.

[0006] CN 202017827 U relates to a tank for electrothermal concentration, wherein it is proposed to have an additional lining of a ceramic on the pipe that carries the corrosive sulfate-containing electrolyte, for example porcelain.

[0007] CN 106809538 A proposes to replace the internal pipes of a conventional bromine tank, which are usually made of polytetrafluoroethylene, by steel pipes with an inner wall lining of lead.

[0008] DE 10 2012 109 015 B3 relates to a support structure for conventional bromine containers with lead coating, wherein, in particular, the cylindrical section of the container can be supported as stress-free as possible in order to prevent damage to the brittle passive layer of the lead coating, which forms the actual corrosion barrier.

[0009] Containers, such as those used for transport, usually have a manhole, which allows a person to access the interior for maintenance and repair. The manhole has a raised section, here also referred to as a "raised manhole connector" or simply "connector", which protrudes over the container like a chimney. The connector and thus the container can be sealed with a domed cover.

[0010] The domed cover is typically also designed as a carrier for the fittings used for filling, emptying and inspecting the container.

[0011] For this purpose, additional openings are typically provided in the domed cover for connecting the fittings attached to the domed cover to the inside of the container. For example, valves can be provided on the domed cover. Bromine can be filled and removed through these valves. Pressure can be raised there so that the bromine is extracted from the container via another valve. In order to prevent the container from exploding, a safety valve can also be provided that opens if the pressure inside the container accidentally rises above a critical value.

[0012] The containers are very durable, but the seal between the domed cover and the raised manhole connector as well as the domed cover and the openings and valves therein constitute a particularly critical area.

[0013] Typically, the coating of lead for sealing continues even on the sealing surfaces and the flanges. In doing so, the containers are coated with lead over the entire inner surface, including the inside of the domed cover and the sealing surfaces such as the contact surfaces of the domed cover on the connector and the valves on the domed cover.

[0014] The sealing surfaces are exposed to considerable contact pressure during operation in order to be able to fulfil their function.

[0015] This causes strong forces to act on the lead coating between the surfaces that seal against each other. Since lead has low hardness and is easily deformed under mechanical stress, the lead coating between the sealing surfaces begins to creep over time. The lead creeps out of the sealing surfaces in both directions and forms a bulge there. The bulge itself is not a problem, but the lead coating in the sealing surfaces becomes thinner, so that the sealing effect is no longer guaranteed. Ultimately, this leads to disposing of containers or refinishing them at high cost due to an insufficient sealing effect of the lead coating on the sealing surfaces.

[0016] The object of the present invention was to provide a solution with which the problem of creep and thus the insufficient sealing for conventional lead coated containers including domed covers can be solved in a simple and economical manner.

[0017] In particular, the solution should also be suitable for retrofitting existing containers that have been decommissioned, for example due to insufficient sealing in the sealing areas.

[0018] According to the invention, the problem described above is solved by replacing the lead coating of the sealing surfaces of the container and the domed cover with sealing surfaces made of nickel.

[0019] The principle according to the invention works equally well for small sealing surfaces, for example on valves, as well as for large sealing surfaces, for example on raised manholes or raised manhole connectors.

[0020] The sealing surfaces on the domed cover and raised manhole connector usually have an annular disk shape and enclose the mouth of the corresponding openings.

[0021] Not only is nickel strong enough to withstand the resulting pressure load, but is also resistant to bromine. However, nickel is significantly more expensive than lead and completely replacing the lead coating with nickel is not advisable for cost reasons. According to the invention, the lead coating is therefore only partially replaced, in particular, in the critical sealing areas, with sealing surfaces made of nickel (also referred to here as "nickel sealing surface").

[0022] In the case of the domed cover, this relates to the top side, the sealing surfaces facing the valves or other structures, if provided, and on the bottom side of the support surface of the domed cover on the connector or the fastening flange of the connector, and in the case of the connector, the corresponding counter-surface on which the sealing surface of the domed cover is positioned.

[0023] One way of providing the required nickel sealing surfaces in the desired annular disk shape is to cut the annular disk shapes in the required size out of nickel sheets. However, this results in high nickel sheet wastage and therefore correspondingly higher costs.

[0024] The present inventors have ascertained that nickel can be deposited in sufficient quantity and in the desired

shape on the corresponding areas by deposition welding wherein a commercially available nickel wire can be used.

[0025] In this process, nickel sealing surfaces can be applied to the designated areas in custom shapes, so to speak, with almost no loss of material.

[0026] Another advantage is that if nickel sealing surfaces are made using deposition welding, a full-surface metallurgical connection is obtained between the nickel as the deposition material and the material of the underlying surface, such as the steel of the domed cover or raised manhole connector. In contrast, a prefabricated nickel ring is attached to a surface by welding a linear weld seam along the abutting edges of the components to be connected.

[0027] The sealing surfaces on the domed cover and connector are typically designed as an annular disk, as shown in the example in the attached figures.

[0028] It is nevertheless clear that the present invention is not limited to an annular disk shape, but it can have a different shape depending on requirements and application.

[0029] In addition to new construction, the solution according to the invention can also be used to retrofit existing containers. The containers can continue to be used by replacing the cover with a domed cover designed according to the invention.

[0030] For this purpose, an appropriately dimensioned additional flange, which is equipped with the nickel sealing surface, is attached to the connector or a fastening flange at the upper end of the connector.

[0031] Advantageously, the application of the nickel sealing surface to the additional flange is also carried out by deposition welding.

[0032] The solution according to the invention can drastically improve the safety of the containers during operation. Leakage caused by creeping of lead can be ruled out. In addition, the repair effort can be significantly reduced and thus the service life of the containers can be significantly increased.

[0033] The present invention is described in more detail below with the help of the embodiments shown in the attached figures.

[0034] Shown are:

[0035] FIG. **1**, a longitudinal section through a domed cover on a raised manhole connector, valve assembly on the domed cover and domed cover hood according to the prior art,

[0036] FIG. **2**, a top view of the domed cover and the valve assembly on the domed cover according to FIG. **1**,

[0037] FIG. **3**, a longitudinal section through the safety valve shown in FIG. **2**, including the associated domed cover section,

[0038] FIG. **4**, a longitudinal section through a domed cover without coating and fittings,

[0039] FIG. **5**, the longitudinal section according to FIG. **4** with lead coating including sealing surfaces made of lead according to the prior art,

[0040] FIG. **6**, the longitudinal section according to FIG. **4** with nickel sealing surfaces and lead coating according to the invention,

[0041] FIG. **7**, a preliminary domed cover according to FIG. **6** with nickel sealing surfaces,

[0042] FIG. **8**, a longitudinal section through a raised manhole connector designed according to the invention,

[0043] FIG. **9**, a top view of the raised manhole connector according to FIG. **8**,

[0044] FIG. **10**, a longitudinal section through a machined surface of a nickel sealing surface,

[0045] FIG. **11**, a longitudinal section through a raised manhole connector closed with a domed cover according to the invention for a container according to the invention, in longitudinal section,

[0046] FIG. **12**, a longitudinal section through a raised manhole connector retrofitted according to the invention having an extension flange with a nickel sealing surface applied thereto, and

[0047] FIG. **13**, an extension flange with a nickel sealing surface for retrofitting a conventional container.

[0048] The figures exemplarily relate to a tank container as is generally known for the storage and transport of contents, in particular aggressive contents.

[0049] Dimensions given in the figures are representational only and can be modified depending on requirements and intended use.

[0050] In the figures, the corresponding tank body is omitted, whereby the lower opening of the raised manhole connector is connected to the tank body via the manhole and forms a single unit.

[0051] FIG. **1** shows a raised manhole connector **1** according to the prior art.

[0052] The domed cover **1** is shown with valve assembly **4**, **5**, **6** in the closed state resting on a raised manhole connector **2**, whereby the domed cover **1** with valve assembly **4**, **5**, **6** is covered with a domed cover hood **3**, which serves to protect the valve assemblies **4**, **5**, **6**.

[0053] In the longitudinal section according to FIG. **1**, three valves **4**, **5**, **6** can be seen, which are arranged in a row along the diameter of the domed cover **1**. In the arrangement shown here, the center valve **4** is used for loading and unloading the container, the left valve **5** is used to introduce gas—usually dry air or nitrogen—to enable unloading, and the right valve **6** is used for degassing during loading.

[0054] On the bottom side of the domed cover **1** is a surface layer of lead coating **8**, the edge region of which forms a sealing surface that is assigned as a counter-surface to a sealing surface **10** on the raised manhole connector **2**.

[0055] The sealing surface **10** on the raised manhole connector **2** is part of the lead coating **9** of the raised manhole connector, which extends along the inner surface of the raised manhole connector **2** over the upper edge to the top of a fastening flange **25**, which is only indicated here, and forms the sealing surface **10** made of lead.

[0056] A seal **11**, which is made of a plastic that is resistant to bromine, for example, polytetrafluoroethylene (PTFE), is typically provided between the sealing surface on the bottom side of the domed cover **1** and the sealing surface **10** on the raised manhole connector.

[0057] Around the outer circumference of the domed cover **1**, a series of through-holes **12** are provided for fastening elements, for example threaded bolts or the like, with which the domed cover **1** is fastened onto the raised manhole connector **2**. The fastening elements are tightened firmly in order to obtain a tight seal. This exerts a high contact pressure on the sealing surfaces made of lead on the bottom side of the domed cover **1** and its counter-surface, the lead sealing surface **10** on the raised manhole connector **2**.

[0058] FIG. **2** shows a top view of the domed cover **1** according to FIG. **1**, wherein the structures on the bottom side of the dome cover including the upper opening **13** of the raised manhole connector **2** are also indicated.

[0059] Valves **4**, **5**, **6** are present on the top of the domed cover **1** as well as an additional valve **7**, which is a safety valve, and through-holes **12** with fastening elements, which are arranged at a distance from one another around the peripheral region of the domed cover **1**.

[0060] The individual circles indicate, from the inside to the outside, the opening **13** of the raised manhole connector **2**, the outer circumference **14** of the surface layer of lead coating **8** on the bottom side of the domed cover **1**, the outer circumference **15** of the domed cover **1** and the outer circumference **16** of the fastening flange **25** on the raised manhole connector **2**.

[0061] The connections of the valves **4**, **5**, **6** and **7** to the domed cover **1** and thereby the container is shown in FIG. **3** using the example of the safety valve **7**. For the connection, a through-hole **17** is provided in the domed cover **1** at the designated position.

[0062] The lead layer **8** on the bottom side of the domed cover **1** extends to the inner wall of the through-hole **17** beyond the upper edge of the through-hole **17** and forms a sealing surface **18** made of lead around the through-hole **17**, on which the valve **7** is mounted.

[0063] In addition, a seal **19** made of plastic that is resistant to bromine, for example PTFE, is placed between the valve **7** and the ring-shaped lead sealing surface **18**.

[0064] For fastening the valves, blind holes **20** can be provided on the top side. of the dome cover **1** around the through-holes **17** and sealing surface **18** made of lead, into which suitable fastening means **21** can be inserted, for example conventional stud bolts, as shown in FIG. **3**.

[0065] The domed cover **1** in FIGS. **1** to **3** corresponds to the prior art and is made of steel. It is provided with a flat layer of lead coating **8** on the bottom side, which also coats the inner wall of the through-holes **17** for the valve connection and extends beyond the upper edge of the through-holes **17** and forms an annular disk-shaped sealing surface made of lead **18** around the through-holes **17**. The valve is mounted on this annular disk-shaped sealing surface made of lead **18**.

[0066] To fasten the valves onto the domed cover **1** and the domed cover **1** onto the raised manhole connector **2**, the respective sealing surfaces are pressed firmly against each other in order to ensure the required sealing effect, which also results in large forces acting on these areas.

[0067] FIGS. **4** to **8** schematically show the individual stages of the arrangement of a domed cover **1** according to the prior art and according to the invention.

[0068] FIG. **4** thereby shows a longitudinal section through a still uncoated domed cover **1** along the diameter with the three through-holes **17** for connecting the valves **4**, **5**, **6**. In addition, blind holes **20** for fastening the valves **4**, **5**, **6** are present in the vicinity of the through-holes **17** for connecting the valves **4**, **5**, **6** and, along the peripheral region of the domed cover **1**, there are through-holes **12** for fastening elements for fastening the domed cover **1** to a raised manhole connector **2**.

[0069] Reference number **15** indicates the outer circumference of the domed cover **1**.

[0070] FIG. **5** shows the domed cover **1** according to FIG. **4** with lead glazing according to the prior art, wherein the bottom side of the domed cover, the inner wall of the through-holes **17** and the sealing surfaces **18** around the through-holes **17** are coated with a continuous layer of lead **8**.

[0071] The surface layer of lead **8** on the bottom side of the domed cover **1** extends up to the through-holes **12**, as indicated in FIG. **5** by the outer circumference **14** of the layer of lead **8**.

[0072] In FIG. **6**, as compared to FIG. **5**, a domed cover **1** designed according to the invention is seen. Here, the layer of lead **8**, in the areas of the domed cover **1** that are subject to a significant pressure load, is replaced by nickel sealing surfaces **22** and **23**.

[0073] These are, in particular, the areas on the top of the domed cover **1** around the through-holes **17** for the valves, which form the counter-surface for the valves, and, on the bottom side of the domed cover **1**, the peripheral region with which the domed cover **1** rests on the raised manhole connector **2**. In these areas, the layer of lead has been replaced by a nickel sealing surface **22** and **23** according to the invention.

[0074] Each of the nickel sealing surfaces **22**, **23** have an annular disk-shaped design.

[0075] As shown in FIG. **6**, the lead coating on the top side of the domed cover **1** along the circumference of the through-holes **17** for connecting the valves is replaced by an annular disk-shaped nickel sealing surface **22**.

[0076] The nickel sealing surfaces **22** are located in the area between the through-hole **17** and the blind holes **20**; the blind holes **20** extend from the top of the domed cover **1** downward into the domed cover **1**, as can be seen in FIGS. **6** and **7**.

[0077] Likewise, on the bottom side of the domed cover **1**, the contact surface area of the domed cover **1** on the raised manhole connector **2** is replaced by a corresponding annular disk-shaped nickel sealing surface **23**. The nickel sealing surface **23** runs on the bottom side of the domed cover **1** along the inner circumferential line of the through-holes **12** for the fastening elements for fastening the domed cover **1** to the raised manhole connector **2**, so that the nickel sealing surface **23** now lies between the lead coating **8** and the through-holes **12**.

[0078] In the example shown here, the thickness of the nickel sealing surfaces **22** can be 6-10 mm, and the thickness of the nickel sealing surfaces **23**, **24** can be 10 mm. The thickness of the nickel sealing surfaces depends on the container's application requirements. As a rule, it can be between 4 mm and 20 mm, whereby optionally the thickness for the nickel sealing surfaces **22** can be less than the thickness for the nickel sealing surfaces **23** on the bottom side of the dome cover and the nickel sealing surfaces **24** on the raised manhole connector.

[0079] To manufacture the domed cover **1**, nickel coatings of the desired dimensions and thickness are first applied by means of deposition welding to the nickel sealing surfaces **22** on a steel blank corresponding to the dimensions of the domed cover at the position intended for the through-holes for the valves.

[0080] In addition, the nickel sealing surface **23** is applied to the bottom side of the dome cover by means of deposition welding.

[0081] By using the deposition welding process, the desired nickel sealing surfaces **22**, **23** can be obtained easily with almost no loss of material. A full-surface metallurgical bond is created between the nickel sealing surface and the domed cover.

[0082] After applying nickel to the nickel sealing surfaces **22**, **23**, the through-holes **17** and the blind holes **20** for the

valves, etc., are machined on the domed cover **1**. The result is a preliminary domed cover as shown in FIG. **7**, with through-holes **17** for the valves, nickel sealing surfaces **22** along the upper circumference of the through-holes **17** and nickel sealing surface **23** on the bottom side of the domed cover along the section where the domed cover **1** comes in contact with a raised manhole connector **2**, as well as through-holes **12** for fastening elements for fastening the dome cover **1** onto the raised manhole connector **2**, and blind holes **20** for fastening elements for fastening the valves to the domed cover.

[0083] Subsequently, the lead coating **8** is applied in a conventional manner, with a surface layer of lead coating **8** being applied to the bottom side of the domed cover in the area surrounded by the nickel sealing surface **23** and extended along the inner surfaces of the through-holes **17** to the upper edge of the nickel sealing surfaces **22**, as shown in FIG. **6**.

[0084] The result is a domed cover **1** in which, according to the invention, in particular, the critical areas that are exposed to high contact pressure during operation are selectively provided with nickel sealing surfaces **22**, **23**.

[0085] Unlike lead, nickel does not show any plastic deformation such as creep due to its high hardness even under high pressure. The nickel sealing surfaces **22**, **23** retain their shape and thus their leak-proofness even under long periods of high pressure.

[0086] According to the invention, similar to the domed cover **1**, the lead sealing surface **10** is also replaced by a nickel sealing surface **24** on the raised manhole connector **2**, as shown in FIG. **8**, which depicts a longitudinal section through a raised manhole connector **2**.

[0087] A fastening flange **25** is provided on the upper opening of the raised manhole connector **2**, which runs around the circumference of the raised manhole connector **2** and protrudes beyond the circumference of the raised manhole connector **2**. This projecting peripheral region of the fastening flange **25** is provided with through-holes **26**, which are arranged spaced apart from one another around the entire circumference and serve to fasten the domed cover **1** onto the raised manhole connector **2**.

[0088] The lead coating **9** extends from the upper edge of the nickel sealing surface **24**, down the inner wall of the raised manhole connector **2**, and along the inner wall of the container body (not shown).

[0089] A top view of the raised manhole connector **2** with fastening flange **25** according to FIG. **8** is shown in FIG. **9**. In this top view, three concentrically arranged ring-shaped areas can be seen.

[0090] The outer ring-shaped area **16** is the protruding peripheral area of the fastening flange **25** with the through-holes **26**, the central ring-shaped area is the annular-disk-shaped nickel sealing surface **24** and the inner ring-shaped area is the lead coating **9**.

[0091] If the domed cover **1** according to the invention is placed on the raised manhole connector **2** according to the invention, the nickel sealing surface **23** on the bottom side of the domed cover **1** will lie on the nickel sealing surface **24** on the fastening flange **25** of the raised manhole connector **2**. As a result, in the areas subject to contact pressure, the nickel sealing surfaces **23**, **24** lie on top of one another, which, unlike the conventional lead coating, can withstand the pressure exerted by the adjacent additional component.

[0092] When the container is in use, an additional plastic seal **11**, e.g. made of PTFE, is provided between the two nickel sealing surfaces **23**, **24**. In principle, any seal can be used as long as it is not corroded by bromine.

[0093] In one embodiment (FIG. **10**), concentric grooves **27** can be provided on the top of the nickel sealing surfaces **22**, **23**, **24**, on which the plastic seals **11**, **19** are placed, so that the plastic seals **11**, **19** are pressed into the grooves **27** by the contact pressure, thus improving the fit and the tightness of the seal **11**, **19** and therefore the leak-proof capacity.

[0094] In principle, the manufacturing process takes place in such a way that the nickel coating on steel, in particular for the production of the sealing surfaces **22**, **23** and **24**, is carried out by deposition welding, and other metallic surfaces are connected by welding, for example between two steel surfaces, such as between the fastening flange **25** and the raised manhole connector **2**. Lead and nickel or lead and steel, on the other hand, are preferably connected by soldering.

[0095] The welded connections (weld seams) between the individual components are marked in the figures, as per convention, by black, usually triangular areas x, e.g. in FIG. **8** between raised manhole connector and fastening flange **25**.

[0096] The situation when a raised manhole connector **2** is closed with a domed cover **1** according to the invention is shown in FIG. **11** in longitudinal section.

[0097] The section again extends along the through-holes **17** for the three valves **4**, **5**, **6**, which are arranged along the diameter of the dome cover **1**. It can be clearly seen that the annular disk-shaped nickel sealing surface **23** on the bottom side of the dome cover **1** is mounted on the annular disk-shaped nickel sealing surface **24** on the fastening flange **25** of the raised manhole connector **2**. A plastic seal **11** is provided between the two annular disk-shaped nickel sealing surfaces **23**, **24**.

[0098] Other nickel sealing surfaces **22** are arranged on the top of the domed cover around the circumference of the through-holes **17** for the valve connection. The remaining lead layer **8** extends here from the upper edge of the nickel sealing surfaces **22**, along the inner wall of the through-holes **17** for the valve structures to the bottom side of the domed cover and on the bottom side of the domed cover, to the nickel sealing surface **23**.

[0099] In this example, the thickness of the sealing surfaces **22**, **23** and **24** is 10 mm in each case.

[0100] Similarly, the layer of lead **9** in the raised manhole connector extends from the upper edge of the nickel sealing surface **24** along the inner peripheral surface of the fastening flange **25** down into the raised manhole connector **2** and from there onto the inner wall of the corresponding container (not shown here).

[0101] Through-holes **12**, **26** for the fastening elements (not shown in the figure) are provided in the peripheral regions of the domed cover **1** and fastening flange **25** that lie outside the nickel sealing surfaces **22**, **23**.

[0102] The core idea of the present invention lies in replacing the areas of the lead coating that are subject to contact pressure with corresponding nickel inserts or nickel sealing surfaces.

[0103] It is advantageous for these nickel sealing surfaces to be applied to the corresponding substrates by means of deposition welding.

[0104] It goes without saying that the present invention is not limited to the embodiments shown above in the figures for illustration purposes, but is also suitable for domed covers that have no through-holes, fewer through-holes or more through-holes for valve connections.

[0105] Also, instead of the annular disk-shaped nickel sealing surfaces exemplarily shown in the figures, if required, any other shape of nickel sealing surfaces can be used.

[0106] The dimensions of the nickel sealing surfaces, such as thickness or width, can also be adapted to the requirements for the application of the container.

[0107] Another major advantage of the invention is that existing containers can also be easily retrofitted according to the invention. This means that containers that have been decommissioned due to the wearing off of the lead coating on the sealing surfaces and the associated insufficient sealing that arises can also be made fit for use again.

[0108] The retrofitting is exemplarily described with reference to FIGS. **12** and **13**.

[0109] FIG. **12** shows a longitudinal section through a raised manhole connector **2** that has been retrofitted according to the invention. For the retrofitting, an extension flange **28** is attached to the existing fastening flange **25**, which is provided with the nickel sealing surface **24**.

[0110] The dimensioning and design of the extension flange **28** with nickel sealing surface **24** and through-holes **29** for fastening elements are adapted to the existing fastening flange **25**.

[0111] For retrofitting conventional containers with sealing surfaces made of lead, the old sealing surface made of lead **10** and lead coating **9** are first removed up to the interior of the raised manhole connector **2**.

[0112] Then the extension flange **28** made of the same material is mounted on the existing fastening flange **25**, which has an annular disk-shaped nickel sealing surface **24** in the area of the sealing surface, for example, as shown in FIG. **5**, instead of the conventional lead sealing surface **10**, as shown in FIG. **13**.

[0113] The lead coating **9** is then recoated between the upper edge of the nickel sealing surface **24** down to the raised manhole connector **2**.

[0114] In this case too, the nickel sealing surface **24** is advantageously attached to the surface of the extension flange **28** by means of deposition welding and the extension flange **28** is connected to the existing fastening flange **25** by means of welding.

[0115] The weld seam between the raised manhole connector **2** and the fastening flange **25** is, as is customary, identified by a black surface x.

[0116] A container retrofitted with a raised manhole connector **2** designed according to the invention can then be reused with a domed cover **1** according to the invention.

[0117] The present invention relates to containers, for example tank containers with raised manhole connector **2** and domed cover **1**, for closing the raised manhole connector **2**, these containers being coated with lead for the transport of aggressive contents, such as bromine, wherein the domed cover **1** and the raised manhole connector **2** have nickel sealing surfaces **22**, **23**, **24**, which are prepared, in particular, by means of deposition welding, as well as conventional containers that are retrofitted according to the invention as well as methods for this purpose.

LIST OF REFERENCE CHARACTERS

[0118] **1** Domed cover
[0119] **2** Raised manhole connector or connector
[0120] **3** Domed cover hood
[0121] **4** Center valve
[0122] **5** Left valve
[0123] **6** Right valve
[0124] **7** Safety valve
[0125] **8** Surface layer of lead
[0126] **9** Lead coating (raised manhole connector)
[0127] **10** Lead sealing surface (raised manhole connector)
[0128] **11** Seal (between domed cover and raised manhole connector)
[0129] **12** Through-hole for fastening the domed cover on the raised manhole connector
[0130] **13** Opening (raised manhole connector)
[0131] **14** Outer circumference of the surface layer of lead **8**
[0132] **15** Outer circumference of the domed cover
[0133] **16** Outer circumference of a flange ring **25**
[0134] **17** Through-hole (for valve fastening)
[0135] **18** Lead sealing surface (valve)
[0136] **19** Seal (valve connection)
[0137] **20** Blind hole (for valve fastening)
[0138] **21** Fastening means (for valve)
[0139] **22** Nickel sealing surface (valve)
[0140] **23** Nickel sealing surface (bottom side of domed cover)
[0141] **24** Nickel sealing surface (raised manhole connector)
[0142] **25** Fastening flange (with outer circumference **16**)
[0143] **26** Through-hole (fastening flange **25**)
[0144] **27** Concentric grooves
[0145] **28** Extension flange
[0146] **29** Through-hole (extension flange **28**)
[0147] x Weld seam

1. A container with raised manhole connector (**2**), which can be closed with a domed cover (**1**),
wherein at least the inner wall of the container and of the raised manhole connector (**2**) is provided with a lead coating (**9**),
wherein a fastening flange (**25**) is provided around the top opening of the raised manhole connector (**2**),
wherein on the top side of the fastening flange (**25**) around the opening to the raised manhole connector (**2**), a nickel sealing surface (**24**) is applied as a seal against a domed cover (**1**),
wherein the nickel sealing surface (**24**) is aligned with the opening of the raised manhole connector (**2**) and the lead coating (**9**) extends to the upper edge of the nickel sealing surface (**24**).

2. The container according to claim **1**,
wherein an extension flange (**28**) is mounted on the fastening flange (**25**), and
wherein the nickel sealing surface (**24**) is located on the top of the extension flange (**28**).

3. The domed cover (**1**) for a container according to claim **1**,
wherein a nickel sealing surface (**23**) is provided on the bottom side of the domed cover (**1**) which nickel sealing surface is associated with the nickel sealing surface (**24**) of a raised manhole connector (**2**),

wherein the nickel sealing surface (**23**) is provided on the bottom side of the domed cover (**1**) in the peripheral region, via which the domed cover (**1**) rests on the nickel sealing surface (**24**) of a raised manhole connector (**2**) during operation, and the bottom surface of the domed cover (**1**), which is surrounded by the sealing surface (**23**) is coated with a surface layer of lead (**8**).

4. The domed cover according to claim **3**,

wherein the domed cover (**1**) has one or more through-holes (**17**) to connect fittings, and

wherein the layer of lead (**8**) extends along the bottom side of the domed cover (**1**) along the inner wall of the through-holes (**17**) and covers the inner wall.

5. The domed cover (**1**) according to claim **4**,

wherein nickel sealing surfaces (**22**) are provided on the top side of the domed cover (**1**) around the opening of the through-holes (**17**) in order to provide sealing with respect to a fitting,

wherein the nickel sealing surfaces (**22**) are aligned with the through-holes (**17**), and the layer of lead (**8**) extends to the upper edge of the nickel sealing surfaces (**22**).

6. The domed cover (**1**) according to claim **5**,

wherein the fittings are selected from valves (**4**) for loading and unloading the container, valves (**6**) for venting the container and valves (**5**) for introducing gas into the container, and a safety valve (**7**).

7. The domed cover according to claim **3**,

wherein the nickel sealing surfaces (**22**) on the top side of the domed cover (**1**) and the nickel sealing surface (**23**) on the bottom side of the domed cover (**1**) have been produced by deposition welding.

8. The container according to claim **1**,

wherein the nickel sealing surface (**24**) has been produced by deposition welding.

9. A method for manufacturing a container and a domed cover according to claim **1**,

wherein the nickel sealing surfaces (**22**, **23**, **24**) are produced by deposition welding on the material surface.

10. The method for manufacturing a container according to claim **2**,

wherein an extension flange (**28**), which is fitted to the fastening flange (**25**) and onto which the nickel sealing surface (**24**) is applied, is mounted on the fastening flange (**25**) of the raised manhole connector (**2**).

11. The domed cover (**1**) for a container according to claim **2**,

wherein a nickel sealing surface (**23**) is provided on the bottom side of the domed cover (**1**) which nickel sealing surface is associated with the nickel sealing surface (**24**) of a raised manhole connector (**2**),

wherein the nickel sealing surface (**23**) is provided on the bottom side of the domed cover (**1**) in the peripheral region, via which the domed cover (**1**) rests on the nickel sealing surface (**24**) of a raised manhole connector (**2**) during operation, and the bottom surface of the domed cover (**1**), which is surrounded by the sealing surface (**23**) is coated with a surface layer of lead (**8**).

12. The domed cover according to claim **11**,

wherein the domed cover (**1**) has one or more through-holes (**17**) to connect fittings, and

wherein the layer of lead (**8**) extends along the bottom side of the domed cover (**1**) along the inner wall of the through-holes (**17**) and covers the inner wall.

13. The domed cover (**1**) according to claim **12**,

wherein nickel sealing surfaces (**22**) are provided on the top side of the domed cover (**1**) around the opening of the through-holes (**17**) in order to provide sealing with respect to a fitting,

wherein the nickel sealing surfaces (**22**) are aligned with the through-holes (**17**), and the layer of lead (**8**) extends to the upper edge of the nickel sealing surfaces (**22**).

14. The domed cover (**1**) according to claim **13**,

wherein the fittings are selected from valves (**4**) for loading and unloading the container, valves (**6**) for venting the container and valves (**5**) for introducing gas into the container, and a safety valve (**7**).

15. The domed cover according to claim **4**,

wherein the nickel sealing surfaces (**22**) on the top side of the domed cover (**1**) and the nickel sealing surface (**23**) on the bottom side of the domed cover (**1**) have been produced by deposition welding.

16. The domed cover according to claim **5**,

wherein the nickel sealing surfaces (**22**) on the top side of the domed cover (**1**) and the nickel sealing surface (**23**) on the bottom side of the domed cover (**1**) have been produced by deposition welding.

17. The domed cover according to claim **6**,

wherein the nickel sealing surfaces (**22**) on the top side of the domed cover (**1**) and the nickel sealing surface (**23**) on the bottom side of the domed cover (**1**) have been produced by deposition welding.

18. The container according to claim **2**,

wherein the nickel sealing surface (**24**) has been produced by deposition welding.

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