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(54) **HIGH-TEMPERATURE MATERIAL CONVEYING TANK**

HOCHTEMPERATURMATERIALFÖRDERTANK

RÉSERVOIR DE TRANSPORT DE MATIÈRES À HAUTE TEMPÉRATURE

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Description

FIELD

[0001] This invention relates to a high-temperature material conveying tank of the kind defined in the preamble of claim 1 or claim 8.

BACKGROUND

[0002] A conveying tank is a commonly used equipment for containing and conveying a material. The material contained in the conveying tank generally has a temperature reaching 900°C, and thus the material to be conveyed is usually called high-temperature material, and the conveying tank may also be called high-temperature material conveying tank. The material is generally fed into the high-temperature material conveying tank through an upper inlet and discharged via a lower outlet, i.e., the feed inlet is arranged at the top of the high-temperature material conveying tank, and the discharge outlet is arranged at the bottom of the high-temperature material conveying tank. The tank body of the high-temperature material conveying tank is mainly classified into a two-section type and a three-section type. The two-section type tank body includes a cylindrical section and an inverted taper section connected to a lower part of the cylindrical section. The three-section type tank body includes a cylindrical section, a taper section connected to an upper part of the cylindrical section, and an inverted taper section connected to a lower part of the cylindrical section. The cylindrical section is butt welded to the tapered section such that a welded joint is formed at the natural angle between the end faces of the cylindrical section and the taper section. During feeding and discharging the material, a temperature at the joint is changed in a periodical manner, resulting in the weld joint suffering uneven stress, which finally leads to deformation at the weld joint, thereby adversely affecting normal conveying of the material seriously. A high-temperature material conveying tank of the kind defined in the preamble of claim 1 or claim 8 is known from the Chinese patent document CN 101 767 694A which discloses a tank having a three-section type tank body as described above.

SUMMARY

[0003] An object of the invention is to solve at least one of the technical problems existing in the prior art to at least some extent. For this purpose, the invention provides a high-temperature material conveying tank which prevents a welded joint from cracking and deforming.

[0004] In one aspect, the invention provides a high-temperature material conveying tank of the kind defined in the preamble of claim 1, which tank is characterized by the features of the characterizing part of claim 1.

[0005] The high-temperature material conveying tank according to the invention has an advantage of good stress intensity, thereby preventing a welded joint from cracking and deforming.

[0006] Otherwise, the tank body includes an inner tank wall and an outer tank wall; and a thermal insulation cavity, formed between the inner tank wall and the outer tank wall, is provided with a thermal insulation layer inside.

[0007] Otherwise, a welding position between the inner tank wall of the cylindrical section and the inner tank wall of first connection section is arranged in a staggered way with respect to that between the outer tank wall of the cylindrical section and the outer tank wall of the first connection section.

[0008] Otherwise, the high-temperature material conveying tank further includes a welding reinforced inner ring plate and a welding reinforced outer ring plate, wherein the welding reinforced inner ring plate is welded on the inner tank wall of the cylindrical section and the inner tank wall of the first connection section, and covers a welded joint between the inner tank wall of the cylindrical section and the inner tank wall of the first connection section; and the welding reinforced outer ring plate is welded on the outer tank wall of the cylindrical section and the outer tank wall of the first connection section, and covers a welded joint between the outer tank wall of the cylindrical section and the outer tank wall of the first connection section.

[0009] Otherwise, the first connection section and the cylindrical section are butt welded after weld groove processing.

[0010] Otherwise, the high-temperature material conveying tank further includes a feed cone, wherein the feed cone forms the feed inlet and is connected to an upper part of the tank body with a connecting piece; the lower part of the feed cone stretches into the material cavity; the connecting piece is connected to the tank body by a bolt; and the feed cone is welded with the connecting piece.

[0011] Otherwise, the high-temperature material conveying tank further includes a second taper section and a second connection section in a cylindrical shape, wherein the second connection section is arranged at the other end of the cylindrical section and arranged between the other end of the cylindrical section and the second taper section; and the second connection section is joined integrally to the second taper section and butt welded to the cylindrical section.

[0012] In another aspect, the invention provides a high-temperature material conveying tank of the kind defined in the preamble of claim 8, which tank is characterized by the features of the characterizing part of claim 8.

[0013] Otherwise, the tank body includes an inner tank wall and an outer tank wall; and a thermal insulation cavity, formed between the inner tank wall and the outer tank wall, is provided with a thermal insulation layer inside.

[0014] Otherwise, a welding position between the inner tank wall of the taper section and the inner tank wall of first connection section is arranged in a staggered way with **respect to** that between the outer tank wall of the

taper section and the outer tank wall of the first connection section.

[0015] Otherwise, the high-temperature material conveying tank further includes a welding reinforced inner ring plate and a welding reinforced outer ring plate, wherein the welding reinforced inner ring plate is welded on the inner tank wall of the taper section and the inner tank wall of the first connection section, and covers a welded joint between the inner tank wall of the taper section and the inner tank wall of the first connection section; and the welding reinforced outer ring plate is welded on the outer tank wall of the taper section and the outer tank wall of the first connection section, and covers a welded joint between the outer tank wall of the taper section and the outer tank wall of the first connection section.

[0016] Otherwise, the first connection section and the first taper section are butt welded after weld groove processing.

[0017] Otherwise, the high-temperature material conveying tank further includes a feed cone, wherein the feed cone forms the feed inlet and is connected to an upper part of the tank body with a connecting piece; the lower part of the feed cone stretches into the material cavity; the connecting piece is connected to the tank body by a bolt; and the feed cone is welded with the connecting piece.

[0018] Otherwise, the high-temperature material conveying tank further includes a second taper section and a second connection section in a taper-like shape, wherein the second connection section is arranged at an end of the cylindrical section and arranged between said end of the cylindrical section and the second taper section; and the second connection section is joined integrally to the cylindrical section and butt welded to the second taper section.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019]

Figure 1 is a schematic view showing a high-temperature material conveying tank according to an embodiment of the present disclosure;

Figure 2 is a schematic diagram showing an enlarged region A in Figure 1.

Figure 3 is a schematic diagram showing an enlarged region B of Figure 1.

Reference:

[0020]

high-temperature material conveying tank 100,

tank body 10, material cavity 11, feed inlet 12, discharge outlet 13,

cylindrical section 14, inner tank wall of the cylindrical section 141, outer tank wall of the cylindrical section 142,

first taper section 15, inner tank wall of the first taper section 151, outer tank wall of the first taper section 152,

first connection section 16, inner tank wall of the first connection section 161, outer tank wall of the first connection section 162,

second taper section 17, second connection section 18,

thermal insulation cavity 20, thermal insulation layer 30, welding reinforced inner ring plate 40, welding reinforced outer ring plate 50,

feed cone 61, connecting piece 62, first supporting section 621, second supporting section 622,

heat resistant bolt 70.

DETAILED DESCRIPTION

[0021] Embodiments of the present disclosure are described in detail in conjunction with examples and drawings hereinafter. The same or similar elements and the elements having the same or similar functions are denoted by like reference numerals throughout the description. The embodiments described herein with reference to the drawings are explanatory, illustrative, and used for a general understanding of the invention. The embodiments shall not be construed to limit the scope of the invention as defined by the appended claims.

[0022] The high-temperature material conveying tank 100 according to one aspect of the invention is described in conjunction with Figures 1 to 3.

[0023] As shown in Figure 1, the high-temperature material conveying tank 100 includes a tank body 10 provided with a material cavity 11 inside, a feed inlet 12 at an upper part, and a discharge outlet 13 at a lower part, wherein the tank body 10 ineludes a cylindrical section 14, a first taper section 15 and a first connection section 16. The first connection section 16 is arranged at one end of the cylindrical section 14 and arranged between the one end of the cylindrical section 14 and the first taper section 15, and the first connection section 16 is **joined** integrally **to** the first taper section 15, and butt welded **to** the cylindrical section 14.

[0024] The high-temperature material conveying tank 100 can contain high-temperature materials in the material cavity 11. The high-temperature materials are fed into the material cavity 11 through the feed inlet 12, and can be discharged through an opening of the discharge outlet 13 and subsequently transported to a designated position. The first taper section 15 of the tank body 10 is joined integrally to the first connection section 16, which is butt welded to the cylindrical section 14. The first connection section 16 is of an inner diameter at a welding position identical to that of the cylindrical section 14 at the welding position, so as to enable the material located at the welding position to have a uniform temperature, thereby preventing a welded joint from cracking, deforming or the like, as well as increasing stress intensity of the high-temperature material conveying tank 100.

[0025] Otherwise, as shown in Figure 1, the tank body 10 includes an inner tank wall and an outer tank wall. A thermal insulation cavity 20, formed between the inner tank wall and the outer tank wall, is provided with a thermal insulation layer 30 inside. Specifically, the inner tank wall is sheathed in the outer tank wall such that the thermal cavity 20, filled with the thermal insulation layer 30, is formed therebetween. The inner tank wall is connected to the outer tank wall by a connection plate vertical to the inner tank wall and the outer tank wall. The inner tank wall of the first taper section 151 is connected with the inner tank wall of the first connection section 161, the outer tank wall of the first tapered section 152 is connected with the outer tank wall of the first connection section 162, the inner tank wall of the cylindrical section 141 is butt welded with the inner tank wall of the first connection section 161, and the outer tank wall of the cylindrical section 142 is butt welded with the outer tank wall of the first connection section 162. In this way, the high-temperature material conveying tank 100 may have a better heat preservation and insulation effect.

[0026] In a specific example shown in Figure 2, a welding position between the inner tank wall of the cylindrical section 141 and the inner tank wall of the first connection section 161 is arranged in a staggered way with respect to that between the outer tank wall of the cylindrical section 142 and the outer tank wall of the first connection section 162. Specifically, the welding position between the inner tank wall of the cylindrical section 141 and the inner tank wall of the first connection section 161 is of a vertical projection on a central axis of the tank body 10 being in a staggered way with respect to that between the outer tank wall of the cylindrical section 142 and the outer tank wall of the first connection section 162. In the example shown in Figure 2, the welding position between the inner tank wall of the cylindrical section 141 and the inner tank wall of first connection section 161 is higher than that between the outer tank wall of the cylindrical section 142 and the outer tank wall of the first connection section 162, so as to facilitate welding operations, thereby enabling the tank body 10 to have a better processing manufacturability.

[0027] Further, the high-temperature material conveying tank further includes a welding reinforced inner ring plate 40 and a welding reinforced outer ring plate 50. As shown in Figure 2, the welding reinforced inner ring plate 40 is welded on the inner tank wall of the cylindrical section 141 and the inner tank wall of the first connection section 161, and covers a welded joint between the inner tank wall of the cylindrical section 141 and the inner tank wall of the first connection section 161; and the welding reinforced outer ring plate 50 is welded on the outer tank wall of the cylindrical section 142 and the outer tank wall of the first connection section 162, and covers a welded joint between the outer tank wall of the cylindrical section 142 and the outer tank wall of the first connection section 162.

[0028] Specifically, the welding reinforced inner ring plate 40 and welding reinforced outer ring plate 50 cover the inner tank wall and the outer tank wall of the tank body 10, respectively. An upper part of the welding reinforced inner ring plate 40 is welded to the inner tank wall of the cylindrical section 141 in an overlapping way, and a lower part of the welding reinforced inner ring plate 40 is welded to the inner tank wall of the first connection section 161 also in an overlapping way. Similarly, an upper part of the welding reinforced outer ring plate 50 is welded to the outer tank wall of the cylindrical section 142 in an overlapping way, and a lower part of the welding reinforced outer ring plate 50 is welded to the outer tank wall of the first connection section 162 also in an overlapping way. Thus, the connection strength between the cylindrical section 14 and the first connection section 16 is further enhanced, and the overall structural strength of the high-temperature material conveying tank 100 is also enhanced.

[0029] As shown in Figure 2, in an alternative example, the first connection section 16 and the cylindrical section 14 are butt welded after weld groove processing. Specifically, a weld groove is in a V-like shape. Thus the butt welding can offer better welding manufacturability, and also improve connection strength. It would be appreciated by an ordinary technician in the art that the butt welding may also have a weld groove in an I-like shape, X-like shape, and the like.

[0030] Otherwise, as shown in Figures 1 and 3, the high-temperature material conveying tank 100 further includes a feed cone 61. The feed cone 61 forms the feed inlet 12 and is connected to an upper part of the tank body 10 with a connecting piece 62. The lower part of the feed cone 61 stretches into the material cavity 11. The connecting piece 62 is connected to the tank body 10 by a bolt, and the feed cone 61 is welded with the connecting piece 62. The feed cone 61 is of a diameter gradually decreasing from top to bottom. The connecting piece 62 is made of heat-resisting cast steel. The connecting piece 62 includes: a first supporting section 621 and a second supporting section 622 both in an annular shape, wherein the second supporting section 622 is located between the inner tank wall of the second taper section 17 and the outer tank wall of the second taper section 17, and connected to the second taper section 17 with a heat-resisting bolt 70; the second supporting section 622 is connected to the first supporting section 621, the first supporting section 621 supports the feed cone 61 and connected to the feed cone 61 by spot welding. Thus, the feed cone 61 is arranged in a manner so as to facilitate feeding materials, thereby effectively preventing an opening of the tank from deforming, preventing a welded joint from generating, and also facilitating dismounting and maintenance.

[0031] Otherwise, referring to Figure 1, the tank body 10 further includes a second taper section 17 and a second connection section 18 in a cylindrical shape. The second connection section 18 is arranged at the other end of the cylindrical section 14 and arranged between

the other end of the cylindrical section 14 and the second taper section 17, the second connection section 18 is joined integrally to the second taper section 17 and butt welded to the cylindrical section 14. Specifically, an upper part of the second taper section 17 is connected to the feed cone 61 with the connecting piece 62, and a lower part of the second taper section 17 is connected to the second connection section 18. The second taper section 17 is of a maximal diameter equal to the second connection section 18, thereby achieving an excellent transition from the feed cone 61 to the cylindrical section 14. It would be appreciated by an ordinary technician in the art that the tank body 10 may also merely include the cylindrical section 14, the first connection section 16 and the first taper section 15; wherein the feed cone 61 is connected to the cylindrical section 14 directly or with a connection piece, so as to facilitate the installation of the feed cone with a larger semi-diameter.

[0032] In an embodiment of the invention according to another aspect, which is not shown in the drawings, the high-temperature material conveying tank includes a tank body provided with a material cavity inside, a feed inlet at an upper part and a discharge outlet at a lower part. The tank body includes a cylindrical section, a first taper section and a first connection section, wherein the first connection section is arranged at one end of the cylindrical section and arranged between the one end of the cylindrical section and the first taper section, the first connection section is joined integrally to the cylindrical section, and butt welded to the first taper section. The high-temperature material conveying tank of the present embodiment is different from that of the previous embodiment as follows: the first connection section. In the previous embodiment, the first connection section is joined integrally to the first taper section, and butt welded to the cylindrical section.

[0033] According to the present embodiment, the high-temperature material conveying tank can contain high-temperature materials in the material cavity. The high-temperature materials are fed into the material cavity through the feed inlet, and can be discharged through an opening of the discharge outlet and subsequently transported to a designated position. The cylindrical section of the tank body is joined integrally to the first connection section, the first connection section is butt welded to the first taper section, and the first connection section is of an inner diameter at a butt welding position identical to that of the first taper section at the butt welding position, so as to enable the material located at the welding position to have a uniform temperature, thereby preventing a welded joint from cracking, deforming or the like, as well as increasing stress intensity of the high-temperature material conveying tank.

[0034] Otherwise, the tank body includes an inner tank wall and an outer tank wall. A thermal insulation cavity, formed between the inner tank wall and the outer tank wall, is provided with a thermal insulation layer inside. Specifically, the inner tank wall is sheathed in the outer tank wall such that the thermal cavity, filled with the thermal insulation layer, is formed therebetween. The inner tank wall is connected to the outer tank wall by a connection plate vertical to the inner tank wall and the outer tank wall. The inner tank wall of the first taper section is butt welded with the inner tank wall of the first connection section, and the outer tank wall of the first taper section is butt welded with the outer tank wall of the first connection section. In this way, the high-temperature material conveying tank may have a better heat preservation and insulation effect.

[0035] Otherwise, a welding position between the inner tank walls of the first taper section and the first connection section is arranged in a staggered way with respect to that between the outer tank walls of the first taper section and the first connection section. Specifically, the welding position between inner tank walls of the first taper section and the first connection section is of a vertical projection on a central axis of the tank body being in a staggered way with respect to that between the outer tank walls of the first taper section and the first connection section, so as to facilitate welding operations , thereby enabling the tank body to have a better processing manufacturability.

[0036] Further, the high-temperature material conveying tank further includes a welding reinforced inner ring plate and a welding reinforced outer ring plate. The welding reinforced inner ring plate is welded on the inner tank wall of the first taper section and the inner tank wall of the first connection section, and covers a welded joint between the inner tank wall of the first taper section and the inner tank wall of the first connection section. The welding reinforced outer ring plate is welded on the outer tank wall of the first taper section and the outer tank wall of the first connection section, and covers a welded joint between the outer tank wall of the first taper section and the outer tank wall of the first connection section.

[0037] Specifically, the welding reinforced inner ring plate and the welding reinforced outer ring plate cover the inner tank wall and the outer tank wall of the tank body, respectively. A lower part of the welding reinforced inner ring plate is welded to the inner tank wall of the first taper section in an overlapping way, and an upper part of the welding reinforced inner ring plate is welded to the inner tank wall of the first connection section also in an overlapping way. Similarly, a lower part of the welding reinforced outer ring plate is welded to the outer tank wall of the first taper section in an overlapping way, and an upper part of the welding reinforced outer ring plate is welded to the outer tank wall of the first connection section also in an overlapping way. Thus, the connection strength between the first taper section and the first connection section is further enhanced, and the overall structural strength of the high-temperature material conveying tank is also enhanced.

[0038] In an alternative example, the first connection section and the first taper section are butt welded after weld groove processing. Specifically, a weld groove is in a V-like shape. Thus the butt welding can offer better

welding manufacturability, and also improve connection strength. It would be appreciated by an ordinary technician in the art that the butt welding may also have a weld groove in an I-like shape, X-like shape, and the like.

[0039] Otherwise, the high-temperature material conveying tank further includes a feed cone. The feed cone forms with the feed inlet and is connected to an upper part of the tank body with the connecting piece. The lower part of the feed cone stretches into the material cavity. The connecting piece is connected to the tank body by a bolt, and the feed cone is welded with the connecting piece. The feed cone is of a diameter gradually decreasing from top to bottom. The connecting piece is made of a material of heat-resisting cast steel. The connecting piece includes: a first supporting section and a second supporting section both in an annular shape; wherein the first supporting section is located between the inner tank wall and the outer tank wall of the second taper section, and connected to the second taper section with a heat-resisting bolt; the second supporting section is connected to the first supporting section, and the second supporting section supports the feed cone and is connected to the feed cone in spot welding way. Thus, the feed cone is arranged in a manner so as to facilitate feeding materials, thereby effectively preventing an opening of the tank from generating deformation, preventing a welded joint from cracking, and also facilitating dismounting and maintenance.

[0040] Otherwise, the tank body further includes a second taper section and a second connection section in taper-like shape. The second connection section is arranged at the other end of the cylindrical section and arranged between the other end of the cylindrical section and the second taper section, the second connection section is joined integrally to the cylindrical section, and butt welded to the second taper section. Specifically, an upper part of the second taper section is connected to the feed cone, and a lower part of the second taper section is connected to the second connection section. The second taper section is of a maximal diameter equal to a minimal diameter of the second connection section, thereby achieving an excellent transition from the feed cone to the cylindrical section. It would be appreciated by an ordinary technician that the tank body may also merely contain the cylindrical section, the first connection section and the first taper section, wherein the feed cone can be connected to the cylindrical section directly or with the connecting piece, so as to facilitate the installation of the feed cone with a larger semi-diameter.

[0041] In the description of the present disclosure, it should be understood that terms such as "upper" and "lower" used herein with reference to an orientation or position relationship shown in drawings are only used to illustrate the present disclosure and simplify description of the present disclosure, and are not intended to indicate or imply that the device or element referred to must have a particular orientation, or must be constructed and operated in the particular orientation, i.e. are not intended to limit the present disclosure.

[0042] In addition, terms such as "first" and "second" are used herein for purposes of description and are not intended to indicate or imply relative importance or significance or to imply the number of indicated technical features. Thus, the feature defined with "first" and "second" may comprise one or more of this feature explicitly or implicitly. In the description of the present disclosure, unless specified otherwise, "a plurality of' means two or more than two, such two, three, or more.

[0043] In the present disclosure, unless specified or limited otherwise, the terms "mounted," "connected", "coupled", "fixed" and the like are used broadly, and may be, for example, fixed connections, detachable connections, or integral connections; may also be mechanical or electrical connections; may also be direct connections or indirect connections via intervening structures; may also be inner communications of two elements, which can be understood by those skilled in the art according to specific situations.

[0044] In the present disclosure, unless specified or limited otherwise, a structure in which a first feature is "on" or "below" a second feature may include an embodiment in which the first feature is in direct contact with the second feature, and may also include an embodiment in which the first feature and the second feature are not in direct contact with each other, but via an additional feature formed therebetween. Furthermore, a first feature "on", "above" or "on top of' a second feature may include an embodiment in which the first feature is right or obliquely "on", "above" or "on top of' the second feature, or just means that the first feature is at a height higher than that of the second feature; while a first feature "below", "under" or "on bottom of' a second feature may include an embodiment in which the first feature is right or obliquely "below", "under" or "on bottom of' the second feature, or just means that the first feature is at a height lower than that of the second feature.

[0045] Reference throughout this specification to "an embodiment," "some embodiments," "one embodiment", "another example," "an example," "a specific example," or "some examples," means that a particular feature, structure, material, or characteristic described in connection with the embodiment or example is included in at least one embodiment or example of the present disclosure. Thus, the appearances of the phrases such as "in some embodiments," "in one embodiment", "in an embodiment", "in another example," "in an example," "in a specific example," or "in some examples," in various places throughout this specification are not necessarily referring to the same embodiment or example of the present disclosure. Furthermore, the particular features, structures, materials, or characteristics may be combined in any suitable manner in one or more embodiments or examples.

Claims

1. A high-temperature material conveying tank (100) comprising a tank body (10) provided with a material cavity (11) inside, a feed inlet (12) at an upper part and a discharge outlet (13) at a lower part, said tank body (10) comprising a cylindrical section (14) and a first taper section (15) connected to said cylindrical section (14) via a butt weld, **characterized in that** a first cylindrical connection section (16) is arranged between one end of said cylindrical section (14) and said first taper section (15), and has the same diameter as said cylindrical section (14), said first cylindrical connection section (16) being joined integrally to said first taper section (15) and having an end at which said first cylindrical connection section (16) **is** butt welded to said one end of said cylindrical section (14).

2. A high-temperature material conveying tank (100) according to claim 1, wherein the tank body (10) comprises an inner tank wall and an outer tank wall; and a thermal insulation cavity (20), formed between the inner tank wall and the outer tank wall, is provided with a thermal insulation layer (30) inside.

3. A high-temperature material conveying tank (100) according to claim 2, wherein a welding position between the inner tank wall of the cylindrical section (141) and the inner tank wall of the first connection section (161) is arranged in a staggered way with respect to that between the outer tank wall of the cylindrical section (142) and the outer tank wall of the first connection section (161).

4. A high-temperature material conveying tank (100) according to claim 3, further comprising a welding reinforced inner ring plate (40) and a welding reinforced outer ring plate (50), wherein the welding reinforced inner ring plate (40) is welded on the inner tank wall of the cylindrical section (141) and the inner tank wall of the first connection section (161), and covers a welded joint between the inner tank wall of the cylindrical section (141) and the inner tank wall of the first connection section (161); and the welding reinforced outer ring plate (50) is welded on the outer tank wall of the cylindrical section (142) and the outer tank wall of the first connection section(162), and covers a welded joint between the outer tank wall of the cylindrical section (142) and the outer tank wall of the first connection section (162).

5. A high-temperature material conveying tank (100) according to claim 1, wherein the first connection section (16) and the cylindrical section (14) are butt welded after weld groove processing.

6. A high-temperature material conveying tank (100) according to claim 1, further comprising a feed cone (61), wherein the feed cone (61) forms the feed inlet (12) and is connected to an upper part of the tank body (10) with a connecting piece (62); the lower part of the feed cone (61) stretches into the material cavity (11); the connecting piece (62) is connected to the tank body (10) by a bolt; and the feed cone (61) is welded with the connecting piece (62).

7. A high-temperature material conveying tank (100) according to any one of claims 1 to 6, further comprising a second taper section (17) and a second connection section (18) in a cylindrical shape, wherein the second connection section (18) is arranged at the other end of the cylindrical section (14) and arranged between the other end of the cylindrical section (14) and the second taper section (17); and the second connection section (18) is joined integrally to the second taper section (17) and butt welded to the cylindrical section (14).

8. A high-temperature material conveying tank comprising a tank body provided with a material cavity inside, a feed inlet at an upper part and a discharge outlet at a lower part, said tank body comprising a cylindrical section and a first taper section connected to said cylindrical section via a butt weld, **characterized in that** a first tapering connection section is arranged between said cylindrical section and one end of said first taper section, said first tapering connection section being joined integrally to said cylindrical section and having an end at which said first tapering connection section is butt welded to said one end of said first taper section, said first tapering connection section having an inner diameter at said end, which inner diameter is identical with the diameter of said first taper section at said one end.

9. A high-temperature material conveying tank according to claim 8, wherein the tank body comprises an inner tank wall and an outer tank wall; and a thermal insulation cavity, formed between the inner tank wall and the outer tank wall, is provided with a thermal insulation layer inside.

10. A high-temperature material conveying tank according to claim 9, wherein a welding position between the inner tank wall of the taper section and the inner tank wall of first connection section is arranged in a staggered way with **re**spect to that between the outer tank wall of the taper section and the outer tank wall of the first connection section.

11. A high-temperature material conveying tank according to claim 10, further comprising a welding reinforced inner ring plate and a welding reinforced outer ring plate, wherein the welding reinforced inner ring plate is welded on the inner tank wall of the taper

section and the inner tank wall of the first connection section, and covers a welded joint between the inner tank wall of the taper section and the inner tank wall of the first connection section; and the welding reinforced outer ring plate is welded on the outer tank wall of the taper section and the outer tank wall of the first connection section, and covers a welded joint between the outer tank wall of the taper section and the outer tank wall of the first connection section.

12. A high-temperature material conveying tank according to claim 8, wherein the first connection section and the first taper section are butt welded after weld groove processing.

13. A high-temperature material conveying tank according to claim 8, further comprising a feed cone, wherein the feed cone forms the feed inlet and is connected to an upper part of the tank body with a connecting piece; the lower part of the feed cone stretches into the material cavity; the connecting piece is connected to the tank body by a bolt; and the feed cone is welded with the connecting piece.

14. A high-temperature material conveying tank according to any one of claims 8 to 13, further comprising a second taper section and a second connection section in a taper-like shape, wherein the second connection section is arranged at an end of the cylindrical section and arranged between said end of the cylindrical section and the second taper section; and the second connection section is joined integrally to the cylindrical section and butt welded to the second taper section.

Patentansprüche

1. Hochtemperatur-Materialbeförderungstank (100) mit einem Tankkörper (10), der innen mit einem Materialhohlraum (11), einem Zuführeinlass (12) an einem oberen Teil und einem Abgabeauslass (13) an einem unteren Teil versehen ist, wobei der Tankkörper (10) einen zylindrischen Abschnitt (14) und einen ersten sich verjüngenden Abschnitt (15) aufweist, der über eine Stumpfnaht mit dem zylindrischen Abschnitt (14) verbunden ist, **dadurch gekennzeichnet, dass** ein erster zylindrischer Verbindungsabschnitt (16) zwischen einem Ende des zylindrischen Abschnitts (14) und dem ersten sich verjüngenden Abschnitt (15) angeordnet ist und den gleichen Durchmesser wie der zylindrische Abschnitt (14) hat, wobei der erste zylindrische Verbindungsabschnitt (16) integral mit dem ersten sich verjüngenden Abschnitt (15) verbunden ist und ein Ende hat, an dem der erste zylindrische Verbindungsabschnitt (16) mit dem einen Ende des zylindrischen Abschnitts (14) stumpfgeschweißt ist.

2. Hochtemperatur-Materialbeförderungstank (100) nach Anspruch 1, wobei der Tankkörper (10) eine innere Tankwand und eine äußere Tankwand aufweist; und wobei ein Wärmeisolierhohlraum (20), der zwischen der inneren Tankwand und der äußeren Tankwand ausgebildet ist, innen mit einer Wärmeisolationsschicht (30) versehen ist.

3. Hochtemperatur-Materialbeförderungstank (100) nach Anspruch 2, wobei eine Schweißposition zwischen der inneren Tankwand des zylindrischen Abschnitts (141) und der inneren Tankwand des ersten Verbindungsabschnitts (161) bezüglich derjenigen zwischen der äußeren Tankwand des zylindrischen Abschnitts (142) und der äußeren Tankwand des ersten Verbindungsabschnitts (161) versetzt angeordnet ist.

4. Hochtemperatur-Materialbeförderungstank (100) nach Anspruch 3, ferner umfassend eine schweissverstärkte innere Ringplatte (40) und eine schweissverstärkte äußere Ringplatte (50), wobei die schweissverstärkte innere Ringplatte (40) an die innere Tankwand des zylindrischen Abschnitts (141) und die innere Tankwand des ersten Verbindungsabschnitts (161) geschweißt ist und eine Schweißverbindung zwischen der inneren Tankwand des zylindrischen Abschnitts (141) und der inneren Tankwand des ersten Verbindungsabschnitt (161) bedeckt; und wobei die schweißverstärkte äußere Ringplatte (50) an die äußere Tankwand des zylindrischen Abschnitts (142) und die äußere Tankwand des ersten Verbindungsabschnitts (162) geschweißt ist und eine Schweißverbindung zwischen der äußeren Tankwand des zylindrischer Abschnitts (142) und der äußeren Tankwand des ersten Verbindungsabschnitts (162) bedeckt.

5. Hochtemperatur-Materialbeförderungstank (100) nach Anspruch 1, wobei der erste Verbindungsabschnitt (16) und der zylindrische Abschnitt (14) nach einer Schweißnutbearbeitung stumpfgeschweißt sind.

6. Hochtemperatur-Materialbeförderungstank (100) nach Anspruch 1, ferner umfassend einen Zuführkonus (61), wobei der Zuführkonus (61) den Zuführeinlass (12) bildet und mit einem Verbindungsstück (62) mit einem oberen Teil des Tankkörpers (10) verbunden ist; wobei der untere Teil des Zuführkonus (61) sich in den Materialhohlraum (11) erstreckt; wobei das Verbindungsstück (62) mit dem Tankkörper (10) durch einen Bolzen verbunden ist; und wobei der Zuführkonus (61) mit dem Verbindungsstück (62) verschweißt ist.

7. Hochtemperatur-Materialbeförderungstank (100) nach einem der Ansprüche 1 bis 6, ferner umfassend

einen zweiten sich verjüngenden Abschnitt (17) und einen zweiten Verbindungsabschnitt (18) in einer zylindrischen Form, wobei der zweite Verbindungsabschnitt (18) am anderen Ende des zylindrischen Abschnitts (14) angeordnet ist und zwischen dem anderen Ende des zylindrischen Abschnitts (14) und dem zweiten sich verjüngenden Abschnitt (17) angeordnet ist; und wobei der zweite Verbindungsabschnitt (18) integral mit dem zweiten sich verjüngenden Abschnitt (17) verbunden ist und mit dem zylindrischen Abschnitt (14) stumpfgeschweißt ist.

8. Hochtemperatur-Materialbeförderungstank mit einem Tankkörper, der innen mit einem Materialhohlraum, einem Zuführeinlass an einem oberen Teil und einem Abgabeauslass an einem unteren Teil versehen ist, wobei der Tankkörper einen zylindrischen Abschnitt und einen ersten sich verjüngenden Abschnitt aufweist, der über eine Stumpfnaht mit dem zylindrischen Abschnitt verbunden ist, **dadurch gekennzeichnet, dass** ein erster sich verjüngender Verbindungsabschnitt zwischen dem zylindrischen Abschnitt und einem Ende des ersten sich verjüngenden Abschnitts angeordnet ist, wobei der erste sich verjüngende Verbindungsabschnitt integral mit dem zylindrischen Abschnitt verbunden ist und ein Ende hat, an dem der erste sich verjüngende Verbindungsabschnitt mit dem einen Ende des ersten sich verjüngenden Abschnitts stumpfgeschweißt ist, wobei der erste sich verjüngende Verbindungsabschnitt an dem Ende einen Innendurchmesser hat, der mit dem Durchmesser des ersten sich verjüngenden Abschnitts an dem einen Ende identisch ist.

9. Hochtemperatur-Materialbeförderungstank nach Anspruch 8, wobei der Tankkörper eine innere Tankwand und eine äußere Tankwand aufweist; und wobei ein Wärmeisolierhohlraum, der zwischen der inneren Tankwand und der äußeren Tankwand ausgebildet ist, innen mit einer Wärmeisolationsschicht versehen ist.

10. Hochtemperatur-Materialbeförderungstank nach Anspruch 9, wobei eine Schweißposition zwischen der inneren Tankwand des sich verjüngenden Abschnitts und der inneren Tankwand des ersten Verbindungsabschnitts bezüglich derjenigen zwischen der äußeren Tankwand des konischen Abschnitts und der äußeren Tankwand des ersten Verbindungsabschnitts versetzt angeordnet ist.

11. Hochtemperatur-Materialbeförderungstank nach Anspruch 10, ferner umfassend eine schweissverstärkte innere Ringplatte und eine schweissverstärkte äußere Ringplatte, wobei die schweissverstärkte innere Ringplatte an die innere Tankwand des sich verjüngenden Abschnitts und die innere Tankwand des ersten Verbindungsabschnitts geschweißt ist und eine Schweißverbindung zwischen der inneren Tankwand des sich verjüngenden Abschnitts und der inneren Tankwand des ersten Verbindungsabschnitt bedeckt; und wobei die schweißverstärkte äußere Ringplatte an die äußere Tankwand des sich verjüngenden Abschnitts und die äußere Tankwand des ersten Verbindungsabschnitts geschweißt ist und eine Schweißverbindung zwischen der äußeren Tankwand des sich verjüngenden Abschnitts und der äußeren Tankwand des ersten Verbindungsabschnitts bedeckt.

12. Hochtemperatur-Materialbeförderungstank nach Anspruch 8, wobei der erste Verbindungsabschnitt und der erste sich verjüngende Abschnitt nach einer Schweißnutbearbeitung stumpfgeschweißt sind.

13. Hochtemperatur-Materialbeförderungstank nach Anspruch 8, ferner umfassend einen Zuführkonus, wobei der Zuführkonus den Zuführeinlass bildet und mit einem Verbindungsstück mit einem oberen Teil des Tankkörpers verbunden ist; wobei der untere Teil des Zuführkonus sich in den Materialhohlraum erstreckt; wobei das Verbindungsstück mit dem Tankkörper durch einen Bolzen verbunden ist; und wobei der Zuführkonus mit dem Verbindungsstück verschweißt ist.

14. Hochtemperatur-Materialbeförderungstank nach einem der Ansprüche 8 bis 13, ferner umfassend einen zweiten sich verjüngenden Abschnitt und einen zweiten Verbindungsabschnitt in einer sich verjüngenden Form, wobei der zweite Verbindungsabschnitt an einem Ende des zylindrischen Abschnitts angeordnet ist und zwischen dem Ende des zylindrischen Abschnitts und dem zweiten sich verjüngenden Abschnitt angeordnet ist; und wobei der zweite Verbindungsabschnitt integral mit dem zylindrischen Abschnitt verbunden ist und mit dem zweiten sich verjüngenden Abschnitt stumpfgeschweißt ist.

Revendications

1. Réservoir (100) de transport de matières à haute température, comprenant un corps de réservoir (10) comportant une cavité interne (11) à matière, un orifice de remplissage (12) en partie haute et un orifice de vidage (13) en partie basse, ledit corps de réservoir (10) comprenant une partie cylindrique (14) et une première partie conique (15) soudée bout à bout avec ladite partie cylindrique (14), **caractérisé en ce qu'**une première partie cylindrique de liaison (16) est disposée entre une extrémité de ladite partie cylindrique (14) et ladite première partie conique (15) et a le même diamètre que ladite partie cylindrique (14), ladite première partie cylindrique de liaison (16) étant intégralement jointe à ladite première partie

conique (15) et présentant une extrémité à laquelle ladite première partie cylindrique de liaison (16) est soudée bout-à-bout à ladite une extrémité de ladite partie cylindrique (14).

2. Réservoir (100) de transport de matières à haute température selon la revendication 1, dont le corps de réservoir (10) possède une paroi intérieure de réservoir et une paroi extérieure de réservoir, et dans lequel une cavité d'isolation thermique (20) formée entre les parois intérieure et extérieure du réservoir comprend une couche thermo-isolante (30) à l'intérieur.

3. Réservoir (100) de transport de matières à haute température selon la revendication 2, dans lequel un emplacement de soudage est prévu entre la paroi intérieure de réservoir de la partie cylindrique (141) et la paroi intérieure de réservoir de la première partie de liaison (161) dans une position décalée par rapport à celui qui se trouve entre la paroi extérieure de réservoir de la partie cylindrique (142) et la paroi extérieure de réservoir de la première partie de liaison (161).

4. Réservoir (100) de transport de matières à haute température selon la revendication 3, comprenant en outre un anneau de soudage intérieur plat (40) renforcé et un anneau de soudage extérieur plat (50) renforcé, l'anneau de soudage intérieur plat (40) renforcé étant soudé sur la paroi intérieure de réservoir de la partie cylindrique (141) et sur la paroi intérieure de réservoir de la première partie de liaison (161) et recouvrant un joint soudé entre la paroi intérieure de réservoir de la partie cylindrique (141) et la paroi intérieure de réservoir de la première partie de liaison (161), et l'anneau de soudage extérieur plat (50) renforcé étant soudé sur la paroi extérieure de réservoir de la partie cylindrique (142) et sur la paroi extérieure de réservoir de la première partie de liaison (162) et recouvrant un joint soudé entre la paroi extérieure de réservoir de la partie cylindrique (142) et la paroi extérieure de réservoir de la première partie de liaison (162).

5. Réservoir (100) de transport de matières à haute température selon la revendication 1, dans lequel la première partie de liaison (16) et la partie cylindrique (14) sont soudées bout-à-bout après façonnage d'une gorge de soudage.

6. Réservoir (100) de transport de matières à haute température selon la revendication 1, comprenant en outre un cône de remplissage (61), le cône de remplissage formant l'orifice de remplissage (12) et étant relié à une partie haute du corps de réservoir (10) par une pièce de liaison (62), la partie inférieure du cône de remplissage (61) se prolongeant dans la cavité à matière (11), la pièce de liaison (62) étant reliée au corps de réservoir (10) par un boulon et le cône de remplissage (61) étant assemblé par soudage avec ladite pièce de liaison (62).

7. Réservoir (100) de transport de matières à haute température selon l'une quelconque des revendications 1 à 6, comprenant en outre une seconde partie conique (17) et une seconde partie de liaison (18) de forme cylindrique, dans lequel la seconde partie de liaison (18) est disposée à l'autre extrémité de la partie cylindrique (14) et entre l'autre extrémité de la partie cylindrique (14) et la seconde partie conique (17), et la seconde partie de liaison (18) est intégralement jointe à la seconde partie conique (17) et est soudée bout-à-bout sur la partie cylindrique (14).

8. Réservoir de transport de matières à haute température, comprenant un corps de réservoir comportant une cavité interne à matière, un orifice de remplissage en partie haute et un orifice de vidage en partie basse, ledit corps de réservoir comprenant une partie cylindrique et une première partie conique soudée bout à bout avec ladite partie cylindrique, **caractérisé en ce qu'**une première partie conique de liaison est disposée entre ladite partie cylindrique et une extrémité de ladite première partie conique, ladite première partie conique de liaison étant intégralement jointe à ladite partie cylindrique et présentant une extrémité à laquelle ladite première partie conique de liaison est soudée bout à bout avec ladite une extrémité de ladite première partie conique, ladite première partie conique de liaison présentant un diamètre intérieur à ladite une extrémité lequel diamètre intérieur est identique au diamètre de ladite première partie conique à ladite une extrémité.

9. Réservoir de transport de matières à haute température selon la revendication 8, dont le corps de réservoir possède une paroi intérieure de réservoir et une paroi extérieure de réservoir, et dans lequel une cavité d'isolation thermique formée entre les parois intérieure et extérieure comprend une couche thermo-isolante á l'intérieur.

10. Réservoir de transport de matières à haute température selon la revendication 9, dans lequel un emplacement de soudage est prévu entre la paroi intérieure de réservoir de la partie conique et la paroi intérieure de réservoir de la première partie de liaison dans une position décalée par rapport à celui qui se trouve entre la paroi extérieure de réservoir de la partie conique et la paroi extérieure de réservoir de la première partie de liaison.

11. Réservoir de transport de matières à haute température selon la revendication 10, comprenant en outre un anneau de soudage intérieur plat renforcé

et un anneau de soudage extérieur plat renforcé, l'anneau de soudage intérieur plat renforcé étant soudé sur la paroi intérieure de réservoir de la partie conique et sur la paroi intérieure de réservoir de la première partie de liaison et recouvrant un joint soudé entre la paroi intérieure de réservoir de la partie conique et la paroi intérieure de réservoir de la première partie de liaison, et l'anneau de soudage extérieur plat renforcé étant soudé sur la paroi extérieure de réservoir de la partie conique et sur la paroi extérieure de réservoir de la première partie de liaison et recouvrant un joint soudé entre la paroi extérieure de réservoir de la partie conique et la paroi extérieure de réservoir de la première partie de liaison.

12. Réservoir de transport de matières à haute température selon la revendication 8, dans lequel la première partie de liaison et la première partie conique sont soudées bout à bout après façonnage d'une gorge de soudage.

13. Réservoir de transport de matières à haute température selon la revendication 8, comprenant en outre un cône de remplissage, le cône de remplissage formant l'orifice de remplissage et étant relié à une partie haute du corps de réservoir par une pièce de liaison, la partie inférieure du cône de remplissage (61) se prolongeant dans la cavité à matière, la pièce de liaison étant reliée au corps de réservoir par un boulon et le cône de remplissage étant assemblé par soudage avec la pièce de liaison.

14. Réservoir de transport de matières à haute température selon l'une quelconque des revendications 8 à 13, comprenant en outre une seconde partie conique et une seconde partie de liaison de forme conique, dans lequel la seconde partie de liaison est disposée à une extrémité de la partie cylindrique et entre ladite extrémité de la partie cylindrique et la seconde partie conique, et la seconde partie de liaison étant intégralement jointe à la partie cylindrique et soudée bout à bout sur la seconde partie conique.

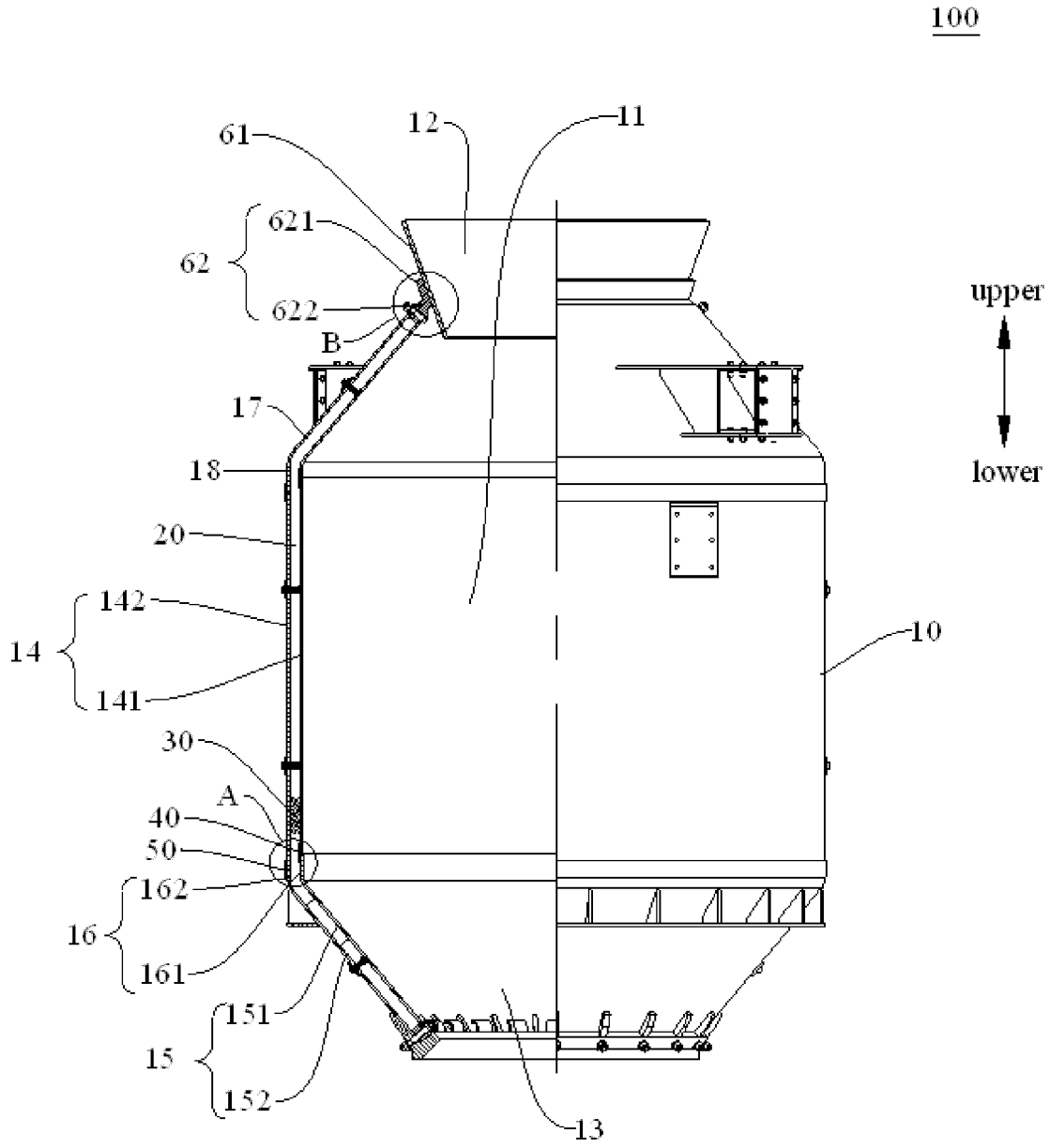
100
61
12
11
621
62
622
B
upper
lower
17
18
20
142
14
141
10
30
A
40
50
162
16
161
151
15
152
13

Figure 1

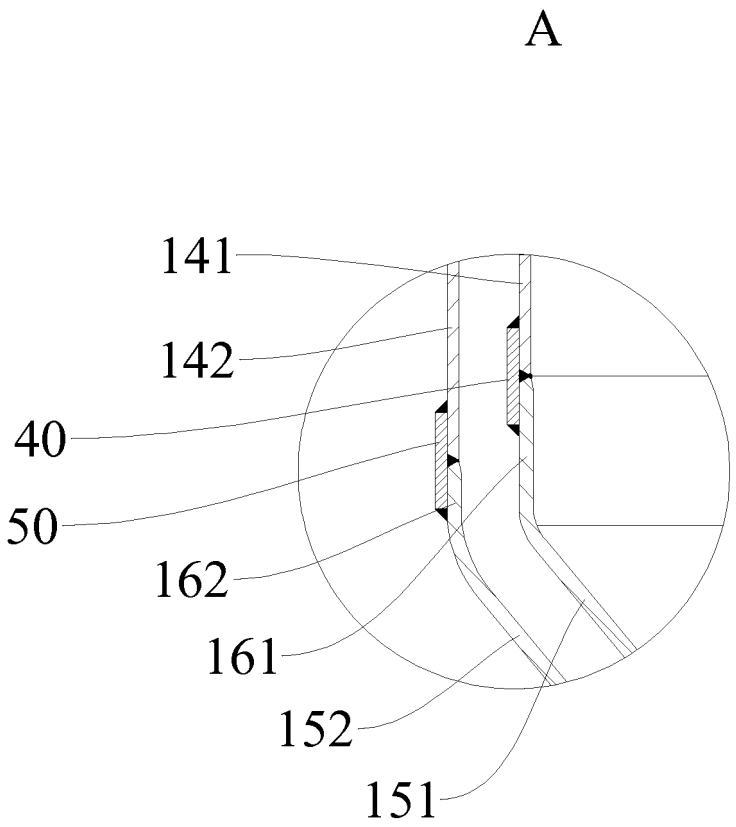

Figure 2

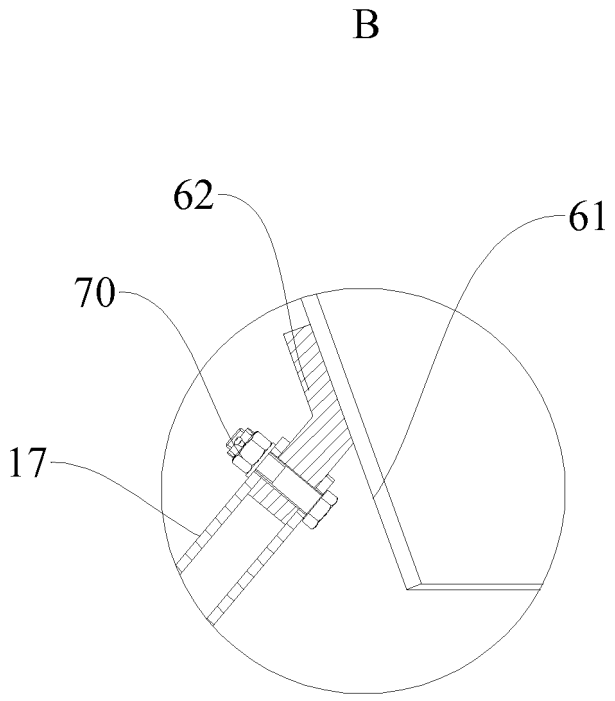

Figure 3

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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